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Mapping the dynamic social care needs and unmet needs of older people in China

by

Wanting Huang

Thesis for the degree of Doctor of Philosophy

[October_2024]

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ABSTRACT
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MAPPING THE DYNAMIC SOCIAL CARE NEEDS AND UNMET NEEDS OF OLDER
PEOPLE IN CHINA

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As China's population is ageing rapidly, meeting the increasing social care needs of older people is a pressing challenge for the government. However, little is known about how social care needs and unmet needs change over time. Using data from the 2014 Life History Survey, Waves 3 (2015), and 4 (2018) of the China Health and Retirement Longitudinal Study (CHARLS), this piece of research aims to examine the dynamic patterns of social care needs and unmet needs in later life, as well as comprehensively understand their predictors, following the Andersen's behaviour model and life course perspective.

Results of cross-sectional analysis suggest that age, illiteracy, physical activities, earned income, and physical health status are statistically significant predictors of reporting social care needs for ADLs and IADLs. Living arrangements and experience of hunger prior to the age of 17 were significant predictors of unmet needs for ADLs or IADLs. Results of longitudinal analysis indicate that about half of the analytical sample who needed help with ADLs or IADLs in Wave 3 no longer needed such help in Wave 4, while 7% report repeated unmet needs for ADLs and IADLs. Marital status, physical limitations, and experiences of hunger prior to the age of 17 are significant predictors of different dynamic patterns of social care needs and unmet needs across the two waves. The key findings of this study are useful for enhancing China's social care system to provide sustainable and tailored support for its older population. Additionally, these findings draw attention to the importance of providing social protection for older people so as to blunt the far-reaching influence of early-life adversities.

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Research Thesis: Declaration of Authorship

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Title of thesis: Mapping the dynamic social care needs and unmet needs of older people in China

I declare that this thesis and the work presented in it is my own and has been generated by me as the result of my own original research.
I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;

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Acknowledgements

"A journey of a thousand miles begins with a single step."

— Laozi, *Tao Te Ching*

I am deeply grateful for the love and support that has accompanied me along this journey. Without it, I would not have made it this far.

First and foremost, I wish to express my deepest gratitude to my amazing supervisors, Professor Athina Vlachantoni and Professor Maria Evandrou. Their unwavering support and guidance from the very beginning to the end have kept me on the right path. Their patience, kindness, and academic expertise have helped me grow wings of my own and prepared me to open a new chapter of life. I feel incredibly fortunate to have had you both as my supervisors.

I extend my sincere thanks to Dr. Gloria Chepngeno Langat, Professor Jane Falkingham, and Dr. Natasha Fothergill-Misbah for their valuable feedback, which has significantly improved this thesis. I am also grateful to Professor Sabu Padmadas and Professor Xiaoting Liu for their insightful comments during my thesis examination. Special thanks to the Department of Gerontology and the Economic, Social, and Political Science Graduate Office, whose timely support has always been available when needed.

My heartfelt gratitude goes to my beloved family. To my dearest parents—your selfless love has filled me with the courage and strength to persevere. You have taught me the true meaning of love and life, and my love for you will never cease. To my wonderful grandparents, my cherished childhood memories are filled with the warmth of your arms in our small town in eastern China. I remember the last summer of my primary school when we spent every dawn to chase the sunrise. Flocks of waterfowl glided over the sea of reeds—an image painted softly in the landscape of my memory. You taught me how to slow down and to appreciate the beauty of changing seasons. These memories have been my constant companions, bringing me comfort on the long, solitary days spent in the library.

I am also deeply grateful to my dear friends—Haiyu Jin, Yilin Huang, Fei Wang, Nan Hu, and Shaoxiang Ge. The light and warmth you have brought into my life have been priceless, filling ordinary days with sparkles of joy. Your friendship has been a guiding light, and for that, I will always be thankful.

Abbreviations

ADLs Activities of Daily Living

CAD Cumulative Advantage/Disadvantage

CFPS China Family Panel Studies

CHARLS China Health and Retirement Longitudinal Study

CHNS China Health and Nutrition Survey

CI Cumulative Inequality

CLHLS Chinese Longitudinal Healthy Longevity Survey

DNA Deoxyribonucleic acid

ERGO the ethics and research governance

ELSA English Longitudinal Study of Ageing

HRS Health and Retirement Survey

HSE Health Survey for England

IADLs Instrumental Activities of Daily Living

PHRASE Panel on Health and Ageing of Singaporean Elderly

SHARE Survey of Health, Ageing and Retirement in Europe

UK United Kingdom

WHO World Health Organization

Chapter 1 Introduction

1.1 Research rationale

China, like many countries across the globe, is faced with pressing challenges brought about by a rapidly ageing population (Cai and Cheng, 2014). Addressing the fast-growing social care needs of older people has been a principal task for the Chinese government (Wong and Leung, 2012). Although there is an emergent body of literature regarding the social care needs in older age (Fu et al., 2017, Berridge and Mor, 2018, Chen et al., 2018b), little is known about how older people's social care needs and unmet needs change over time (Vlachantoni et al., 2022). This thesis explores the dynamic patterns of social care needs, as well as those needs that are unmet in greater depth, investigating the variations in these changes over time and their predictors. Specifically, it focuses on the disparities in dynamic patterns between older people with varying demographic and socioeconomic characteristics by innovatively examining the impacts of early life adversities on social care needs. Knowledge of such dynamic changes is crucial for policymakers and other stakeholders in order to provide tailored social care for older people and reduce the inequalities in care resource allocation.

The volume of studies researching social care needs and unmet needs of older Chinese people has increased sharply in the last decade (Zhu, 2015, Zhu and Österle, 2017, Chen et al., 2018b, Zeng et al., 2019). The majority of these studies adopted a cross-sectional approach to exploring the inequalities and disparities in social care needs and their underpinning factors. Age, gender, hukou status, residential area, and education have all been found to be significant predictors of reporting social care needs (Zhou and Walker, 2016, Qian et al., 2016). Additionally, researchers have observed several trends in the disabilities relating to activities of daily living (ADLs, hereafter) and instrumental activities of daily living (IADLs) (Liang et al., 2015, Liang et al., 2017), with declining trends in these areas signalling improvements in people's functional capabilities (Feng et al., 2013, Zimmer et al., 2014).

However, gaps remain in our understanding of the dynamics of social care needs associated with ADLs and IADLs. First, as previously mentioned, most studies conducted in China have been cross-sectional analyses concerning the prevalence of disparities in social care needs or unmet needs, as well as their associated factors (Zhu, 2015, Zhu and Österle, 2017), or the negative impact of unmet needs on older individuals' health (Hu and Wang, 2019). Studies on the trends in ADLs or IADLs have often examined changes in the prevalence or incidence rates of physical limitations related to ADLs, IADLs, and unmet needs (Zimmer et al., 2014, Peng et al., 2015, Liang et al., 2015, Liang et al., 2017, Cao et al., 2023), rather than exploring the dynamics indicating how the social care needs and unmet needs may change in later life, especially in the Chinese context. Understanding the dynamic patterns of needs and unmet needs for social care in later life is crucial for policymakers to work towards improving the sustainability of social care services and to lower the risk of people having unmet needs in the long term.

Secondly, the existing literature has frequently overlooked the impacts of early-life adversities on social care needs and unmet needs in later life from a life-course perspective (Feng et al., 2013, Sjölund et al., 2014). Therefore, further studies needed to identify the connections between factors from different life stages, and social care needs in later life in order to gain a more comprehensive understanding of the underlying predictors of needs and unmet needs, as well as their dynamics over time.

Therefore, this thesis addresses the gaps in our current understanding of social care needs and unmet needs from a dynamic perspective by employing longitudinal data from the 2014 Life-History Survey, along with data from Waves 3 (2015) and 4 (2018) of the China Health and Retirement Longitudinal Survey (CHARLS). Disparities in the social care needs and unmet needs of older individuals, as well as the underlying predictors of such changes, were investigated by conducting both cross-sectional and longitudinal analyses through the lens of the life course perspective. The findings of this analysis

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are useful for improving the social care system in China and providing older people with more flexible care arrangements and tailored social care services.

1.2 Research questions

As noted above, there has been limited discussion thus far regarding how the social care needs and unmet needs associated with everyday activities change over time for older people, the disparities in these trends, and their underpinning factors. Therefore, the central question that motivated this thesis was: what are the dynamic patterns of social care needs and unmet needs amongst older people in China over time, and what are their underpinning predictors? This overarching question then yielded several pertinent sub-questions:

Research Question 1a: What is the extent of older people's social care needs and unmet needs?

Research Question 1b: How does the extent of older people's social care needs and unmet needs vary by their demographic and socioeconomic characteristics or early-life adversities?

The primary objective of this first set of research questions is to explore older people's contemporary social care needs and unmet needs. Building on existing research, social care needs here are defined as the need for help with ADLs and IADLs (World Health Organization, 2015). Unmet needs refer to situations where older people report social care needs for which they do not receive sufficient support (Vlachantoni et al., 2011). These needs and unmet needs was measured using outcome variables related to ADLs and IADLs (Hu et al., 2020b). The choice of predictors that were examined was informed by the conceptual framework outlined in Chapter 4 based on the ageing and health policy framework (World Health Organization, 2015), the Andersen behaviour model of care utilisation (Andersen, 1995), the life course perspective (Crystal and Shea, 1990, Ferraro and Shippee, 2009, Deng and Lindeboom, 2022), and empirical findings. Detailed measures of the key

variables are discussed in Section 5.5.

Drawing on data from the 2014 Life History Survey and 2018 Wave 4 of the CHARLS, descriptive statistic methods were employed to address the first set of research questions. Cross-tabulations, along with a series of logistic regression and Poisson regression models, were used to explore the associations between the underlying predictors and needs and unmet needs for social care. The underlying predictors were composed of predisposing, enabling, and need factors, as well as early-life factors. Hypotheses related to the first set of research questions are listed below, which are discussed in further detail in Chapter 4:

Hypothesis 1a: The extent of social care needs varies by older people's demographic characteristics and the risk of needing social care needs in later life increases with age.

Hypothesis 1b: Older women are more likely to report social care needs for ADLs and IADLs compared to their male peers.

Hypothesis 1c: Older people with higher educational attainment or income are less likely to report social care needs compared to those with relatively lower educational attainment or income.

Hypothesis 1d: Older people who experienced hunger early in their lives are more likely to require assistance with ADLs and IADLs than those with no such experiences.

The following hypotheses were then proposed regarding unmet needs and their predictors:

Hypothesis 1e: Older people with fewer living children or living alone are more likely to report unmet needs compared to those with more living children and living with others.

Hypothesis 1f: Older people with rural hukou are more likely to have unmet needs compared to those with urban hukou.

Hypothesis 1g: Early-life experiences of hunger increase the risk of reporting unmet needs in later life.

Research Question 2a: How do older people's social care needs and unmet needs change over time?

Research Question 2b: What are the underlying factors associated with the different dynamic patterns of these needs?

The first set of research questions focus on examining older people's social care needs and unmet needs in contemporary China. This second set of research questions addresses the lacuna in existing knowledge concerning the dynamic social care needs and unmet needs amongst older Chinese people through adding a temporal dimension. A critical question proposed by Smith and Connolly (2020) – 'What happens to a given need for health care?' – is illuminating for researchers exploring the dynamic changes in older people's needs and unmet needs for social care. Employing data from Waves 8 and 9 of the English Longitudinal Study of Ageing (ELSA), Vlachantoni et al. (2022) investigated the dynamic unmet needs regarding two specific ADL tasks: bathing and dressing. Their study shows that older people's needs, whether met or unmet, are not static, and that the changes in such needs are significantly associated with their lifestyle characteristics. For instance, older people living alone or suffering from diminishing physical functions reported between Waves 8 and 9 of the ELSA facing a higher risk of repeated unmet needs for bathing and dressing in both Waves 8 and 9 (Vlachantoni et al., 2022). Following their innovative conceptual framework (see Section 4.7), this study is amongst the first to examine dynamic patterns regarding social care needs and unmet needs for ADLs and IADLs of older Chinese people. A descriptive profile of the analytical sample was created using data from the 2014 Life History Survey and Waves 3 (2015) and 4 (2018) of the CHARLS. A

series of logistic regression models were used to identify the significant determinants of different dynamic patterns regarding needs and unmet needs to test the following hypotheses:

Hypothesis 2a: The dynamic patterns of social care needs and unmet needs are associated with individual characteristics.

Hypothesis 2b: Older people with declining functions in terms of ADLs over time tend to experience repeated unmet needs compared to those reporting similar or improved functions.

Hypothesis 2c: Older people living alone are more prone to having repeated unmet needs compared to those living with others.

1.3 Unique contribution

This thesis makes an original contribution in three regards. First, it expands the current empirical findings on older people's needs and unmet needs for social care by exploring changes in these needs in terms of ADLs and IADLs over time. Second, it applies the life course perspective to understand the predictors of reporting social care needs in later life, examining the impact of early life experiences of hunger on these needs. Finally, it provides several implications for policymakers and other stakeholders by identifying key areas for improving the social care system to offer older Chinese people sustainable and tailored services.

To begin with, this thesis examines social care needs and unmet needs in relation to ADLs and IADLs to provide targeted evidence for providing tailored social care for older people. This strategy is in line with the policy concerns for addressing the social care needs of older people with functional limitations (see Section 2.3.2). Current knowledge about the dynamic patterns of unmet needs for social care in China is limited. The framework proposed by Vlachantoni et al. (2022) addresses the dynamic nature of social care needs and unmet needs, which was then adapted in this study to the Chinese

context in order to fill the gap in empirical studies on the country. Additionally, most studies exploring the associated factors of needs and unmet needs have focused on contemporary personal characteristics. To further address the gap created by this analytic focus, this study examined the impact of early life adversities on social care needs and unmet needs in later life through the lens of the life course perspective.

Moreover, this study makes an original theoretical contribution by developing a conceptual framework based on the ageing and health framework, Andersen's behavioural model, the life course perspective, and empirical findings. The ageing and health policy framework was adopted to conceptualise social care needs (World Health Organization, 2015). The Andersen's behavioural model and the life course perspective were employed to conceptualise the potential determinants of needs and unmet needs in terms of social care (Andersen, 1995). Specifically, the cumulative advantages and disadvantages theory and cumulative inequality theory were used in order to understand the impacts of early life adversities on social care needs and unmet needs in later life (Crystal and Shea, 1990, Ferraro and Shippee, 2009). By applying a temporal dimension, the conceptual framework adopted in this study offers fresh insights into the comprehensive predictors of older people's social care needs, unmet needs, and their dynamics.

Finally, the key findings of this study are crucial for helping policymakers improve the current social care system for older people in China. The empirical findings on needs and unmet needs regarding ADLs and IADLs can help provide flexible and tailored social care for older community-dwelling people. Considering the adverse effects of unmet needs on one's health, older people with multiple unmet needs are a particularly vulnerable group. The findings of this thesis thus offer useful evidence to assist policymakers in identifying the groups most in need of social care. This, in turn, supports a more efficient allocation of social resources.

1.4 Thesis structure

The first chapter provides an overarching justification of the thesis's rationale, research questions, and the hypotheses targeting each research question. The rest of the thesis is structure as follows:

Chapter 2 presents a comprehensive overview of the research context. It begins with a general background of population ageing in China, followed by a review of major state policies related to effectively coping with the challenges brought on by an ageing population, which have shaped the provision of social care for older people.

Chapter 3 discusses the theoretical basis of the conceptual framework, including the WHO ageing and health framework and Andersen's behavioural model of care utilisation, for the purpose of understanding the contemporary predictors of older people's health and social care needs. The life course perspective is also discussed, highlighting the heterogeneous and dynamic nature of ageing, as well as early life impacts on maintaining independence in later life. The conceptual framework is then further informed by the review of previous empirical studies presented in Chapter 4.

Chapter 4 presents a critical review of previous studies that have examined older people's social care needs and unmet needs, including studies that have applied either a cross-sectional or longitudinal approach. The presentation of the conceptualisation and measures of social care needs is followed by a discussion regarding the empirical findings of the associated factors, unmet needs, and their adverse impact on one's health, along with studies that have used the Andersen model to investigate health and social care needs. The chapter ends with an overview of the conceptual frameworks incorporating the theoretical considerations and empirical findings separately, addressing the underlying predictors of needs and unmet needs for social care and the dynamic patterns of social care needs and unmet needs in older age.

Chapter 5 introduces the methods and data employed in this study. First, the general analytical strategies are discussed, followed by the justification for the choice between quantitative and qualitative analysis. The secondary dataset used to understand older Chinese people's social care needs and unmet needs is then presented, along with a discussion regarding why the CHARLS was the most appropriate dataset for this research. The following section dissects the process of screening samples, as well as the measurements of the dependent and independent variables. The chapter concludes by outlining the analysis plans for each research question.

Chapters 6 and Chapter 7 present the results addressing the first set of research questions. Specifically, these chapters demonstrate the prevalence of social care needs, unmet needs, and their underlying predictors. Chapter 6 focuses on the empirical evidence addressing older Chinese people's social care needs for ADLs and IADLs on the basis of descriptive, bivariate, and multivariate analyses. Chapter 7 discusses the results regarding unmet needs for ADLs and IADLs.

Chapter 8 delves into the results addressing the second set of research questions using longitudinal analysis. The descriptive profile of the analytical sample employed to address the dynamic social care needs and unmet needs for ADLs and IADLs is first introduced, followed by a detailed investigation of the prevalence of five dynamic patterns amongst older Chinese people featuring different characteristics. Then, the predictors of the different dynamic patterns are presented based on a series of logistic regression models. Chapters 6, 7, and 8 conclude with discussions of the hypotheses regarding needs, unmet needs, and their dynamic patterns based on the empirical evidence.

Chapter 9 is the discussion and conclusion chapter. The key findings of the first and second research questions are elucidated and compared with existing findings. The implications for policies and future studies are further detailed based on the key findings. Then, the limitations related to the

research design and the secondary dataset are addressed. Notwithstanding these limitations, the theoretical and empirical contributions to the field are emphasised.

Chapter 2 Understanding social care for older people in the context of population ageing in China

2.1 Chapter overview

This chapter presents the research context of the thesis, discussing the increasing trend of social care needs and comprehensively reviewing the different sources of social care. It also sets the scene for Chapter 4, which conceptualises unmet needs as the gap between demand and support for social care. Section 2.2 provides the background of the thesis, focusing on the ageing population and their needs for social care. Section 2.3 presents the historical context, focusing specifically on two important state policies that have shaped the structure and size of modern families, namely, the Reform and Opening-Up and the One-Child policies, and discusses their far-researching impacts on the traditional ways of providing care for older people. It also critically reviews the development of policies targeting the ageing population since the establishment of the People's Republic of China in 1949, showing the growing policy attention given to social care for older people. Following this discussion, multiple sources of social care are presented in Section 2.4, which include traditional informal care, developing formal care, and the newly emerging voluntary support.

2.2 Population ageing in China and its implications

2.2.1 Population ageing and health

Population ageing presents an unprecedented challenge, marking one of the furthest-reaching demographic transitions in recorded human history. Such a transition in age structure derives from the combined effects of a steady decline in fertility and prolonged longevity (Phillips et al., 2010). Evidence from the United Nations shows that, in 2018, the number of people around the world aged 65 and over exceeded that of children under five (United Nations Department of Economic Social Affairs, 2019). The number of people aged 60 and above in the world is predicted to increase by 1.1 billion, up to 2 billion in

total, between 2015 and 2050, and the population aged 80 and above is expected to total more than 434 million by 2050. Global population ageing presents numerous challenges to economic structures, medical systems, public policy, and health and social care (World Health Organization, 2015). From a social and cultural perspective, governments and societies across the globe face the strain of sustainable pension provision and feasible policies for providing older adults with the resources to live comfortably for the remainder of their lives (Sander et al., 2015). However, while population ageing does entail a multitude of challenges, longevity per se should be regarded as a triumph of this era in terms of improvements in public health (Lloyd-Sherlock et al., 2012). With continuous advancements in longevity, older people today tend to lead more fulfilling lives than in the past. They are now entitled to opportunities to try new activities and pursue new goals and can continue to make contributions to family and society, such as devoting themselves to caregiving and volunteering (Arai et al., 2012).
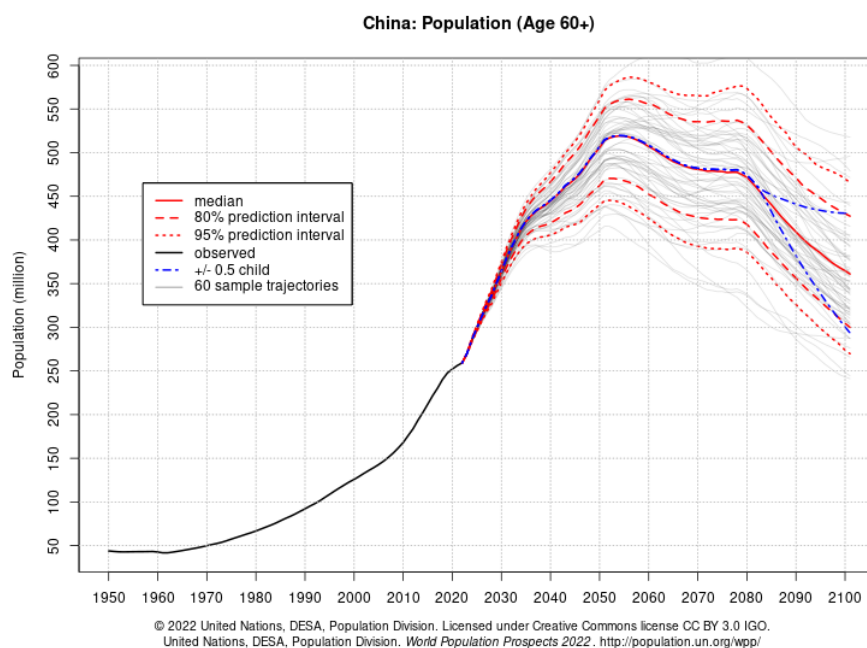
Figure 2.1 The projection of Chinese population older than 60 from 1950 to 2050

Source: Author's adaptation from World Population Prospects 2022.

Accessible: https://population.un.org/wpp/Graphs/Probabilistic/POP/60plus/156

It has been acknowledged that the Chinese population is ageing particularly fast (Mao et al., 2020a) — a situation that has been characterised by three unique features. First, at the time when China initially became an ageing society, its economy remained underdeveloped (Du, 2013). Second, China has the largest ageing population in the world in absolute terms. According to China's seventh national population census, the total population of people aged 60 years and above increased to 264.02 million in 2020, accounting for 18.7% of the total population that year (Ning, 2021). Third, over half of the older population resides in economically underdeveloped rural regions (Du, 2013). Figure 2.1 illustrates the bell-shaped curve of the projection of the size of China's older population, which is expected to peak in 2050 when it exceeds 500 million, posing a series of substantial challenges to Chinese society.
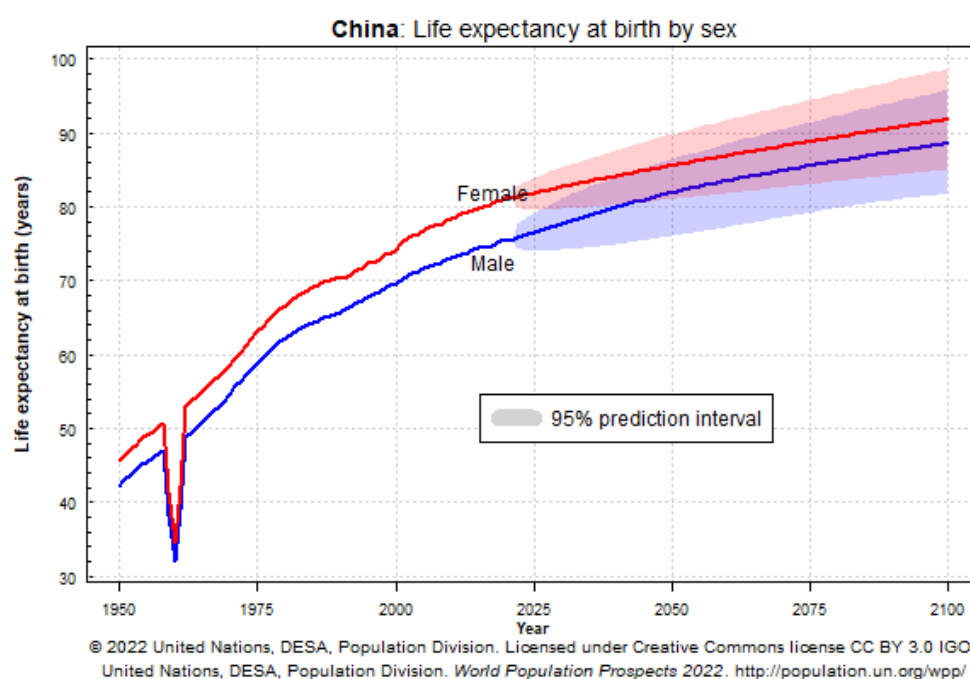
Figure 2.2 The average life expectancy at birth in China by gender from 1950 to 2100

Source: Author's adaptation from World Population Prospects 2022. Accessible: https://population.un.org/wpp/Graphs/DemographicProfiles/Line/156

Figure 2.2 presents the projected increase in male and female average life expectancy at birth in China from 1950 through to 2100. There are two distinct features in the life expectancy trends amongst Chinese people. First, there has been a steadily increasing trend in the average life expectancy at birth for both men and women since 1950, with the exception of a drop in life expectancy in 1960 as a result of excess mortality during the Chinese famine of 1959 to 1961 (Peng, 1987), which is discussed in Section 2.3.1. Life expectancy is expected to continue to increase, reaching over 80 years old in 2050. Second, women are expected to live longer than men. According to the seventh Chinese population census, the average life expectancy at birth reached 77.9 years old in 2020. Women's life expectancy reached 80.9 years old that year, while men's life expectancy was 75.7 years old.[1] The improvements in the average life expectancy at birth show that Chinese people have benefitted from advancements in public hygiene, healthcare, education, economics, and technology (Salomon et al., 2012, Jiang et al., 2018). One significant consequence of the fast-growing older population and prolonged life expectancy is that more and more people living with chronic conditions (World Health Organization, 2015). This unprecedented situation directly affects the country's future socioeconomic structure and social welfare system (Yang, 2016b). In 2016, the Chinese government announced the 'Healthy China 2030' agenda to better meet the challenges brought about by population ageing (Tan et al., 2017). This national action plan was first introduced in Beijing by the Central Committee of the Communist Party of China, focusing on the promotion of healthy lifestyles, the optimisation of medical services, and improvements in public health (Tan et al., 2017).

Effectively addressing increasing social care needs is an essential part of improving public health, as emphasised in the 'Healthy China 2030' agenda (Tan et al., 2017, Sciences et al., 2019). The following sections emphasise the particular challenges to the sustainability of the social care system in China

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[1] Data source, accessible at: https://data.stats.gov.cn/easyquery.htm?cn=C01

brought on by its ageing society from the perspective of older people in need of social care (Du et al., 2016).

2.2.2 Social care needs of older Chinese people

2.2.2.1 Social care, long-term care, informal care and formal care

This subsection introduces key concepts relating to social care, long-term care, and informal and formal care. Care is the interaction of 'providing or receiving assistance in a supportive manner'(Phillips et al., 2010, p.42). Social care or long-term care confines such activities continuing to happen during a period. Social care and long-term care have both been employed in empirical studies (Fu et al., 2017, Copley et al., 2017) to explore the demand for care in relation to individuals' difficulties with ADLs or IADLs and the support they receive from social networks, including family, friends, and state-funded programmes. Long-term care is a commonly used phrase in studies focusing on older Chinese people's needs for daily assistance in dealing with functional disabilities measured in terms of ADLs and IADLs (Gu and Vlosky, 2008, Zhu and Österle, 2017, Feng et al., 2020b). However, the term social care is applied more often in European studies against a comprehensive background of social policy research (Vlachantoni et al., 2011, Copley et al., 2017, Vlachantoni et al., 2022).

The term social care is used in this thesis for two reasons. First, compared with the term integrated long-term care, social care specifically refers to assistive actions associated with daily activities. Integrated long-term care addresses comprehensive needs for medical treatment and daily assistance (World Health Organization, 2021). Second, the emphasis on social responsibility in the notion of 'social care' is in line with the expanding role of the Chinese government in supporting older people. Informal and formal care are two main types of social care that have been explored in broader contexts in previous research (Hu and Li, 2020, Liu, 2021, Jain and Sheehan, 2023) Informal and formal care are distinguished by the source and location of care (Phillips et al., 2010). For instance, informal care refers to care provided by

families, relatives, friends, and neighbours, while formal care is provided by organised and employed caregivers receiving an agreed-upon salary, which is ensured by signing a labour contract (Liu, 2021).

2.2.2.2 The increasing need for social care

The recent significant demand for social care services is unprecedented in the history of China. One of the top priorities of the Chinese government has been to address the challenges associated with population ageing. (Zhu and Walker, 2018). On the one hand, it is encouraging to observe the decreasing prevalence rate of disabilities related to ADLs and IADLs amongst older people over time (Feng et al., 2013). A previous study reported that the prevalence rate of disabilities in ADLs reduced from 13.2% to 9.9% between 1997 and 2006 (Liang et al., 2015). On the other hand, because of the sheer size of China's population, even a small proportion of older people having limitations in ADLs and IADLs can result in a considerable increase in absolute numbers of individuals needing daily assistance, indicating a growing demand for social care. Specifically, the number of older Chinese people needing daily assistance is projected to be doubled from 2015 to 2035, climbing from 41.3 million to 82.6 million (Hu, 2019).

Existing studies have reported great disparities in social care needs between older individuals featuring different characteristics (Zeng et al., 2019, Yang and Tan, 2021, Zhou and Walker, 2016). Drawing on data from the 2012 Chinese Longitudinal Healthy Longevity Survey (CLHLS), Zhu and Walker (2018) utilised the physical self-maintenance scale to evaluate older people's capacity to care for themselves. They found that only around 10% of respondents aged between 60 and 69 years required daily assistance. Conversely, nearly half of the respondents over 90 years and above needed social care (Zhu and Walker, 2018). Similarly, Qian et al. (2016) conducted a cross-sectional analysis based on the 2011 wave of the CHARLS to investigate the relationship between older people's characteristics and their difficulties in performing ADLs and IADLs. One of their central foci was the

disparity between genders. Their findings suggested that older women faced a higher risk of reporting physical limitations in terms of ADLs and IADLs than older men (Qian et al., 2016). Employing data from the 2008 wave of the CLHLS, Zhou and Walker (2016) found significant differences regarding community care between older people residing in rural areas and those living in urban areas. Their study showed that older people residing in towns or villages reported a higher level of social care needs than those living in cities (Zhou and Walker, 2016).

Considering the increasing number of older Chinese people requiring social care, it is essential to gain an understanding of the key policies shaping the social care system in contemporary China. The following section discusses the historical and current policies influencing social care provision for older people.

2.3 Policies shaping the social care system

2.3.1 Historical policies and their implications

This section reviews state policies influencing the Chinese population's health status and later-life care provision. First, the Great Leap Forward and the resulting famine left a lasting impact on the physical and mental health of the older generation born before or during the famine (Li and Lumey, 2017). Second, two significant processes that have developed since the 1970s have had a substantial impact on the trajectory of China's development as an ageing society: the introduction of the Reform and Opening-Up of Chinese society and the One-Child Policy. Traditionally, the social care system for older people in China was premised on Confucian values emphasising filial piety, with the core of one's filial duty being to respect and take good care of older family members (Lu et al., 2021). However, this traditional culture encountered new challenges brought on by the Reform and Opening-Up and One-Child policies.

2.3.1.1 The Great Leap Forward and the Chinese Famine of 1959 to 1961

The Great Leap Forward was the culmination of a series of policies designed to achieve an unrealistic rate of urbanisation and industrialisation beginning in 1958 (Almond et al., 2007). The Chinese government introduced the Great Leap Forward in an effort to accelerate the development of industry and agriculture (Li and Yang, 2005). The devastating result of these endeavours was the low quality of industrial products, a significant reduction in agricultural outputs, an enormous waste of limited resources, and a famine that lasted from 1959 to 1961 (Peng, 1987). This famine was one of the worst in human history, causing an estimated 15 million to 43 million excess deaths (Li and Lumey, 2017), and leaving a profound impact on Chinese society and people's health (Almond et al., 2007, Luo et al., 2010). Using data from the 1% sample of the 2000 Chinese population census, Almond et al. (2007) found that malnutrition in foetal development was significantly associated with severe adverse impacts on socioeconomic status, such as increasing illiteracy amongst Chinese people. Luo and colleagues' (2010) study examined the relationship between famine and physical health outcomes. Drawing data from the China Health and Nutrition Survey (CHNS), Luo et al. (2010) found that older people who had been exposed to famine in early life were more likely to be overweight compared with those who had not. Based on the data from the 2013 Dongfeng-Tongji cohort study, Yu et al. (2018) reported that, compared with older people who were not exposed to famine in early life, those who experienced famine during their childhood faced a higher risk of reporting metabolic syndromes, such as hypertension. Outcomes of exposure to famine on cognition ability have also been identified. Xu et al. (2018) found that older Chinese people born in 1961 reported lower a cognitive level compared with those born in 1963 after the famine based on the data from the 2011 baseline CHARLS. Above empirical evidence suggests that adverse early-life experiences can have a long-lasting influence on health in older age. It is therefore necessary to explore early-life indicators of older people's social care needs and unmet needs from the life-course perspective.

2.3.1.2 The Reform and Opening-Up

The Reform and Opening-Up scheme was first introduced to Chinese society in 1978 (Hou, 2011). As a country that was once highly dependent on agriculture, China has successfully achieved modernisation and urbanisation during the ensuing forty-plus years. Such a fast-paced process has caused tremendous changes in Chinese people's political, economic, public, and personal lives (Hou, 2011). On the one hand, rapid modernisation and urbanisation are credited with significant improvements in living conditions, especially due to the establishment of the social security system (Guan et al., 2018). On the other hand, these radical changes may have weakened intergenerational support for older family members due to the out-migration of children, especially as population ageing continues to challenge the sustainability of China's traditional family-based social welfare system (Cai and Cheng, 2014).

One significant result of the Reform and Opening-Up has been the massive flow of internal migration, which has been driven by two underlying conditions: institutional relaxation of the hukou system and the salary gap (Shen, 2013). First, the Reform and Opening-Up policy relaxed regulations concerning the 'floating population' from rural to urban areas and across provinces. The hukou system refers to the strict population registration system in China, which maintains a tight management on migration (Afridi et al., 2015). Second, this migratory flow has been stimulated by economic disparities between different regions in China (Shen, 2013). The considerable income gap between regions has stimulated migration from inland regions to coastal areas as well as from villages to cities (Combes et al., 2020). As the primary driving force of urbanisation, this significant rural-to-urban migration has produced not only a marked effect on urban populations and economic growth (Tan et al., 2016), but also an impact on the geographical separation, size, and structure of Chinese families (Phillips and Feng, 2015). The out-migration of adult children fosters disputes over who should stay behind to take care of older parents. A case study conducted in Jiangxi province showed that the

'left-behind' older parents tended to have less communication with neighbours, spend more time on television, and report a higher need for care than those with adult children living nearby (Lin et al., 2014).

2.3.1.3 The One-Child Policy

In addition to the Reform and Opening-Up Policy, the One-Child Policy is another significant factor that has directly affected family size and structure, thereby impacting the family lives and social care needs of older Chinese individuals (Feng et al., 2014). The One-Child Policy originated from a series of rigorous family planning policies with two slogans embedded in Chinese society: 'One is few; three are too many; two is just right' (yi ge tai shao, san ge tai duo, liang ge zheng hao) (Zhang, 2017), and 'Having one child was enough, and the government was supposed to take the responsibility to support you in later life' (zhi sheng yi ge hao, zheng fu lai yang lao)'(HE et al., 2017). The One-Child policy was officially introduced in 1979, with notable variations in how it was implemented between urban and rural areas (Feng et al., 2014). For nearly forty years, the One-Child policy has controlled urban citizens and public officials with a strict ruling permitting only one child for one couple, while rural families have been allowed to have a second child if the firstborn was female. Additionally, having multiple children was generally approved for some ethnic minorities (Feng et al., 2014). In 2015, this policy was superseded by the Two-Child Policy (Padmadas, 2017). However, while the One-Child policy was replaced, it has nevertheless wielded a significant impact on Chinese society that continues to reverberate to this day.

The impacts of the One-Child policy on Chinese society are long-term and complicated, with substantial debates regarding its lasting influence. One line of argumentation asserts that the One-Child policy has been the dominant force behind the country's fertility decline, thus leading to the acceleration of population ageing in China (Feng et al., 2014, Zhang, 2017). Typical families composed of a couple and an unmarried child have become more common in Chinese cities (Feng et al., 2014), further influencing traditional living

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arrangements. For example, an only child usually chooses to move out to search for self-independence once they have been admitted to college or have married. In such cases, most parents remain in the household, resulting in a phenomenon known as the 'empty-nest syndrome'(Zhang, 2017). According to the China Family Development Report (2015), the percentage of empty-nest families in 2014 exceeded 50%, with an even higher percentage, 70%, identified in cities. Growing up during a period marked by a rapidly developing Chinese economy, the one-child generation now faces new challenges in terms of the shrinking size and changing structure of the family, which has led to difficulties in terms of sharing the responsibility between siblings for taking care of older parents.

For centuries, family support occupied a prominent position in people's later lives in Chinese culture. According to the seventh national population census of China, the average household size had reduced to 2.62 people in 2020 (Ning, 2021). Historical changes in family size and structure have naturally led to the question of who will be available to take care of older parents. Zhang and Goza (2006) conducted fifteen interviews in 2000 in Shanghai, Hangzhou, and a village in Inner Mongolia addressing this question. Their choice of locations involved considerations about the disparities between different regions, including rural-urban and north-west. The authors observed that parents from cities often came to terms with the fact that their only child might be unable to take care of them and that they had to make alternative plans, independent of their children, for later life (Zhang and Goza, 2006). However, parents in rural areas seemed to be caught up in more challenging circumstances (Zhang and Goza, 2006). This is because the younger generation often prefers to pursue career aspirations in cities instead of staying in towns or villages (Wu et al., 2010). Additionally, older people in rural areas can hardly depend on formal care as they face more barriers to accessing state-provided social care (Li et al., 2013). Such a situation may explain why older people in rural areas still think highly of filial piety and value traditional cultural norms because families remain the most reliable resource

for informal help during difficult times (Zhang and Goza, 2006, Li et al., 2013).

Some researchers have examined the impact of the One-Child policy on the perception of filial piety from the only child's perspective. Deutsch (2006) interviewed 84 undergraduate college students in South-eastern China from 2000 to 2001 in order to gain a better understanding of the one-child generation's attitudes towards filial piety. Deutsch (2006) argued that the strict implementation of the One-Child policy in urban areas did not undermine the core values of filial piety since interviewees who were only children expressed a higher level of responsibility for caring for their parents and were more willing to live in the same city with their parents than those who had siblings. This study provided fresh insight into filial piety in modern China by listening to children's voices. While this study offered new perspectives on filial piety by incorporating the voices of children, Deutsch's (2006) sample was not necessarily representative since it only included 84 undergraduate college students. Especially in the early 2000s, less than half of high school graduates had the opportunity to attend university in China (Li, 2010).

Another study also examined the changes in perceptions regarding caring for one's parents amongst the one-child generation in China. Gui and Koropeckyj-Cox (2016) employed semi-structured interviews to explore these perceptions amongst younger Chinese individuals studying or working in Montreal, Canada. One sentiment participants repeatedly expressed was that they were willing to take care of their parents if they required assistance with daily activities (Gui and Koropeckyj-Cox, 2016). The findings of the above-mentioned two studies demonstrate that young people who are the only child of their family may prefer more traditional methods of caring for their parents. However, such implications should be interpreted with caution since the analytical samples employed in these two studies do not necessarily represent the entire only-child generation.

The Implementation of the One-Child policy has resulted in significant changes in individuals' family and personal lives, potentially placing one-child

families at considerable risk. According to data from the sixth national population census in China, the number of families having lost their only child increased by about 76,000 every year (Yin et al., 2018b). Previous studies showed that losing the only child had long-term adverse effects on parents' mental and physical health, as such a child often carries the entire family's hopes and expectations (Feng et al., 2014, Yin et al., 2018b, Wang and Hu, 2021). Based on a qualitative analysis of 12 media reports in China between 2012 and 2013, Song (2014) suggested that ageing parents in such families had suffered from lasting emotional wounds of losing their only child and worried about their later lives. Given this situation, there is a crucial need in the Chinese context for a well-developed social care system for older people in order to offer them greater security in later life (Song, 2014).

In conclusion, the implementation of the Reform and Opening-Up and Only-Child policies have had a profound impact on the traditional way of taking care of ageing people in China. This raises a slew of questions regarding the role of the Chinese government in coping with this unprecedented challenge. The following sections review the policy developments shaping the social care system for older people, highlighting the limitations of these policies pertaining to sustainable improvements in social care provision.

2.3.2 Social care system: policy developments

With a focus on the issue of a rapidly ageing population and increasing social care needs, this section presents the policy landscape that characterises the contemporary social care system in China. These policies can be divided into three stages based on their focus and the groups that benefit from them, as depicted in Figure 2.3 (Yang, 2016a).

Stage I: 1949-1981	—— 1956.1, the Guidance on the National Agriculture Development (1956-1967)
Stage II: 1983-2006	—— 1982.3, the Establishment of the China National Committee on Ageing
	—— 1994. 12, the Seven-Year Development Outline on Work Concerning Older People in China (1994-2000)
	—— 1996.8, The Law on the Protection of the Rights and Interests of Older People

2000, the Entry into the Ageing Society

Stage III:2006-	—— 2006.9, the Opinions on Accelerating the Development of the Older-Age Services
	—— 2011.9, the 12th Five-Year Plan of the Undertakings related to the Older People (2011-2015)
	—— 2011.12, the Construction Plan of Social Care System for Older People (2011-2015)
	—— 2015.2, the Implementation Opinions on Encouraging Private Capital to Participate in Older-Age Services for older people
	—— 2015.9, the Opinions on Building a Comprehensive System of Subsistence Allowance for Indigent and Disabled People and Attendance Allowance for Severely Disabled People
	—— 2016.7 the Guidance on Launching the Pilot Long-Term Care Insurance
	—— 2020.9, the Opinions on Expanding the Pilot Long-Term Care Insurance
	—— 2021.12, the 14th Five-Year Plan on the Undertakings related to Older People and Older-Age Service System

Figure 2.3 The timeline of the policy development concerning population ageing and social care provision for older people in China

Source: Author's work based on previous studies (Wong and Leung, 2012, Shum et al., 2015, Yang, 2016a, Feng et al., 2020b) and policies issued by the National People's Congress, State Council and Ministry of Civil Affairs and other government departments in China.

In Stage I, from 1949 to 1981, there was no national policy targeting the welfare of older people. The support older people could obtain from the state was limited, and family care played a central role in people's later lives (Yang, 2016a). In the 1950s, the Chinese government began paying attention to older people with limited labour capacities, incomes, and families, who were known as the 'Three-No's' older group (Feng et al., 2012, Feng et al., 2020b). In 1956, the 'Guidance on the National Agriculture Development (1956–1967)' was issued, ensuring that members of the 'Three-No's' living in rural regions would be provided with basic food, clothes, housing, medical treatment, education, and funeral services, which became known as the Five-Guarantees Policy (Politburo of the Chinese Communist Party, 1956).

Since the establishment of the China National Committee on Ageing in 1982,[2] which was aligned with the international actional programme proposed by the World Assembly on Ageing,[3] the Chinese government has introduced a series of policies to cope with its ageing population. In 1994, the first guideline on national work in relation to the ageing population was introduced. The 'Seven-Year Development Outline on Work Concerning Older People in China (1994–2000)' addressed the importance of family and community care for older people and proposed the necessity of developing institutional care (Ministry of Civil Affairs et al., 1994). This outline provided a general direction for the development of social care for older people over the following decade, which encompassed ensuring family care and expanding social care as well as highlighting the disparities between rural and urban regions.

In 1996, the 'Law on the Protection of the Rights and Interests of Older People' was introduced, further confirming the essential human rights of older individuals. This law specifically emphasised the responsibility of families (adult children and spouses) for providing care to older people, clearly stating

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[2] Data resources: https://www.mca.gov.cn/zt/history/18lh/20180300895697.html
[3] First World Assembly on Ageing, 26 July – 6 August 1982, Vienna:
https://www.un.org/en/conferences/ageing/vienna1982

that adult children should carry out their obligations regarding financial and instrumental support. Apart from meeting these daily needs, the law also encouraged children to consider older people's psychological states, with regular contact being advised to provide stable emotional support. Additionally, spouses were responsible for caring for their older partners if they required daily assistance (National People's Congress, 1996). Compared with the policies in Stage I released before the establishment of the National Committee on Ageing, policies introduced in Stage II had a clearer vision in terms of paying attention to older people's welfare, emphasising the importance of the role families play in older people's daily lives (Wong and Leung, 2012).

In 2000, China officially became an ageing society (Mai et al., 2013). This led to a change in policies from improving the welfare of the overall older population to providing care specifically for older people with physical limitations. In 2006, the Chinese government introduced the 'Opinions on Accelerating the Development of the Older-Age Services' to promote the development of social care for older people with different levels of physical capabilities (China National Committee on Ageing et al., 2006). While the 'Older-Age Services' provided daily assistance and care, at that point, it did not yet include the concepts of long-term care and social care, let alone a detailed assessment of older people's needs for social care.

In 2011, the '12th Five-Year Plan of the Undertakings Related to Older People' was issued. One of its critical goals was to establish a comprehensive social care system for older people with a combination of home care, community care, and institutional care (State Council, 2011a). Coinciding with this overall goal, another instrumental policy, the 'Construction Guidance of a Social Care System for Older People (2011–2015)', was enacted and contained specific instructions for the development of social care under different scenarios, along with diverse forms of funding (State Council, 2011b). This was the first time that the construction of social care was brought into the scope of national

planning (Yang, 2016a).

In order to enable the market to play an effective role in resource distribution, the Chinese government introduced the 'Implementation Opinions on Encouraging Private Capital to Participate in Older-Age Services for Older People' in 2015. This called for the active participation of private capital in providing quality care services for older people, including offering assistance with making meals, taking baths, and organising leisure activities (Ministry of Civil Affairs et al., 2015). In comparison with former policies, the 'the 12th Plan' and the 'Guidance' emphasised the importance of social care, and how to improve social care for older people. However, these two policies only pointed out that older people need social care; they still failed to clearly define which groups of older people needing social care.

Later, in 2015, a policy was issued concerning subsidies for disabled people. The target groups for receiving long-term care were first proposed in this document, which defined people eligible for receiving special care products and services are those reported disabilities lasting more than six months. Although such a precise definition was of great importance for care resource allocation (State Council, 2015), the exact meaning of 'special care products and services' was not defined, leaving a grey area in terms of governance and management. In order to further clarify the content and recipients of long-term care, the pilot Long-Term Care Insurance (LTCI) programme was launched in 15 cities in 2016 (Zhang and Yu, 2019, Ministry of Human Resources and Social Security, 2016). with the total number of pilot cities rising to 29 in 2020 (Lei et al., 2022, National Health Security Administration, 2020). However, to date, the LTCI system remains relatively fragmented, and a national-level policy framework is still undefined (Du et al., 2021).

In 2021, the Chinese government introduced the '14th Five-Year Plan on the Undertakings Related to Older People and the Older-Age Service System (2021–2025)' and proposed a set of goals in order to build an integrated long-term care system for older people, particularly regarding social care. One

critical goal of this endeavour was to increase the number of beds in institutional care homes to 9 million, with 55% of them being nursing beds (State Council, 2021). Compared with previous policies in this vein, this newly released policy emphasised the significance of nursing beds, exemplifying the growing policy attention towards older people with disabilities (Yang, 2016a).

In conclusion, since the establishment of the China National Committee on Ageing, the focus of ageing policies has evolved from providing for the general welfare of older people and addressing their family support to enhancing the level of comprehensive social care for older people. The policy target group has also shifted from the older population in general to specifically older people with functional disabilities. The essential pillars in caring for older people have expanded from informal care from families, friends, and neighbours to a combination of informal and formal care, as well as an emerging voluntary sector, reflecting the increasingly important role of the state and other private practitioners in supporting older people (Yang and Tan, 2021, Liu, 2021).

2.3.3 The limitations of current policies regarding providing social care

Though the Chinese government has improved its policy system by addressing the urgent issue of caring for older people with functional disabilities (Hu and Wang, 2019), there are still several limitations of these policy efforts relating to social care for older people.

To begin, there is an imbalanced policy focus on the expansion of institutional formal care instead of home- and community-based care (Zhu and Österle, 2019). Considering the fact that most older people live in their own homes, their need for home- and community-based care should be highlighted (Zhou and Walker, 2016). However, a detailed set of goals targeting home- and community-based care has been missing from recent policy initiatives. For example, the 'Fourteenth Five-Year Plan' proposed significant growth in the number of beds in institutional care homes (Feng et al., 2020b) while overlooking similarly clear goals for improvements in home- and community-

based care (State Council, 2021).

Second, the policy around LTCI is blurred and fragmented (Feng et al., 2020b), meaning that there is no clear and unified definition for the coverage and beneficiaries of LTCI. The coverage of LTCI is different from city to city. Specifically, during the first pilot stage, LTCI in some cities only covered individuals participating in urban employee-based basic medical insurance. By contrast, LTCI covered residents in other cities who took part in employee or resident-based medical insurance (Zhang and Yu, 2019). This disparity led to a wide gap in the initial insurance coverage. Additionally, there have been several disparities regarding the range of beneficiaries. In developed cities like Shanghai and Nantong, all individuals with severe or moderate functional disabilities or cognitive impairments were covered by LTCI. However, in Anqing and Chengde, only severely disabled individuals were eligible for benefits (Zhu and Österle, 2019). This narrow scope of beneficiaries potentially results in the exclusion of some older individuals in need of social care.

Finally, there has been a general lack of regulation and oversight for the development of formal care, with the expansion and improvements in formal care resting primarily on the promotion of policies (Shi and Hu, 2020). Although the government has emphasised the importance of professional care for older people with disabilities since the turn of the twenty-first century, a significant gap remained in terms of the development of formal care for older people until a national policy was issued in 2020. At the end of 2020, the State Council introduced a policy to facilitate the supervision of social care services for older people in five areas, aiming to enhance the regulations for service quality, management and funding of practitioners, supervision of institutional operations, and the handling of emergency services (State Council, 2020). Despite highlighting the general oversight of social care services for older people, the policy contained no detailed standards for how to conduct the supervision work. Therefore, although developments in

institutional care for older people have experienced a 'great leap forward' in the last two decades (Shum et al., 2015), regulations are still relatively new and undefined. The missing puzzle piece of regulation and oversight has inevitably led to imbalanced and poor-quality growth in the supply of formal care for older people (Feng et al., 2012).

Based on these discussions of past and more recent policies shaping the social care system for older people in China, the following section creates a profile of various sources of social care provision, comprising informal care, formal care, and voluntary services.

2.4 Social care for older people in China

This section focuses on reviewing the empirical and policy evidence indicating different sources of social care and emphasising the inadequacy of current social care provision in terms of addressing increasing social care needs.

2.4.1 Receiving informal care: the role of family, friends and neighbours

Informal care remains the principal pillar of social care in contemporary China (Hu and Ma, 2018). Reflecting a long-standing tradition, informal care for older people is principally provided by their families, friends, and neighbours (Zhou and Walker, 2016). This tradition is embedded in Confucianist thought, in which the family is regarded as the basic unit of Chinese society (Yang and Tan, 2021). Filial piety, which is a core value of Confucianism, has deeply influenced Chinese people's behaviour. Younger Chinese people inherit this paradigm through interactions in everyday life. Correspondingly, older parents tend to take pride in children who observe the doctrine of filial piety (Feng, 2017).

Filial piety shapes the practice of caring for older parents in four fundamental ways: co-residence, providing support, showing respect, and obeying moral obligations related to gender (Li et al., 2010). First, in traditional agricultural contexts in China, living with aged parents is deemed paramount, for it shows the intimacy of intergenerational relationships. Such a living arrangement is

also convenient for sharing resources and supporting one another in difficult times. Second, providing support, including financial assistance and help with daily activities, is also a vital practice of filial piety, which is particularly essential for senior family members when formal care is absent (Gu and Vlosky, 2008). Third, respecting one's parents used to translate into obedience, signifying an asymmetric relation between parents and children. There is a saying contained in the text *Di Zi Gui*: 'Fu Mu Hu, Ying Wu Huan; Fu Mu Ming, Xing Wu Lan', meaning that when parents call their children, the children should answer them immediately; when parents tell them to do something, they should do it immediately.[4] As for the different obligations of men and women, it was traditionally the primary duty of the eldest son and his wife, rather than the daughters, to take care of older parents. Such gender segregation was due to the marginal position of women in ancient China (Li et al., 2010).

In modern China, the norms of practising filial piety are changing. As noted in Section 2.3, the shrinking family size due to the One-Child policy and the geographic separation of families driven by rapid modernisation and urbanisation have resulted in decreased availability of family caregivers, especially adult children (He and Ye, 2014). Moreover, the practice of respecting parents no longer entails blindly following their every instruction; instead, this has been replaced by mutual respect. Growing up under the influence of modernisation and urbanisation, people today are more open to accepting newly emerging ideas and expressing their opinions. Obedience has transformed into an open discussion, leading to more equal parent-child relationships (Yeh et al., 2013). A study found that parents and children in urban China now prioritise emotional support and the harmony of intergenerational relationships over strict parental obedience their priorities

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[4] *Di Zi Gui*, first published in the Qing Dynasty, is a book based on the teaching content of ancient Chinese philosopher Kong Zi. It demonstrates the basic requirements of being a decent gentleman as well as emphasising filial piety and fraternal duty. Data sources: http://tsoidug.org/dizigui_trans_simp.php

(Yeh et al., 2013).

Existing studies have identified several factors associated with older people receiving informal care. Drawing data from the fourth wave of the ELSA, Vlachantoni et al. (2015) constructed an analytical framework for exploring the predictors of receiving social care in one's later life in England, finding that difficulties with ADLs or IADLs were the prominent predictors for receiving informal care for both men and women. Regarding informal care resources, Liu et al. (2017b) reported that older people with greater difficulties in performing daily activities preferred getting help from close kin, such as children and spouses, rather than other relatives, based on the baseline wave of the CHARLS. Hu and Ma (2018) used data from the 2013 wave of CHARLS to explore how demographic, socioeconomic, and health characteristics were associated with older people receiving informal care from their children, spouses, and other relatives. Their findings demonstrated that challenges in terms of performing ADLs independently were the principal indicator for receiving informal care amongst older Chinese people (Hu and Ma, 2018). Additionally, individuals who were older and lived with their families had a higher likelihood of receiving informal care (Hu and Ma, 2018).

In terms of socioeconomic characteristics, education is a critical indicator of receiving informal care in later life. In Hu and Ma (2018)'s study, older individuals who were less educated were more likely to receive informal care compared with those with a relatively higher educational attainment. Hukou, a unique feature of the Chinese context, is also significantly associated with informal care. Older people with rural hukou and who reside in rural areas are more likely to receive informal care from other relatives or from mixed sources than those with urban hukou (Hu and Ma, 2018). Employing data from the 2005 to 2014 waves of CLHLS, Wang et al. (2021a) examined whether income influences the receipt of informal care amongst people with physical limitations. They found that older people with a higher household income were more likely to receive a higher intensity of informal care than those with lower

household incomes (Wang et al., 2021a). One possible explanation is that higher incomes are related to more 'bargaining power' inside the household (Friedberg and Webb, 2006).

The Reform and Opening-Up and the One-Child policies have also challenged the foundation of traditional informal care practices. In contrast with the Confucian emphasis on extended family, 4–2–1 families[5]are becoming prevalent in contemporary China, resulting in lower availability of family caregivers (Jiang and Sánchez-Barricarte, 2011). As a result, adult children may search for formal social care services in lieu of caring for their ageing parents.

2.4.2 Receiving formal care: the role of the state and other private practitioners

The formal care sector in China is still in its initial stages of development, lacking integrated planning, systematic construction, and adequate care facilities (Shi and Hu, 2020). Though it is still a nascent source of social care for older Chinese people, formal care is becoming an essential supplement to informal care (Liu, 2021). It was not until the most recent decade that the Chinese government introduced a series of policies to promote healthy ageing and the establishment of the social care system in order to cope with the increasing need for social care for older people (see Section 2.3.2). Institutional care homes for older people have mushroomed over the last decade. According to the National Bulletin on the Development of Ageing Affairs, there were approximately 387,000 institutional care homes and facilities at the end of 2022, which were able to provide beds for about 8.3 million older people.[6]

However, such an expansion in the formal care sector has not been without its

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[5] The 4-2-1 family structure refers to four older grandparents, two parents, and one child, which has become the typical structure of the Chinese family.
[6] Data sources, accessible:
https://www.mca.gov.cn/n152/n165/c1662004999979996614/attr/315138.pdf

limitations. Wu et al. (2015) carried out a survey focusing on institutional care homes for older people in twelve cities (including administrated rural areas) across China in 2014, which produced several noteworthy findings. First, 32.5% of the 257 institutional care homes reported an operating loss. Second, the distribution of these institutions was unbalanced, with more institutional care homes in developed regions than in underdeveloped regions. Third, most institutions were not capable of providing quality care services due to a shortage of facilities and professional caregivers (Wu et al., 2015). Finally, recent statistics indicated that older people showed little interest in moving into institutional care homes, with one possible reason being the financial cost (Wu and Ding, 2021). Wu et al. (2015) noted that the average charge per month was 2,134 yuan in 2014 (around £231 GBP), while the average monthly pension of retirees from enterprises was only 2,061 yuan (around £224 GBP).[7] Therefore, despite improvements in the formal care sector in recent years, it remains limited in its capacity to address the increasing social care needs of older people.

2.4.3 The emerging role of the voluntary sector

Compared with the two above-mentioned forms of social care provision, voluntary support for older people with functional disabilities is in its infancy. Thus far, there have been few comprehensive and empirical studies examining who is providing voluntary care and who is receiving it among older Chinese people. There is also a paucity of literature on voluntary care for older Chinese people using quantitative analysis. Instead, researchers have opted for a more qualitative approach in this regard, utilising structured interviews to understand the experiences of volunteers providing daily assistance to older Chinese people (Shea, 2017, Yang, 2020b, Xin et al., 2023).

From the perspective of productive ageing, a case study on volunteers aged

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[7] All fees in renminbi (yuan) are converted into UK pounds using the exchange rate provided by the People's Bank of China in 18th March, 2024.

between 50 and 74 years old working with non-governmental organisations (NGO) in Shanghai showed that they played an important role in supporting other older people living in the same community, as well as in the development of the community-based care sector (Shea, 2017). After receiving basic training, volunteers would primarily provide help to the oldest-old individuals, empty-nest older people, and older couples who had lost their only child. One interesting point raised in this paper was that volunteers tended to draw a line between what they could and could not do to prevent an overlap between their work and the care provided by the local government. Their concerns about potential conflicts with local neighbourhood committees prevented volunteers from being fully engaged in helping older people with their daily activities. Therefore, their voluntary activities were primarily limited to the realm of emotional support, such as providing company or regular visits (Shea, 2017).

Some problems with the training and management of voluntary organisations have surfaced in examinations regarding the volunteering experience for older people. First, training for volunteers is generally inadequate. Based on a qualitative study in a district in Dongbei province, Yang (2020b) reported that some volunteers did not know how to properly assist older people with their daily tasks. Second, the options for recruiting new volunteers are often severely limited. A case study focusing on a community voluntary group found that membership remained static for many years (Yang, 2020b). Third, it is often difficult for some volunteers to carry out their volunteer work continuously in the long term. Previous evidence in the Chinese context found that older volunteers were often sick and asked for leave, while younger volunteers were more prone to ending their contributions early (Shea, 2017, Yang, 2020b). Conducting semi-structured interviews with 15 volunteers in Wuhan, Xin et al. (2023) further underscored the importance of providing continuous voluntary support for older community-dwelling people. Despite qualitative studies providing deeper insights from the volunteer's perspective, a national-level survey would be more effective in determining whether these

problems are universal or atypical. Furthermore, national-level evidence would be also helpful in informing policy decisions to enhance the delivery of voluntary services to older people (Cheung and Kun Ma, 2010, Shea, 2017).

The Time Bank is an excellent example of a volunteering system that develops a mutually beneficial relationship between volunteers and individuals who receive help (Wu and Ding, 2021). In the UK, individuals in this scheme build their own accounts for 'depositing' volunteering time by helping others and they are also allowed to trade the time for help if they need it one day (Perez-Vega and Miguel, 2022). Compared with the development of Time Bank projects in the UK, the Time Bank in China has only just begun to develop. In 2019, Nanjing, the capital city of Jiangsu province, was chosen as one of the pilot cities for developing the Time Bank scheme.[8] Similarly, the Time Bank system officially became a part of the Beijing government's work plan.[9] Promoting the Time Bank scheme in communities also resonates with a critical goal of the Fourteenth Five-Year Plan, which is to develop and expand volunteering teams in China (see Section 2.3.2).

It is encouraging to see the Time Bank scheme taking root in China since it is beneficial for the expansion of community care. However, there are some concerns about its future development. First, since more developed cities in China are the ones taking the lead in establishing a mutual support system for older people, there is a risk that such arrangements may cause social resources to be even more concentrated in developed areas, thereby further increasing the gap in resource allocation between urban and rural areas. Song et al. (2019) drew on data from the regular reports of rural areas in China from 2008 to 2014 in order to examine the inequality in health services and the accessibility of healthcare in rural China. They found that wealthy villages had significantly more access to healthcare resources and that inequalities were growing between wealthier and poorer regions (Song et al.,

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[8] Source: http://www.zgjssw.gov.cn/shixianchuanzhen/nanjing/202201/t20220110_7379895.shtml.
[9] Source: https://baijiahao.baidu.com/s?id=17268939070026138175&wfr=spider&for=pc.

2019). Thus, it is argued in this study that it might be more helpful to remain cautious of any policy initiatives that may cause further inequalities in social care for older people during the process of developing the Time Bank system in China, especially considering the fact that most older adults in China still reside in rural areas and not in developed cities (Du, 2013).

2.5 Chapter summary

The aim of this chapter was to provide a comprehensive overview of the research context of this thesis. This is helpful in terms of understanding the demographic trends resulting in the increase of social care needs, the policies shaping the methods of caring for older family members, and the vital pillars of social care provision. Although the formal care sector has expanded over the past two decades, family members and neighbours remain the primary providers of social care for older individuals in China. The following chapter focuses on reviewing the theoretical frameworks relating to predicting and understanding the underlying factors for social care needs and unmet needs.

Chapter 3 Theoretical Frameworks

3.1 Chapter overview

This chapter offers insights into three theoretical frameworks adopted in this research for understanding social care needs, unmet needs, and their underpinning factors, including the ageing and health framework, the Andersen behavioural model, and the life-course perspective. The ageing and health analytical framework constructed by the WHO, discussed in Section 3.2, highlights two fundamental concepts in relation to social care needs – intrinsic capacity and functional ability. Section 3.3 introduces the Andersen behavioural model, including predisposing characteristics, enabling resources, and need factors, which has been widely applied in previous research investigating the predictors for the utilisation of health and social care, social care needs, and unmet needs. Section 3.4 discusses applications of the life-course perspective in research focusing on the ageing process and later-life health. The life-course perspective provides a clear focus on the impacts of different life stages and broader social contexts on maintaining independence in later life. Section 3.5 introduces the theoretical framework developed in order to comprehensively understand the predictors of social care needs and unmet needs, drawing on the Andersen behavioural model and the life course perspective. This overview of the theoretical basis for the conceptual frameworks that influenced this research is then expanded upon in Chapter 4.

3.2 The WHO Framework on Ageing and Health

Proposed by the World Health Organization (WHO) in 2015, the ageing and health framework emphasises the economic contributions of older people and equity throughout the course of one's life and conceptualises social care needs based on intrinsic capacities and functional abilities. Intrinsic capacity is characterised by physical and mental health conditions, and the concept has been innovatively employed by the WHO in the context of ageing and health (World Health Organization, 2015). However, there is no consensus on the definition and measurement of intrinsic capacity. On the basis of the

International Classification of Functioning, Disability, and Health (ICF) framework, Cesari et al. (2018) demonstrated five key domains in constructing a measure of intrinsic capacity: locomotion, vitality, cognition, and psychological and sensory functions. Apart from understanding intrinsic capacity from a holistic perspective, individuals' intrinsic capacity is often evaluated according to their reported difficulties with ADLs and IADLs (World Health Organization, 2015).

Functional ability is an inclusive concept determined by individuals' intrinsic capacity and social environment (Cesari et al., 2018). Maintaining functional ability is essential for both older individuals and the ageing society in general. Using the Barthel index to evaluate older people's autonomy and independence, Li-Hsing and Chia-Chan (2020) suggested that a higher level of independence is positively associated with a higher level of life satisfaction. Society can also benefit from adopting the ageing and health policy framework to promote healthy ageing through decreased financial costs in terms of providing medical support and social care for older people (World Health Organization, 2015). A significant loss in functional ability and intrinsic capacity can result in care dependency, indicating that individuals must depend on assistance in order to undertake daily activities and, thus, require social care (World Health Organization, 2015). Based on the above discussion concerning the measures of functional ability, intrinsic capacity, and their associations with social care needs, using physical limitations related to ADLs or IADLs in order to understand the loss of functional ability and intrinsic capacity is helpful in identifying social care needs of older people (World Health Organization, 2015).

As illustrated in Figure 3.1, intrinsic capacity and functional ability are influenced by both external and internal factors. (World Health Organization, 2015). External factors include living environment, while internal factors include personal features, genetic factors, and other health-related characteristics. The translation of DNA influences one's health at the

beginning of foetal programming and interacts with environmental factors throughout one's life (Marasco et al., 2022). Personal characteristics are conceptualised as fixed features, such as demographic and socioeconomic characteristics, which, in turn, influence people's social position and their opportunities to obtain necessary resources (World Health Organization, 2015, Yang, 2020a).
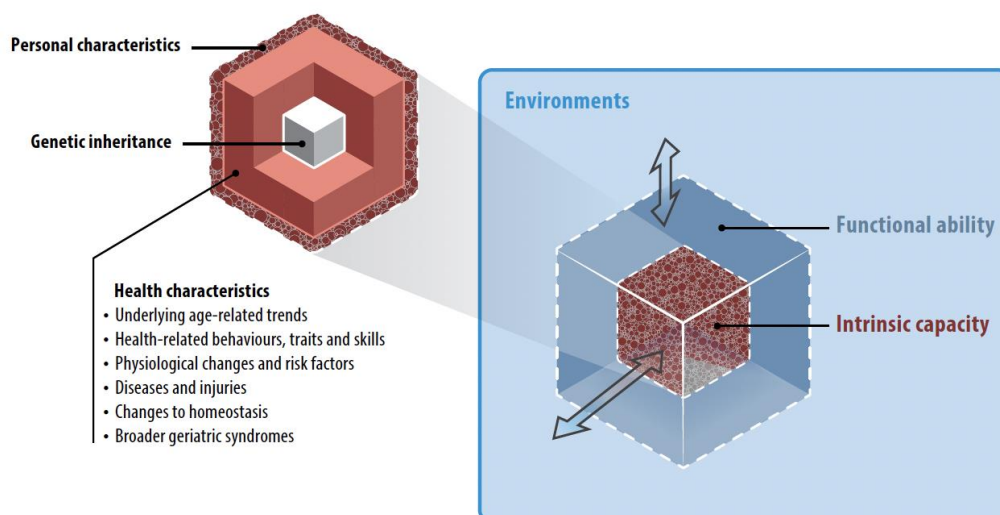
Figure 3.1 Conceptualising intrinsic capacity and functional ability

Source Author's adaptation from the World Report on Ageing and Health (World Health Organization, 2015).

While the ageing and health framework offers critical insights that further our understanding of social care needs relating to functional ability and intrinsic capacity, it lacks detailed information regarding its specific predictors. To supplement this knowledge gap, the Andersen behavioural model and the life-course perspective provide theoretical instructions for exploring the predictors of social care needs in later life in a more precise and comprehensive manner (Andersen, 1995, Moritz and Stein, 1999, Willis et al., 2007).

3.3 The Andersen behavioural model of care utilisation

The Andersen behaviour model is useful for predicting and explaining individuals' behaviours in terms of the utilisation of health and social care. Ronald M. Andersen first developed the behavioural model to evaluate the

access to medical care in the context of 1960s America as well as to help understand the mechanisms by which families can access health services (Andersen, 1968). Due to difficulties in conceptualising and measuring family-level characteristics, the focus of the model shifted from investigating family-level factors to determining indicators at the individual level (Andersen, 1995). This framework has been widely used in studies investigating older people's health and social care needs, including factors associated with unmet long-term care needs and receiving informal care, in various cultural and social contexts (Willis et al., 2007, Travers et al., 2020, Che and Cheung, 2022).

As demonstrated in Figure 3.2, the initial model included three aspects of predictors: predisposing characteristics, enabling resources, and need factors. The predisposing factors that indicate whether individuals seek health or social care include demographic characteristics, health beliefs, and social structures. Genetic and psychological factors were added later in order to examine the influence of predisposing factors more comprehensively (Andersen, 1995, Bradley et al., 2002). Enabling resources are composed of organisational and individual factors that can facilitate or hinder personal behaviours regarding using care services. Organisational factors establish whether health and social care facilities are available for people, indicating regular and stable sources of medical treatment and daily assistance. Individual enabling factors usually consist of income, health insurance, and residential location. Together, these factors indicate whether people have access to care resources (Andersen, 1968, Andersen, 1995). The difference between predisposing characteristics and enabling resources concerns how they influence care utilisation. Predisposing characteristics affect the possibility of using care while enabling resources indicate an individual's ability to actually use such services (Willis et al., 2007). Need factors are the most direct predictors of care utilisation. This is because such behaviour is only feasible when people have needs earlier, which are usually determined by chronic conditions in physical and mental functions (Che and Cheung, 2022).

PREDISPOSING ——► ENABLING ——► NEED ——► USE OF
CHARACTERISTICS   RESOURCES   HEALTH SERVICES

| | | |
Demographic   Personal/Family   Perceived

| | | |
Social Structure   Community   (Evaluated)

|
Health Beliefs
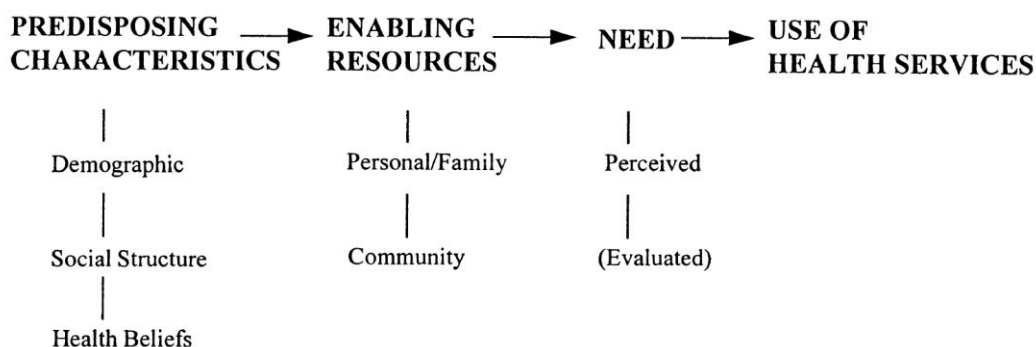
Figure 3.2 The classic Andersen behavioural model of care utilisation in the
1960s

Source: Author's adaptation of Andersen's work (Andersen, 1995).

Since the initial Andersen model was first conceptualised, it has received
numerous critiques concerned with the narrow scope of its predictors and its
lack of a more dynamic perspective (Andersen, 1995). Andersen (1995) later
constructed the phase-4 Andersen model in an attempt to explore the
dynamic nature of people's health and care utilisation behaviours and address
these limitations. In particular, the phase-4 model addresses the health
outcomes of care utilisation and, more importantly, how perceived and
evaluated health outcomes can further influence future care utilisation. By
including this more dynamic and temporally cognisant perspective, it is useful
to use the longitudinal data to operationalise the phase 4 Andersen model so
as to research predictors of the dynamics of care utilisation (Andersen, 1995).
As shown in Figure 3.3, the updated framework is useful in exploring how the
changes in individuals' health status influence their subsequent health and
social care needs (Vlachantoni et al., 2022), providing a theoretical
perspective to understanding the changes in health status and their influence
on further using social care, thereby fitting the criteria of the second research
question.

ENVIRONMENT	POPULATION CHARACTERISTICS	HEALTH BEHAVIOR	OUTCOMES

Health Care System ⎯ External Environment	Predisposing Characteristics → Enabling Resources → Need	Personal Health Practices ⎯ Use of Health Services	Perceived Health Status ⎯ Evaluated Health Status ⎯ Consumer Satisfaction
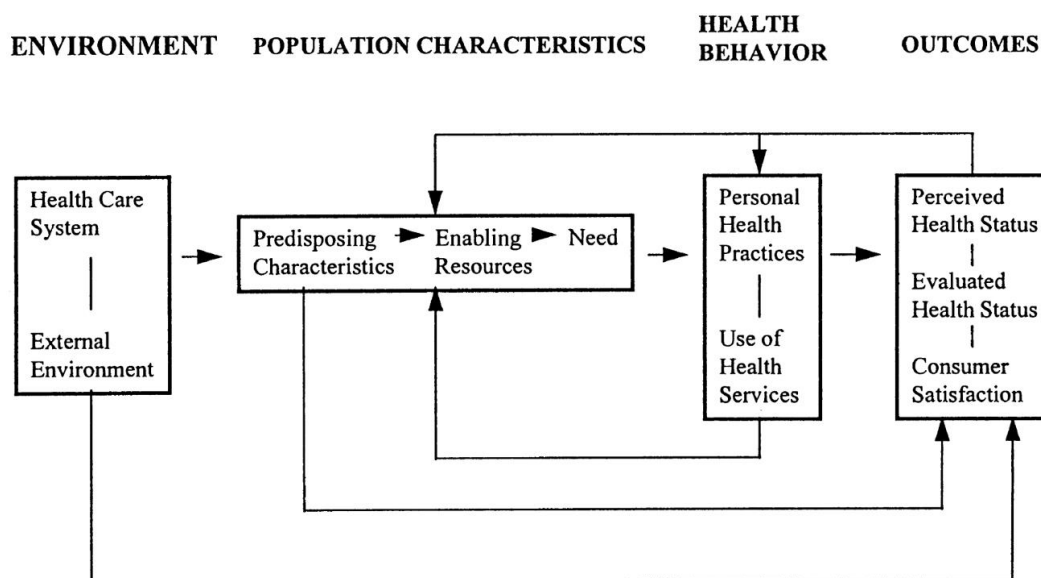
Figure 3.3 The revised Andersen behavioural model of care utilisation in the 1990s

Source: Author's adaptation of Andersen's work (Andersen, 1995).

Despite the classical Andersen model being first introduced in 1968 in America, it has been applied in previous studies in the Chinese context (Che and Cheung, 2022), with the validity and flexibility of the model being particularly useful in these cases. A detailed discussion of previous studies employing the Andersen model is presented in Section 4.5. The Andersen model offers a well-rounded theoretical framework for exploring the determinants of social care needs and unmet needs, which was one of the critical goals of this study. However, the initial and phase-4 models only address the predictors relating to fixed personal characteristics, such as an individual's contemporary demographic and socioeconomic characteristics, while predictors for the long-term impacts on social care needs and unmet needs are neglected. In comparison, the analytical framework presented in the following sections offers a more comprehensive approach to understanding the predictors throughout the entirety of one's life course.

3.4 The life course perspective

This subsection critically discusses the life course perspective, focusing

specifically on how it is applied in ageing-related studies. Additionally, the Cumulative Advantages and Disadvantages theory (CAD) and the Cumulative Inequality theory (CI) are reviewed since they offer critical insights into understanding how inequalities are accumulated and influence life trajectories. These theories provide theoretical insights into the impacts of early-life malnutrition on social care needs and unmet needs. This section begins by reviewing the origins and development of the life course perspective, followed by a discussion on conceptualising ageing from the life course perspective. It then introduces one framework that explores factors over the life course and how they impact maintaining independence in later life.

3.4.1 The origin and development of the life course perspective

The life course perspective is particularly useful in understanding how personal lives are impacted by social contexts, historical events, age, and the interactions from the cradle to the grave (Hutchison, 2010). Discussion of the life course perspective can be traced back to the 1910s. The hallmark study is Thomas and Znaniecki's work, '*The Polish Peasant in Europe and America*' (Thomas and Znaniecki, 1919). The authors enhanced the research paradigm by adopting a longitudinal perspective while researching immigrants' and peasants' life stories and historical trajectories (Stanley, 2010). However, it was not until later in the 20th century that the life course was developed as a specific theoretical approach. This major breakthrough was achieved in 1974 by Elder in his pioneer work, *Children of the Great Depression*, which examined how personal lives were intertwined with historical events and social changes (Elder Jr, 1998). The life course perspective emphasises the profound impact of social change and historical events on a person's life while highlighting the link between individual, family, and historical timing (Hunt, 2017).

Adopting the life course perspective provides an integration of micro and macro perspectives for exploring the interaction effects – including age, social

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relationships, and historical events – that can result in diverse life trajectories and health disparities in later life (Hutchison, 2010). Extending the life course perspective to research on ageing offers a deeper understanding of the interactions and links between individuals, families, and social change over one's whole life.

3.4.2 Understanding ageing from the life course perspective

The life course perspective, which has been widely adopted in sociological and psychological research, sheds considerable light on the concept and experience of ageing (Hunt, 2017). It was not until the latter parts of the 19th century that researchers came to view old age as a life stage with distinct boundaries between mid-life, adolescence, and childhood (Hareven and Adams, 1982). At that time, it was thought that older people faced a greater likelihood of experiencing loss in terms of physical, mental, and cognitive health, as well as bereavement (Hareven and Adams, 1982). The fact that they had only limited time and resources led to their disengagement and withdrawal from their broader social environments, contributing to structural dependency in later life.

However, this view has been challenged by recognising the substantial variation in later life experiences (Bengtson and Settersten Jr, 2016). Later-life trajectories can be shaped by characteristics and experiences during the earlier stages of one's life (Crystal and Shea, 1990, Ferraro and Shippee, 2009, Vilhena et al., 2019). This diversity has encouraged scholars to view older people from a more dynamic perspective and to uncover the links between early and later life periods by addressing the ripple effects through the entirety of one's life course. In particular, researchers have employed the life course perspective in understanding the impacts of early life experiences on later life (Wrulich et al., 2013, Ferraro et al., 2016, Hu, 2021). Empirical research examining the connections between early life experiences and health conditions later life has yielded valuable findings. For instance, employing data from the 2011, 2013, and 2014 waves of CHARLS, Shi and

Wu (2018) found a causal relationship between early experiences and current health conditions amongst individuals aged between 40 and 80 years old. Specifically, adverse childhood experiences, such as poverty and hunger, contributed to worse health status in adulthood (Shi and Wu, 2018).

In addition to the life course perspective, the cumulative advantages and disadvantages theory and the cumulative inequality theory are useful for understanding the mechanisms by which early-life inequalities accumulate over one's life course. Crystal and Shea (1990)'s study utilised the cumulative advantages and disadvantages framework in order to understand the growing gap in economic well-being amongst retirement-aged people in the US. Individuals who experienced a more advantaged socioeconomic status in their childhood were more likely to attain a higher level of education and better job opportunities, with these trajectories then leading to better health care and pension income in later life (Crystal and Shea, 1990, Dannefer, 2003).

Standing on the shoulder of giants, the cumulative inequality theory proposes five axioms demonstrating how inequalities influence life trajectories in greater detail and how such trajectories can be adjusted by resources, subjective perceptions of life transitions, and human agency (Ferraro and Shippee, 2009). Axiom 1 suggests that disadvantages are generated by social systems and accumulate according to demographic characteristics through the ageing process, emphasising the fundamental link between childhood status and adulthood conditions. Axiom 2 focuses on advantages and disadvantages simultaneously rather than highlighting disadvantages alone, proposing that disadvantages are related to an elevated risk of inequalities while advantages equate to more opportunities. The adverse consequence of manifested disadvantages may be blunted by advantages. Axiom 3 posits that accumulative (dis)advantages, useable resources, and human agency affect and modify an individual's life trajectory. Individuals' available resources and personal coping agency are valuable for them to rise above the difficulties over the life course. Axiom 4 indicates that an individual's subjective sense of

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their actions influences what they are going to do next. Such perceptions are based on people's comparison to their peers. Axiom 5 proposes that the premature mortality caused by accumulated disadvantages over the life course may lead to the semblance of declining inequality in later life (Ferraro and Shippee, 2009).

The aforementioned studies explored the factors from early life based on specific cultural and social contexts and provide insights into understanding the far-reaching impacts of advantages and disadvantages in early life. The framework discussed in the following section offers more detailed information on the predictors across the life course of maintaining independence in later life.

3.4.3 Translating the life course perspective into a practical approach to exploring needs for social care in later life

The WHO proposed an analytical framework in 1999 in order to understand how the ability of maintaining the independence in later life can be influenced by factors from different life stages (Moritz and Stein, 1999). This framework addresses predictors of independence in older age including individual-level as well as social and cultural context-level factors (Moritz and Stein, 1999). These determinants for functional ability and maintaining independence in later life are depicted in great detail in accordance with different life stages, starting from foetal development, infancy, and childhood experiences to adolescence and adult lifestyles (Moritz and Stein, 1999). Figure 3.4 depicts the determinants discussed the framework discussing the indicators of maintaining independence in later life through the lens of life course perspective. The predictors on the left side are arranged in chronological order, while the predictors on the right-side correlate to the impacts of internal and external events, such as personal medical history and socio-cultural environment.
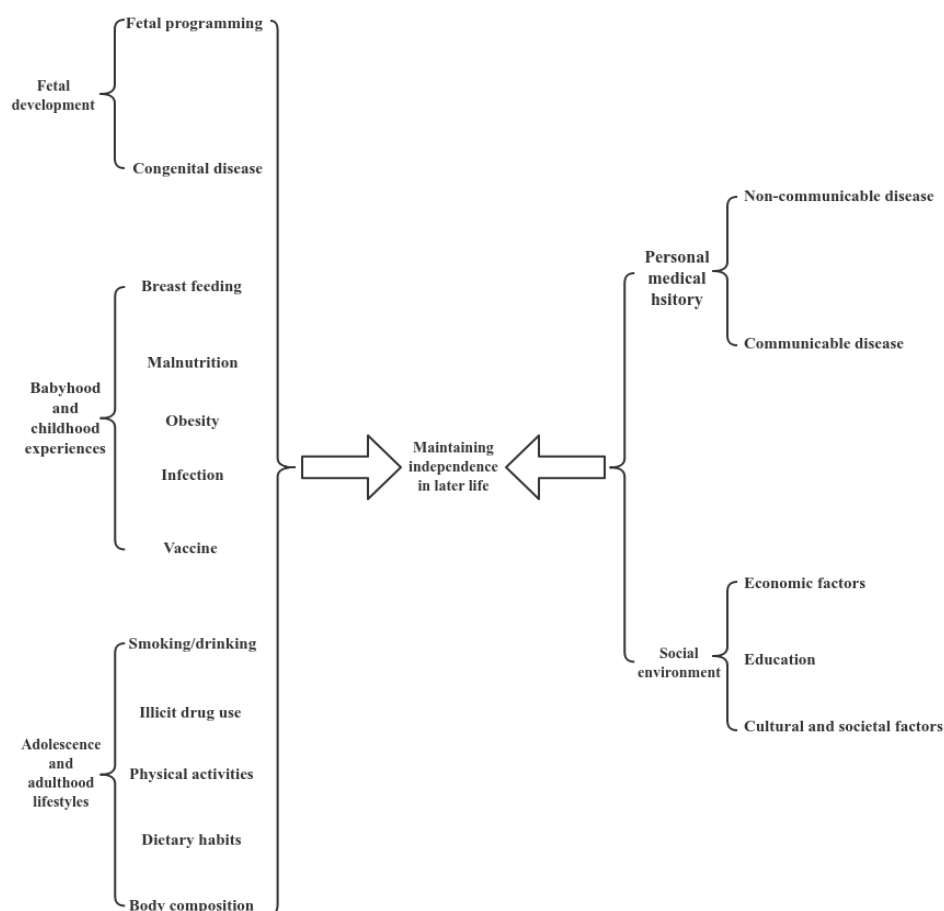
Figure 3.4 The conceptual framework of understanding independence in later life from a life course perspective

Source: Author's work based on a life course perspective on maintaining independence in later life (Moritz et al., 1999).

During the foetal development, the lasting adverse impacts of exposure to hazardous environments and congenital diseases are highlighted. Malnutrition during foetal programming can result in dysfunction in the growth of tissues and organs, which influences individuals' functional in later life (Godfrey and Barker, 2001). Congenital diseases are determined by genetics or harmful factors during pregnancy and can have a life-long influence on an individual's health (Moons et al., 2023). Babyhood and childhood are critical stages in relation to life-long development (Case et al., 2005, Miranda et al., 2017). Breastfeeding, malnutrition, obesity, infections, and working in childhood are

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discussed in this framework. Specifically, suffering from malnutrition in early life often leads to impaired cognition and compromised physical and mental health (Groce et al., 2014). Based on a meta-analysis of empirical studies exploring the relationship between childhood infections and adulthood psychotic symptoms, Khandaker et al. (2012) found that infections of the central nervous system in childhood increased the risk of psychosis in adulthood. The lasting influence of maintaining healthy lifestyles in keeping good health status has been found (Hulsegge et al., 2016). Six factors are addressed in the WHO Framework (Moritz and Stein, 1999): smoking, drinking, illicit drug use, physical activities, dietary habits, and body composition. Unhealthy habits can lead to health and financial burdens for individuals and their families (Moritz and Stein, 1999). Smoking, one of the most prevalent unhealthy habits, significantly increases the risk of poor health and early mortality (West, 2017). More recent findings also suggest that a lack of physical activity is a significant predictor of mild impairment in cognition and a higher frequency of using health care (Haider et al., 2019, Krell-Roesch et al., 2021).

In addition to addressing the impact of each life stage, the determinants from one's personal medical history and socio-cultural context are emphasised as well by Moritz and Stein (1999). For example, people living in poverty-stricken areas often have limited access to medical resources. An international comparative study found that national development indicators, such as multidimensional poverty, low education, and higher unemployment rates, are significant risk factors for developing physical limitations amongst a nation's population in that nation (Mitra et al., 2013). Moreover, cultural and societal factors shape attitudes towards older populations and influence how these individuals are likely to be treated (North and Fiske, 2015). In a society that values older people's wisdom, they tend to receive more respect and support from their offspring, which may yield beneficial effects on older people's independence (Du, 2013).

Few studies have investigated the impact of early-life experiences on older people's later-life needs and unmet needs for social care in the context of China (Hu et al., 2020b, Hu and Wei, 2022). Adopting this framework displayed in Figure 3.4 in the Chinese context can provide fresh insight into examining associated predictors from early life stages of needs and unmet needs. As noted in section 2.3, this generation of older Chinese people was exposed to famine in early life (Li and Lumey, 2017). Moreover, before the Reform and Opening-up policy being implemented, most part of China remained to be poor, underdeveloped, as well as faced the problem of hunger and food insecurity (Ye et al., 2014, Morrison, 2019). Experiences related to hunger may be not distant memories for older Chinese people (Hu et al., 2020b). Therefore, based on the life course framework on maintaining independence in later life (Moritz and Stein, 1999) and the historical context discussed above, examining the far-reaching influence of early life experiences regarding hunger on needing daily assistance in later life is a central aspect of this research.

In conclusion, the framework discussed above is of great importance in terms of identifying predictors of foetal development, childhood, and adulthood. However, potential associated factors from later life are omitted. Therefore, the Andersen model and the framework based on the life course perspective were both employed in order to gain a comprehensive understanding of the predictors of needs and unmet needs, which was discussed in Section 3.5.

3.5 The theoretical framework of predicting and explaining social care needs in later life from a comprehensive perspective
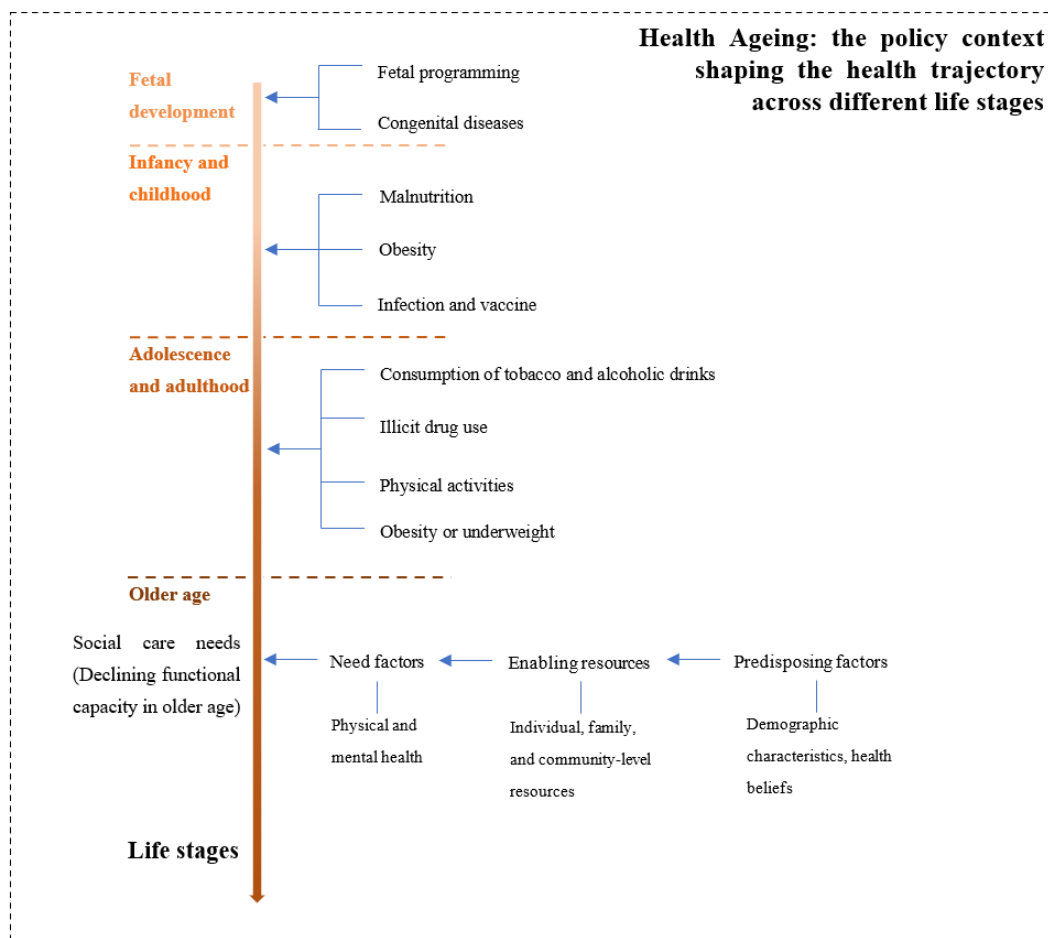
Figure 3.5 The theoretical framework of understanding the factors of social care needs in older age

Source: Authors' work based on the Andersen Behaviour model of care utilisation (Andersen, 1995) and a life course perspective on maintaining independence in later life (Moritz and Stein, 1999).

The framework presented in Figure 3.5 is based on the Ageing and Health framework, the Andersen behavioural model of care utilization, and the life course perspective on maintaining independence in later life. It aims to provide a holistic understanding of the predictors of social care needs in later life. In this thesis, social care needs are conceptualised through two key concepts: functional ability and intrinsic capacity. Intrinsic capacity, which is assessed using ADLs and IADLs, declines with age, leading to the need for daily assistance (World Health Organization, 2015). Moreover, individuals do not age

in social vacuum and their health trajectories are shaped by the broader policy context. For instance, decisions about utilisation of health and social care are influenced by policies related to health insurance and state-provided care (World Health Organization, 2015). As discussed in Section 3.3, the Andersen behaviour model has been employed in the Chinese context to examine the predictors of social care needs and unmet needs (Andersen, 1995). The life course perspective, introduced in Section 3.4, emphasises that independence in later life is shaped by health and behaviours throughout different stages of life (Moritz and Stein, 1999).

The outlining text box represents the broader social and policy context that influences the development of each life stage and the current health and social status. The vertical arrow in the figure represents the socially sequenced timeline of the life course, spanning from foetal development to older age. The horizontal arrows indicate the predictive relationships between the factors derived from the Andersen behaviour model and the life course perspective and social care needs in later life.

On the one hand, factors from different life stages act as indicators influencing the development of the specific stage, which in turn shapes an individual's life trajectory, health outcomes, and independence in older age. On the other hand, the predisposing, enabling, and need factors in older age outlined by the Andersen behaviour model are helpful for understanding the predictors relating to older individuals' current status. In summary, the combination of these theoretical models is useful for examining the predictors relating to one's contemporary life status, and accumulated life experience.

3.6 Chapter summary

This chapter has outlined the theoretical frameworks as the basis of the conceptual framework. Specifically, the ageing and health framework offers critical insights for identifying social care needs relating to intrinsic capacity and functional ability. The Andersen model and the framework on maintaining independence in later life from the life-course perspective together provide a

solid theoretical basis for conceptualising the underlying predictors of needs and unmet needs. Empirical studies on social care needs, unmet needs, and their predictors are further discussed in the following chapter.

Chapter 4 Empirical literature review

4.1 Chapter overview

Chapter 4 provides the overview of the literature on older adults' social care needs, unmet needs and their predictors that provides empirical evidence as another essential base for the conceptual frameworks of this study. Section 4.2 reviews how social care needs were conceptualised and studied in previous studies. Section 4.3 offers an insight into the operationalisation and predictors of unmet needs in existing studies. The Andersen behavioural model is one of the fundamental analytical frameworks providing the theoretical basis for exploring reliable indicators of social care needs and unmet needs. Therefore, how earlier studies utilised different datasets to operationalise the Andersen model is reviewed in Section 4.5. Notably, the gap in current understanding of social care needs and unmet needs is highlighted in Section 4.6. Section 4.7 explicates the conceptual frameworks that is helpful for understanding the predictors of social care needs and unmet needs in later life and how such needs may change over time based on the theoretical and empirical evidence from Chapters 3 and 4.

4.2 Social care needs: operationalisation and predictors

The way that social care needs have been conceptualised and operationalised in previous studies is first discussed in Section 4.2.1, followed by a review of empirical evidence suggesting important risk factors of social care needs in Section 4.2.2. The hypotheses for the first set of research questions – How does the extend of older people's social care needs and unmet needs vary by their demographic and socioeconomic characteristics and early-life adversities? – are put forward in relation to reviewing related empirical findings in each subsection.

4.2.1 Conceptualising and operationalising social care needs in empirical studies

Physical limitations regarding ADLs and IADLs have been employed as a valid set of tools for measuring social care needs in broader contexts. Employing data from the 2011, 2012 and 2013 waves from the Health Survey for England (HSE), Copley et al. (2017) used self-reported difficulties in ADLs or IADLs as proxies of social care needs. In the context of Asia and the Pacific, the World Bank used these measures to identify older people's long-term care needs in order to highlight the pressing challenges experienced by ageing populations (World Bank, 2015). Teerawichitchainan and Knodel (2018) also used these measurements to examine the long-term care needs of older individuals in Myanmar based on data from the 2012 Myanmar Ageing Survey. Limitations in terms of ADLs and IADLs have also been applied in the Chinese context. For instance, Gu and Vlosky (2008) employed self-reported limitations in ADLs as a proxy of social care needs using data from the 2005 CLHLS. Additionally, Lu et al. (2015) evaluated older Chinese people's need for informal care through their difficulties relating to ADLs and IADLs based on the 2011 baseline wave of the CHARLS.

While the utilisation of ADLs and IADLs has been a well-acknowledged and reliable manner of operationalising social care needs, it should be noted that applying the unified index (i.e., combining ADLs and IADLs) may obfuscate the complexities and heterogeneity of social care needs in later life. Specifically, ADLs are fundamental skills relating to self-care capabilities, while IADLs refer to the ability to live independently in a community. Compared to ADLs, independently performing IADLs requires more complicated skills and may be more challenging for older people (Pashmdarfard and Azad, 2020). Therefore, it is necessary to study social care needs related to ADLs and IADLs, respectively.

In addition to using physical limitations in terms of ADLs and IADLs as indicators for social care needs, some scholars have opted for a more

straightforward way of operationalising social care needs. Using primary data from a self-conducted survey focusing on individuals aged 60 years and over living in Chengdu, Chongqing, Guizhou, and Hubei province, the measurement for social care needs was acquired by asking the question: 'Which type of long-term care do you want to choose?' (Zeng et al., 2019). Similarly, Fu et al. (2017) evaluated older Chinese people's social care needs by asking respondents which type of long-term care they would utilise, allowing respondents to choose from three alternatives, including family care, home- and community-based care, and institutional care. Their study was based on survey data from individuals aged 60 years and above in Beijing, Guizhou, Heibi, and Xi'an, four cities of China. As both of these studies were based on primary data, they were able to access participants' information, which is generally unavailable when using secondary datasets (Hox and Boeije, 2005). However, directly asking participants what they would choose in these two studies may have provided imprecise assessments of social care needs since older people's preferences for one type of social care do not necessarily equate to needing it in daily life. For example, Liu et al. (2021) employed a similar question 'If you are unable to care for yourself in the future, which type of long-term care would you choose?' to obtain information about older Chinese people's preference for informal and formal care. Thus, such a way of operationalising social care needs is not employed in this study.

In Zhou and Walker (2016)'s study examining older Chinese people's needs for community care, which utilised data from the 2008 CLHLS, they were able to identify eight distinct types: personal care, home visiting, psychological help, grocery shopping, social activities, legal aid, health education, and improving neighbourhood relationships (Zhou and Walker, 2016). Their analysis provides critical insights into the community care needs of older Chinese people and implications for policymakers in China regarding improving community care services. However, such a measure may not be entirely appropriate for operationalising social care needs since it fails to address older people's specific needs for daily help with basic ADLs.

Based on this analysis of the various methods adopted for measuring social care needs in empirical studies, along with the considerations regarding intrinsic capacity and functional ability in Section 3.2, this study adopts reported physical limitations related to ADLs and IADLs to operationalise social care needs.

4.2.2 The predictors of social care needs of older people

This section reviews the empirical evidence from previous studies analysing the underlying risk factors for reporting social care needs in older age. These factors consist of demographic characteristics, socioeconomic status, and physical and mental health, as well as factors from one's early life.

4.2.2.1 Demographic Characteristics

Several studies have investigated the association between demographic characteristics and social care needs in terms of age, gender, marital status, living arrangements, and the number of living children (Gu and Vlosky, 2008, Zhou and Walker, 2016, Du et al., 2016). In particular, age has been identified as a vital indicator for reporting social care needs, as older people tend to require more daily support as they age. Drawing on data from the 2012 Myanmar ageing survey, Teerawichitchainan and Knodel (2018) reported a higher prevalence of reporting long-term care needs in terms of mobility, ADLs, and IADLs amongst individuals aged 80 years and above than those aged between 60 and 69 years old. Hu et al. (2022) also found the association between advanced age and an increased number of ADLs and IADLs for which older English people reported difficulties.

Age has also been identified as an important indicator of the need for different types of social care. For instance, Zhou and Walker (2016) found that the needs for community care amongst different age groups varied. Older Chinese people aged 65 to 69 years old preferred enhancing the provision of social activities in the community, while other types of care services, including legal support, education about medical care, and services for improving neighbourhood relations, were required by those aged from 70 to 79 years old

(Zhou and Walker, 2016). Thus, it is anticipated that growing older indicates a higher risk of needing help with ADLs or IADLs.

Hypothesis 1a: The extent of social care needs varies by older people's demographic characteristics and the risk of needing social care needs in later life increases with age.

As for gender disparities, studies have found that older women tend to face a higher risk of having physical function impairments and reporting social care needs compared to their male counterparts (Teerawichitchainan and Knodel, 2018, Yang, 2020a). Ample evidence suggests that gender inequalities persist through one's life course, significantly influencing educational attainment, employment, financial status, and access to health insurance and medical help and that these factors lead to a higher risk of reporting worse health status amongst older women than older men (Vlachantoni, 2012, Heise et al., 2019, Browne et al., 2022). For example, using data from the 2005 wave of the CLHLS, Gu and Vlosky (2008) examined older Chinese people's long-term care needs in relation to ADL limitations. Their findings suggest that older Chinese women are more likely to need assistance with one or more ADLs compared to older men. Additionally, employing longitudinal data from the 2002, 2005, and 2008 waves of the CLHLS, Yang (2020a) found that older Chinese women faced a higher likelihood of requiring assistance with ADLs or reporting cognitive impairments than their male counterparts. Therefore, Hypothesis 1b posits that:

Hypothesis 1b: Older women are more likely to report social care needs for ADLs and IADLs compared to their male peers.

Numerous studies have also demonstrated the vital role of marital status in predicting physical and mental health problems in later life (Bennett, 2006, Robards et al., 2012, Xu et al., 2021). Using data from the National Health Interview Survey from 1997 to 2010, Liu and Zhang (2013) found that older people in the US who were married faced a lower likelihood of reporting

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disabilities relating to ADLs or IADLs. Employing data from a cohort survey in 2016 that investigated the health status of community-dwelling individuals aged 60 years and above living in Luan and Fuyang, two cities of Anhui Province in China, Xu et al. (2021) reported that older men who were unmarried or did not have a partner were more likely to report worse cognition status than those who were married. Trevisan et al. (2016) used data from respondents aged 65 years and over in the Progetto Veneto Anziani Study and reported that unmarried older men were more likely to identify as being frail compared to those who were married. Conversely, older women who were widowed faced a lower risk of physical frailty than those who were married (Trevisan et al., 2016).

The relationship between living arrangements and physical limitations in later life has also been well-researched. For instance, Weissman and Russell (2018) used longitudinal data from individuals aged 65 years and over from the 2009-2014 National Health Interview Survey to explore the associations between living arrangements and health in later life. Their findings suggest that older people living with others (i.e., not a spouse or partner) reported a worse health status compared to those living alone or with a spouse or partner. Additionally, they observed substantial gender disparities regarding living arrangements and health. Older women living alone face a higher risk of developing more health problems than those living with a spouse or partner (Weissman and Russell, 2018). Using data from the 2009 and 2011 waves of the Panel on Health and Ageing of Singaporean Elderly (PHASE), Gubhaju et al. (2018) found that older people living with children reported more disadvantaged socioeconomic status and worse mental health compared to those living with a spouse. Evidence from the Chinese context suggests that older people living alone are more likely to report lower life quality compared to those living with others (Sun et al., 2011). As evinced in this discussion, there has been no consensus concerning the relationship between marital status, living arrangements, and physical limitations in terms of ADLs and IADLs. Therefore, no hypotheses in this vein were proposed.

4.2.2.2 Socioeconomic characteristics

Educational attainment and income are two important socioeconomic factors that often correlate with health status in later life. The relationship between educational level and health has been well-explored (Conti et al., 2010, Arpino et al., 2018, Arpino and Solé-Auró, 2019). A higher level of education increases people's human resources by enhancing their knowledge and skills, influencing people's health over their life course (Conti et al., 2010). Older individuals with less educational attainments tend to report worse health conditions compared to their more educated counterparts (Zajacova and Lawrence, 2018). Yang et al. (2018) examined the disparities in older people's physical functions in relation to their socioeconomic status using longitudinal data from four waves (2002, 2005, 2008, and 2011) of the CLHLS and reported a significant positive association between higher educational attainment and fewer IADL-related limitations. Similarly, employing longitudinal data from the 1997, 2000, 2004, and 2006 waves of the CHNS, Liang et al. (2017) found that less educated older people faced a higher risk of IADL-related limitations.

In terms of income, lower incomes indicated less frequent social participation, diminished well-being, and worse self-evaluated health status amongst older people (Feng et al., 2020a, Qin and Xu, 2021). Using longitudinal data from the 2010 baseline and 2013 follow-up wave of the Japan Gerontological Evaluation Study, Ikeda et al. (2019) found that older people with lower incomes were faced with a higher risk of staying in the pre-frailty status compared to those with relatively higher incomes. Previous evidence from the CHNS showed that individuals with higher incomes were significantly more likely to report better self-reported health than those with lower incomes (Baeten et al., 2013). Qin and Xu (2021) utilised data from the Elderly Family Health Service Survey conducted in Shandong Province of China in 2017 and also noticed that older people with lower incomes were more likely to report worse self-reported health status (Qin and Xu, 2021). Based on existing

evidence regarding the relationship between socioeconomic indicators and health status, the third hypothesis regarding social care needs is as follows:

Hypothesis 1c: Older people with higher educational attainment or incomes are less likely to report social care needs compared to those with relatively lower educational attainment or income.

4.2.2.3 Health-related characteristics

A substantial body of literature has suggested the important link between cognition levels, chronic conditions, and limitations relating to ADLs and IADLs amongst older people (Lindbergh et al., 2016, Fong, 2019, Wu et al., 2017, Yang, 2020a, Qiao et al., 2022). Older people with worse health statuses in terms of chronic conditions and cognitive capabilities are more likely to report limitations in ADLs and IADLs (Fong, 2019, Kim et al., 2022). Wu et al. (2017) employed national-level representative data from the 2011 wave of CHARLS and reported a sizeable proportion of older people experiencing limitations in ADLs and frailty simultaneously. Qiao et al. (2022) used primary data from a local survey recruiting participants aged 60 years and over in Sichuan province in 2020 and found that older people with a higher frequency of hospitalisations, chronic diseases, and lower cognition levels were at an increased risk of reporting physical limitations in terms of ADLs. Using data from individuals aged 60 years and above living in Shanghai, Wang et al. (2021b) reported that cardio-metabolic dysfunction was a significant indicator for reporting limitations in terms of ADLs and IADLs, while mental health status was found to be significantly associated with limitations regarding IADLs.

Older people's health statuses can benefit from their lifestyles and health behaviours (Davies, 2011, McPhee et al., 2016, Roberts et al., 2017). Existing evidence suggested that regular physical activities were associated with a lower risk of chronic conditions and degradation in cognition and muscle strength (McPhee et al., 2016). More direct evidence has also been found regarding the relationship between physical activities and performance in

ADLs. Based on a meta-analysis of 47 randomised controlled experiments, Roberts et al. (2017) demonstrated that moderate exercise was helpful for improving older adults' physical functions regarding ADLs. On the one hand, smoking and drinking are substantial risk factors for premature mortality and developing chronic conditions, such as cardiovascular diseases (Grønbæk, 2009, West, 2017). On the other hand, some studies have reported a positive influence of moderate alcoholic drinks consumption on one's health (Towers et al., 2018). Using data from the Universidad Autónoma de Madrid and Seniors-ENRICA two cohort studies, León-Muñoz et al. (2017) found that individuals aged 60 years and above who consumed a moderate amount of alcoholic drinks per day were less likely to report limitations to ADLs or IADLs than non-drinkers. These findings suggest that health and lifestyle characteristics can be underlying predictors of social care needs for ADLs and IADLs in later life.

As discussed above, the associations between older people's social care needs and their socioeconomic and demographic characteristics have been explored extensively in previous studies. However, few attempts have been made to examine how early-life experiences impact social care needs in later life. The following section reviews the existing literature that has explored the far-reaching impacts of early-life experiences on socioeconomic status and health in adulthood and older age, offering inspiration for researching the associations between early-life factors and social care needs in later life.

4.2.2.4 Impacts of early life on later life

The negative impacts of exposure to adversities in early life on one's health in later life have been repeatedly highlighted in the literature (Flores and Kalwij, 2014, Kesternich et al., 2015, Ferraro et al., 2016, Hu, 2021, Hu and Wei, 2022). Employing data from participants who were older than 60 in the first three waves (2004, 2006, and 2008) of the Survey of Health, Ageing, and Retirement in Europe (SHARE), Arpino et al. (2018) reported the adverse impacts of childhood conditions on health in older age. Similarly, based on a

longitudinal analysis of the first seven waves of the SHARE, Flores and Wolfe (2023) suggested that childhood health was a significant predictor of health status over one's life course. For example, they noted that poor childhood health was significantly associated with incidences of cardiovascular diseases amongst men, while for women, poor childhood health was a strong predictor for the onset of cardiovascular diseases in early adulthood (Flores and Wolfe, 2023).

Studies conducted in the Chinese context have also observed the harmful impacts of early-life adversities on health. Chen et al. (2021b) used data from the 2014 Life History Survey of the CHARLS and found that older people with lower educational attainment, experiences of hunger, and poor family economic status were at a higher risk of developing depressive symptoms compared to their counterparts with more positive childhood experiences. Employing data from the 2014 Life History Survey and the 2015 follow-up wave of the CHARLS, Hu (2021) investigated the impact of multiple adverse childhood experiences on physical and mental health in older age. He found that older people aged 60 and over who experienced more adverse childhood experiences were more likely to report physical and mental health problems (Hu, 2021). Deng and Lindeboom (2022) analysed data from the 2010, 2012, and 2014 waves of the China Family Panel Studies (CFPS) to specifically examine the impact of experiences of famine on health in later life. A significant causal effect was found between early-life exposure to famine and diminished health amongst older Chinese women (Deng and Lindeboom, 2022). Based on a meta-analysis of 21 studies focusing on the lasting impacts of early-life experiences of famine, Li and Lumey (2017) found a higher prevalence rate of obesity, metabolic syndrome, and schizophrenia amongst older people born during the famine (1959-1961) than those born after.

Evidence from both Eastern and Western contexts suggests that early-life adversities have harmful and long-lasting impacts on later-life health. This raises the question of whether a similar association exists between early-life adversities and requiring help with ADLs and IADLs amongst older people.

Very few studies have attempted to address this question. Hu and colleagues (2020b)' work provides some insights into understanding the relationship between early-life adversities and limitations regarding ADLs and IADLs amongst older Chinese people with at least one chronic disease. Employing data from the 2013 follow-up wave and 2014 Life History Study of the CHARLS, they reported that older people who experienced hunger before the age of 17 were more likely to report limitations in terms of ADLs and IADLs compared to those with no such experiences (Hu et al., 2020b). However, their work was limited to older Chinese people with at least one chronic disease, did not include the analysis of social care needs for each task of ADLs or IADLs (Hu et al., 2020b).

In an effort to build upon the work of Hu et al. (2020b), 'early-life experiences of hunger' was selected to operationalise early-life adverse experiences. This decision was also based on the following considerations as well. To begin with, the theoretical evidence of examining experience of hunger in early life has been addressed in Section 3.4.3 (Mu and Zhang, 2011). Moreover, hunger and malnutrition in critical life periods have far-reaching effects on growth and development over the course of one's life (Barker, 2004, Kesternich et al., 2015). Childhood and adolescence are vital life stages, and malnutrition occurring in these critical life stages has long-term impacts on one's health status in later life (Ampaabeng and Tan, 2013, Norris et al., 2022). Therefore, 'experiences of hunger in early life' was selected as the proxy of adversities in early life and examined in the subsequent analysis of this study. The possible relationship between early-life adversities and social care needs regarding ADLs and IADLs is demonstrated in Hypothesis 1d:

Hypothesis 1d: Older people who experienced hunger early in their lives are more likely to require assistance with ADLs and IADLs than those with no such experiences.

4.3 Unmet needs for social care: operationalisation and predictors

Section 2.2.2 discussed the expanding social care needs of older Chinese people and the challenges related to providing sustainable support for them. Expanding upon this discussion, unmet needs are conceptualised as the gap between the demand for social care and its provision (Vlachantoni et al., 2011). Previous studies have adopted two types of measures for operationalising unmet care needs. First is the subjective and self-reported measurement of individuals' unmet needs (Allin et al., 2010). Second, the objective measurement is based on whether individuals receive help with specific ADLs or IADLs, with which they report difficulty (Yang and Tan, 2021).

Studies on unmet needs conducted in the Chinese context have investigated the extent of unmet needs, as well as their predictors (Zhu, 2015, Zhu and Österle, 2017, Chen et al., 2018b, Zeng et al., 2020). Regarding demographic factors, age and gender have been identified as being significantly associated with unmet needs (Gu and Vlosky, 2008, Hu and Wang, 2019). Hu and Wang (2019) utilised data from the second wave of the CHARLS and found that advanced age was associated with a lower risk of reporting unmet needs. Using data from the 2019 National Survey on Basic Public Service Delivery of Persons with Disabilities, Zhao and Wang (2021) noted that older men were less likely to report unmet needs compared to older women. With informal care serving as the most critical pillar in supporting older people, marital status, living arrangements, and the number of living children play a vital role in predicting unmet needs for social care (Zhao and Wang, 2021, Meng et al., 2021, Cao et al., 2023). Recent studies have shown that spouses and children are primary caregivers for older Chinese people (Yang and Tan, 2021). Living with families and having more living children also correlated with older people being more likely to receive timely and adequate support, leading to a lower risk of unmet needs (Hu and Ma, 2018, Jain and Sheehan, 2023, Cao et al., 2023). Based on these empirical findings, the following hypothesis

concerning the relationship between living arrangements and unmet needs was proposed:

Hypothesis 1e: Older people with fewer living children or living alone are more likely to report unmet needs compared to those with more living children and living with others.

Socioeconomic characteristics have also been investigated in terms of their impacts on the prevalence of unmet needs. Drawing on data from the 2005 and 2008 waves of the CLHLS, Peng et al. (2015) demonstrated that lower financial status and more difficulties with ADLs were significant determinants for reporting unmet needs amongst individuals aged 80 years and over in China. Employing data from the 2005, 2008, and 2011 waves of the CHARLS, Zhu (2015) suggested that financially dependent older people were more likely to report unmet needs than those who are financially independent. This may be because financial resources enable older people to have their long-term care needs met, and their families have more options for obtaining support (Choi and McDougall, 2009, Wang et al., 2021a).

Rural-urban disparities in terms of unmet needs are also salient factors to consider. Gu and Vlosky (2008) found a higher prevalence of unmet needs for ADLs amongst older people living in rural areas than for those living in urban areas. Zhu and Österle (2017) used data from respondents with functional limitations who were 45 years and older in the second wave (2013) of the CHARLS to examine how hukou status and residing in rural or urban communities influenced the unmet long-term care needs of older people. Their findings suggest significant rural-urban disparities amongst middle-aged and older people, specifically that hukou status rather than residential area plays a determining role in geographic disparities (Zhu and Österle, 2017). Future studies can further examine the geographic disparities in unmet needs between different regions of China to expand Zhu and Österle's work. Rural-urban disparities of unmet needs might be different based on the economic deveopment of certain regions (Yin et al., 2018a). Hu and Ma (2018)

investigated the relationship between unmet care needs and depressive symptoms amongst older people by analysing data from the 2013 wave of CHARLS, observing evident disparities in unmet needs and depression between individuals living in rural and urban areas (Hu and Ma, 2018). Based on the disparities regarding unmet needs between rural and urban hukou, Hypothesis 1f is proposed:

Hypothesis 1f: Older people with rural hukou are more likely to have unmet needs compared to those with urban hukou.

Additionally, other studies have emphasised the relationship between received care and unmet needs. Employing data from the 2015 wave of the CHARLS, Yang and Tan (2021) critically examined the association between the intensity of received informal care and unmet needs amongst older Chinese people with difficulties in ADLs or IADLs. According to their findings, high intensity of informal care was associated with a diminished risk of unmet needs for IADL(Yang and Tan, 2021).

As noted above, the majority of studies on unmet needs have relied on cross-sectional analyses that overlooked factors indicating early life impacts. However, a recent study conducted by Hu and Wei (2022) was amongst the first to attempt to examine the effects of early-life adversities on unmet needs in older age. The authors creatively explored how abusive family relationships in childhood impacted unmet needs amongst Chinese individuals aged 60 and above based on data from the 2014 Life History Study and the third wave of the CHARLS. Their findings suggest that older people who had dysfunctional family relationships in childhood were more likely to have unmet needs compared to those without such experiences (Hu and Wei, 2022). Their study sheds light on the impacts of early-life adversities on unmet needs for social care in later life and helps guide further explorations regarding the impacts of other early-life adversities. Based on evidence suggesting that older people with financial difficulties are more likely to report unmet needs (Peng et al.,

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2015), along with the insights of cumulative advantages and disadvantages theory (Crystal and Shea, 1990), Hypothesis 1g was formulated as follows:

Hypothesis 1g: Early-life experiences of hunger increase the risk of reporting unmet needs in later life.

4.4 Empirical studies on the dynamics of social care needs

Studies employing longitudinal data to investigate older people's social care needs have primarily focused on the trend of disabilities related to ADLs and IADLs (Feng et al., 2013, Sjölund et al., 2014, Yu et al., 2016). A declining trend in disabilities related to ADLs and IADLs has been observed, suggesting a improvement in older Chinese people's functional capabilities (Feng et al., 2013, Liang et al., 2015). Drawing on data from four waves between 1998 and 2008 of the Shanghai longitudinal survey, Feng et al. (2013) found that older people were less likely to be ADL- and IADL-disabled in 2008 than they were in 1998. Employing data from the 1997, 2000, 2004, and 2006 waves of the CHNS, Liang et al. (2017) reported that the declining trend in ADL disabilities was statistically significant amongst the younger older group (60–69), older women, and individuals residing in rural areas, while the declining trend in IADL disabilities was significant across all subgroups (Liang et al., 2017).

Compared with studies on prevalence or incidence of social care needs and unmet needs amongst older population, there is a relatively small body of literature examining how older individuals' social care needs and unmet needs may change over time. It is worth noting that one specific example of research exploring the dynamic trajectories of unmet needs amongst older English people offers critical insights into the dynamics of unmet needs amongst older people (Vlachantoni et al., 2022). Employing data from Waves 8 and 9 of the ELSA, Vlachantoni et al. (2022) identified five possible dynamic patterns capturing the possible changes in unmet needs for social care. Their findings indicated that reporting social care needs or unmet needs can be either temporary or stable, and a sizeable proportion of older people reported unmet needs in terms of bathing and dressing from Wave 8 to 9. Age, gender, living

arrangements, marital status, and changes in physical functions related to ADLs were found to be significant predictors for reporting different dynamic patterns regarding social care needs and unmet needs (Vlachantoni et al., 2022). Based on the empirical evidence and longitudinal analyses concerning the dynamics of needs and unmet needs, three hypotheses of the second set of research questions were proposed:

Hypothesis 2a: The dynamic patterns of social care needs and unmet needs are associated with individual characteristics.

Hypothesis 2b: Older people with declining functions in terms of ADLs over time tend to experience repeated unmet needs compared to those reporting similar or improved functions.

Hypothesis 2c: Older people living alone are more prone to having repeated unmet needs compared to those living with others.

4.5 Application of the Andersen behavioural model in the Chinese context

The Andersen behavioural model as a key analytical framework was discussed in detail in Section 3.3. Researchers have employed this framework to explore the determinants for utilising health care, long-term care, the intention of using care, care preferences, and needs and unmet needs for social care (Willis et al., 2007, Zhu, 2015, Hu and Ma, 2018, Slobbe et al., 2017). It is essential to draw insights from these previous empirical studies using the Andersen framework to understand what variables are necessary to operationalise predisposing, enabling, and need factors. Predisposing factors are often composed of age, gender, and marital status (Zeng et al., 2019, Slobbe et al., 2017, Travers et al., 2020). In particular, there are notable disparities in the exact variable researchers have employed to address these predisposing factors. For instance, Slobbe et al. (2017) chose age, gender, and region as proxies of predisposing factors. Li et al. (2016) included ethnicity as a predisposing factor to examine the effects of predisposing,

enabling, and need factors on using health care services amongst people in rural Guangxi province, which is known for being home to multiple ethnic minorities (Dai et al., 2018). Hu and Wang (2019) adopted the Andersen framework to examine the relationship between unmet needs and depression, employing residence areas as a proxy of rural-urban disparities in terms of predisposing factors.

Amongst studies on the predictors for using long-term care and unmet care needs, education, income, household size, housing tenure, living arrangements, and the number of living children have been included in the range of enabling resources (Li et al., 2016, Fu et al., 2017, Peng et al., 2020). Much like with predisposing factors, there has been no consensus regarding the selection of enabling factors. For example, Li et al. (2016) employed the time spent travelling to the nearest health facilities, the cost of medical treatment, and health insurance coverage to operationalise enabling resources while enabling resources in the study conducted by Peng and colleagues' study consisted of household income, living arrangements, the number of living children, and social support (Peng et al., 2020).

Need factors are perhaps the strongest determinants for using social care and health care (Andersen, 1995). Difficulties in physical functions are usually employed as a need factor for using social care. For example, Slobbe et al. (2017) used difficulties related to ADLs as a need factor to examine the predictors of using long-term care for the first time. Similarly, Fu et al. (2017) employed physical functions in terms of ADLs and IADLs, as well as chronic diseases, as need factors to explore older Chinese people's social care needs.

The above-mentioned studies show the flexibility of choosing different variables to operationalise predisposing, enabling, and need factors to serve different research aims. The Andersen model employed in previous studies is the classic model (displayed in Figure 3.2) without applying the dynamic perspective. By employing the phase-4 Andersen model (see Figure 3.3) and

the changes in older people's health status over time into the analysis, this study provides a novel perspective to the exploration of how improvements or degradation in physical functions can further influence the dynamics of social care needs and unmet needs amongst older Chinese people.

4.6 Identifying gaps in the empirical literature

Although extensive studies have been conducted regarding the needs and unmet needs of older people in China (Choi and McDougall, 2009, Zhen et al., 2015, Chen et al., 2018b), gaps remain in terms of the dynamic changes in social care needs and unmet needs across different time points, as well as how early-life experiences impact later-life social care needs.

As previously discussed, most studies have overlooked exploring needs and unmet needs through the lens of the life course perspective, focusing instead on underlying factors related to contemporary personal characteristics. (Peng et al., 2015, Cao et al., 2023). Additionally, few studies have attempted to understand the changes in needs and unmet needs amongst older people over time, especially in the Chinese context. This study addresses these gaps by providing a detailed and comprehensive examination of the extent of social care needs and unmet needs, their dynamics, and the underlying predictors through the lens of the life course perspective.

4.7 Conceptualising predictors of social care needs, unmet needs, and their dynamics over time

The conceptual framework illustrated in Figure 4.1 is based on Andersen's behavioural model, the ageing and health framework proposed by the WHO, the life-course perspective, and the empirical findings discussed in this chapter. The core concept of social care needs is related to intrinsic capacity and functional ability borrowed from the ageing and health framework (World Health Organization, 2015). Predisposing factors included demographic characteristics, genetic factors, health beliefs, and social structure. Enabling resources encompassed individual- and community-level factors. Individual resources were related to income and access to health insurance and regular

medical treatments (Andersen, 1995, Fu et al., 2017, Hu et al., 2020b, Hu and Wei, 2022). Community resources concerned whether the community could provide a convenient and stable source of assistance.
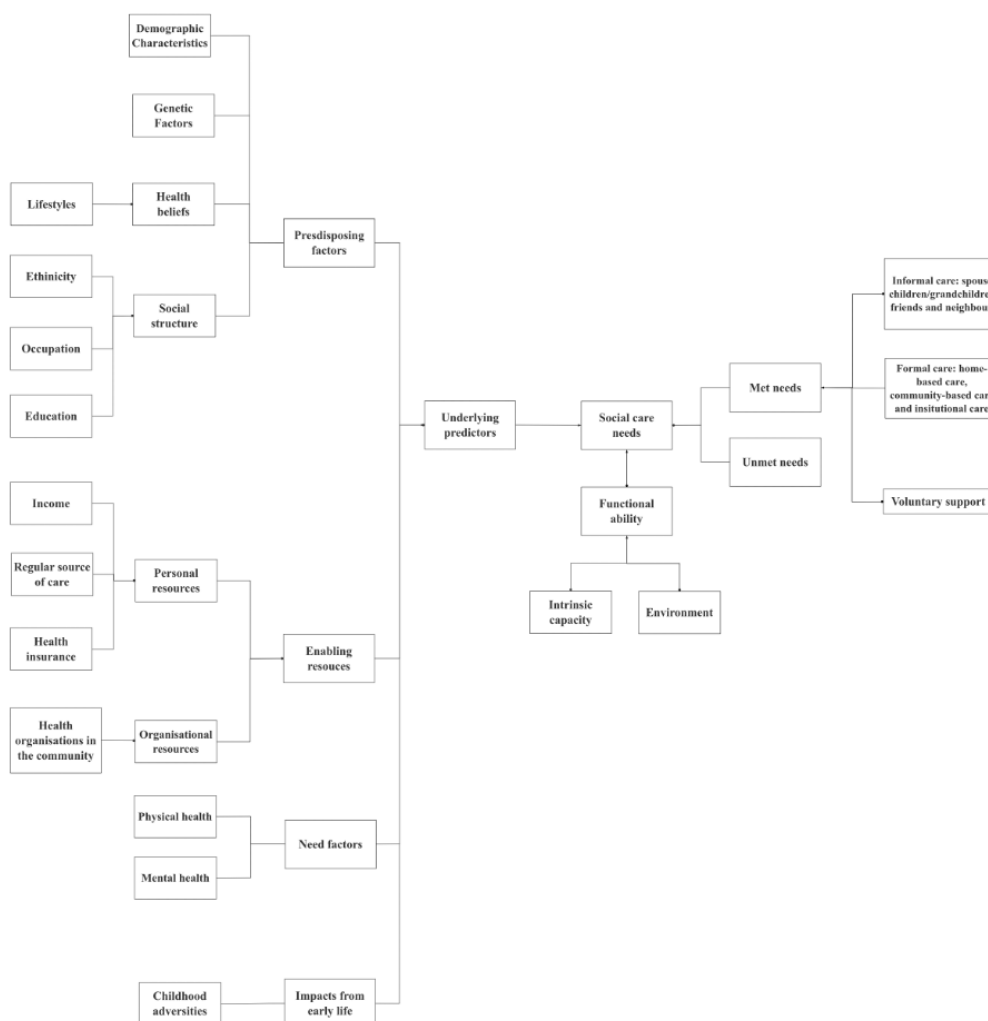
Figure 4.1 The conceptual framework for this exploration of the underlying predictors for needs and unmet needs for social care

Source: The author's work based on the Andersen model, the life-course perspective, and the ageing and health framework, as well as existing findings on social care needs and unmet needs of older adults.

Need factors comprised physical and mental health. 'Experiences of hunger' was selected as the proxy of adverse experiences in early life. Chapter 2 provided detailed information on the source of assistance for older people in

China (see Section 2.4), which helps to conceptualise how social care needs are met or unmet.
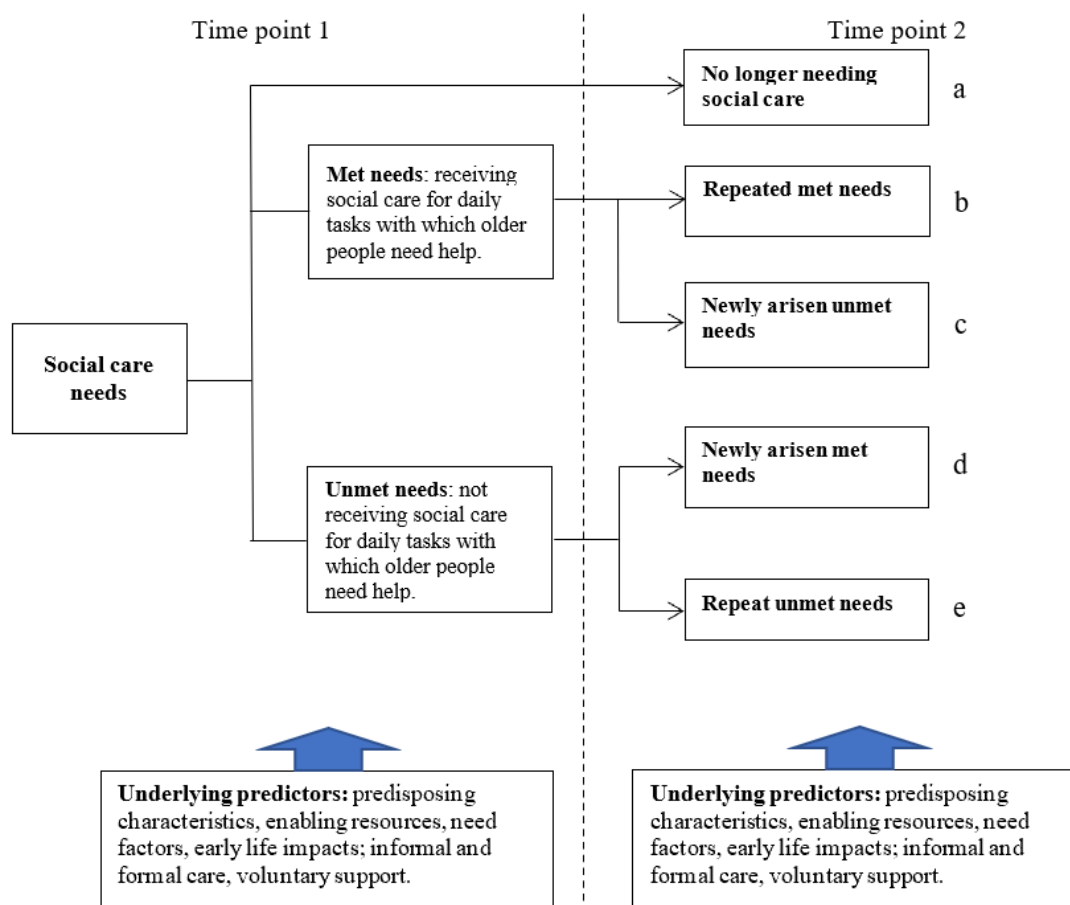
Figure 4.2. The conceptual framework of dynamic social care needs and unmet needs across two points of time

Source: Author's adaptation and organisation based on the work of Vlachantoni et al. (2022).

Figure 4.2 presents the conceptual and analytical framework related to the dynamic social care needs and unmet needs in later life. This framework is based on the discussion regarding the determinants of social care needs and unmet needs in the framework displayed in Figure 4.1, as well as the conceptual framework developed by Vlachantoni and colleagues depicting five dynamic patterns capturing the changes in social care needs and unmet needs (Vlachantoni et al., 2022), which include no longer needing social care, repeated met needs, newly arisen unmet needs, newly arisen met needs, and repeated unmet needs. A) 'No longer needing social care' refers to the

transition from reporting social care needs at Time Point 1 to not needing any help with daily activities at Time Point 2, indicating the potential for relinquishing one's dependency on other's help and adaptation to adversities in later life (World Health Organization, 2015). B) 'Repeated met social care needs' suggests that an individual with social care needs receives assistance with the tasks for which they report needing support at Time Points 1 and 2. C) A person who reports social care needs and receives sufficient daily assistance at Time Point 1 but not at Time Point 2 is classified as having 'newly arisen unmet needs.' D) 'Newly arisen met needs', on the other hand, refers to situations where people report unmet needs at Time Point 1 but subsequently receive adequate care, leading to having their needs met at Time Point 2. E) 'Repeated unmet needs' is the dynamic pattern denoting that people report unmet needs at both Time Points 1 and 2 (Vlachantoni et al., 2022).

4.8 Chapter summary

This chapter provided a critical review of the literature pertaining to older people's social care needs and unmet needs, identified gaps in the existing research, proposed hypotheses targeting each research question, and detailed the conceptual frameworks. The main body of this chapter included a discussion of needs and unmet needs for social care, and dynamic needs over two different time points amongst older people. The conceptual frameworks that were developed to address the first and second research questions were built on the theoretical frameworks presented in Chapter 3 and the previous empirical findings analysed in this chapter. The following chapter presents a detailed discussion of the data and methods employed in this study.

Chapter 5 Methodology

5.1 Chapter overview

This chapter presents the methodology employed in this thesis, which was shaped by the research aims, research design, and research questions. The justification of the selected quantitative methods is discussed in Section 5.2. Then, the secondary dataset employed to address the research questions is introduced in Section 5.3. Section 5.4 describes the screening process of the analytical sample used for addressing the first and second sets of research questions. Section 5.5 focuses on operationalising the conceptual framework through a detailed description of how each independent and outcome variable was measured. The analytical plan is presented in Section 5.6 to show how the first and second sets of research questions were addressed through cross-sectional and longitudinal analysis. Table 5.1 outlines the analytical strategy used to visualise the data and methods employed to address the first and second sets of research questions. Ethical approval of the second data analysis was obtained from the University of Southampton's Ethics and Research Governance (ERGO) Committee on the 11th November, 2020. All statistical analyses were conducted using Stata version 18.0 (StataCorp, College Station, TX).

Table 5.1 The outline of the analysis plan for each set of research questions

Research Question 1	Research Question 2
a) What is the extent of older people's social care needs and unmet needs? b) How does the extent of older people's social care needs and unmet needs vary by their demographic and socio-economic characteristics and early life adversities? Data: the 2014 Life History Survey and 2018 Wave 4 of the CHARLS Methods: The descriptive, bivariate, and multivariate analysis methods were employed, including the Chi-2 test, Fisher exact test, logistic regression, and Poisson regression models.	a) How do older people's social care needs and unmet needs change over time? b) What are the underlying factors associated with different dynamic patterns of these needs? Data: the 2014 Life History Survey, 2015 Wave 3, and 2018 Wave 4 of the CHARLS Methods: The descriptive, bivariate, and multivariate analysis methods were employed, including the Chi-2 test, Fisher exact test, and logistic regression models.

Sources: Author's work

5.2 Justification of quantitative methods

Considering the research aims of this thesis, which were to understand the extent of older people's needs and unmet needs for social care and explore the dynamic patterns of those needs in later life, quantitative methods were more appropriate than qualitative methods for the following reasons. First, quantitative methods are suitable for constructing reliable measurements of independent and outcome variables, coinciding with the framework presented in Section 4.7. Second, using quantitative methods based on the national-representative survey data fit the goal of exploring the extent of older Chinese people's needs and unmet needs for social care. By comparison, utilising qualitative methods would be useful in terms of understanding an older individual's reflection of needing help in daily life or not receiving adequate support. However, such an understanding was not helpful for addressing the research questions of this study. Third, results based on quantitative methods and national representative datasets are useful for making statistical inferences from the analytical sample to the ageing population. Such an analytical strategy was suitable for this study since it aimed to provide population-based empirical evidence and offer policy suggestions regarding improvements to the social care system for older Chinese people (Queirós et al., 2017). Finally, using quantitative methods and high-quality survey data helped save time, money, and energy when time was limited. Although this methodological decision inevitably overlooked older people's own reflections on needing social care and reporting their unmet needs in this study, future studies could potentially build upon this limitation by integrating both qualitative and quantitative methods to gain a better understanding of the topic at hand.

5.3 Data resource: the China Health and Retirement Longitudinal Study

The CHARLS, supported by Peking University and the National Natural Science Foundation of China, the Behavioural and Social Research Division

of the National Institute on Aging, and the World Bank,[10] was selected because of its broad exploration of the ageing experiences of Chinese people, providing researchers and other stakeholders with high-quality microdata (Zhao et al., 2020). The design of the questionnaire references international longitudinal surveys on ageing populations, such as the Health and Retirement Survey (HRS) in the US and the English Longitudinal Study of Ageing (ELSA). The CHARLS survey was first conducted in 2011, with follow-up surveys being administered every two or three years. To date, four follow-up waves have been completed in 2013, 2015, 2018, and 2020. In addition, several other surveys, including the 2008 Pilot Survey and the 2014 Life History Survey, have been carried out as well. To date, researchers have access to the 2008 Polit Survey, the 2014 Life History Survey, the 2011 baseline survey data, and the follow-up data from Waves 2-5 (2013-2020).[11] By the end of Wave 4 of the CHARLS in 2018, 12,400 households and 19,000 residents aged 45 years and above had been recruited from 28 provinces, 150 counties, and 450 communities (villages).[12] However, since data from Wave 5 (2020) was made available to the public only on November 16, 2023, it was not included in this thesis due to time limitations (ZHAO et al., 2023).

The CHARLS questionnaire contains several modules in order to collect a comprehensive profile of respondents' information concerning their a) demographic characteristics, b) family structures and transfers, c) physical and mental health status, d) medical help utilisation and insurance, e) work and retirement, f) pension, g) income, costs, and, assets, and h) house property.

In particular, the 2014 Life History Survey collected reflective information on respondents' childhood, including their childhood experiences and socioeconomic status and their neighbourhood environment while growing up.

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[10] Detailed information of the CHARLS is accessible at: https://charls.pku.edu.cn/en/About/About_CHARLS.htm
[11] The last time this was checked was March 18, 2024.
[12] Data sources, accessible: https://charls.pku.edu.cn/gy/gyxm.htm

Respondents recruited for the 2014 Life History Survey were composed of all living respondents from the baseline and Wave 2. This information was of critical importance in providing an essential foundation for examining the impacts of early-life experiences on health, social care needs, and unmet needs in later life.

In conclusion, the CHARLS dataset was appropriate for this study because it offered interdisciplinary, multidimensional, and high-quality nationally representative sample data for investigating the older Chinese population (ZHAO et al., 2023). By providing detailed information on older Chinese people's needs for help in terms of ADLs and IADLs, as well as rich data on sources of daily support, this dataset allowed this research to explore their needs and unmet needs in greater detail. Additionally, five available waves of CHARLS spanning over a decade enable researchers to explore the current extent and track the dynamics of social care needs and unmet needs in later life, which are suitable for addressing the first and second set of research questions of this study.

5.4 The analytical samples used for the first and second sets of research questions

5.4.1 The samples of the CHARLS

The CHARLS collects detailed and comprehensive data on Chinese individuals aged 45 and older, offering high-quality survey information to understand the middle-aged and older population in China. Table 5.2 displays the basic demographic characteristics of the sample from the 2014 Life History Survey, as well as the 2015 and 2018 follow-up surveys. The 2014 Life History Survey includes 20,543 respondents, with 9,006 individuals aged 60 and older, representing approximately 43.8% of the sample. The 2015 follow-up survey contains 21,097 respondents, about half of whom were aged 60 and over. In the 2018 follow-up wave, 10,800 respondents were aged 60 and older, making up 54.5% of the sample. Approximately 84.5% of the 2014 Life History Survey respondents participated in Wave 4, and over 80%

participated in both Waves 3 and 4. This relatively low attrition rate ensures a sufficient sample size for longitudinal studies and enhances the generalizability of the findings. The sample distribution by gender and hukou status aligns with the 2022 census, which shows a higher proportion of middle-aged and older women compared to men, with the majority having agricultural hukou. However, a limitation of using the CHARLS to study the social care needs and unmet needs of older Chinese individuals is the potential underrepresentation of those aged 80 and over, which may lead to an underestimated prevalence of needs and unmet needs.

Table 5.2 The basic demographic characteristics of the sample from the 2014 Life-History Survey, the 2015 and 2018 follow-up waves of the CHARLS

	2014 Life History Survey			2015 Follow-up Survey			2018 Follow-up Survey		
	n	%	weighted %	n	%	weighted %	n	%	weighted %
Age groups									
under 45	1,830	8.9	6.4	1,280	6.1	3.9	297	1.5	1.2
45-59	9,664	47	47.5	9,874	46.8	47.8	8,654	43.7	42.8
60-69	5,637	27.4	27.8	6,177	29.3	28.8	6,496	32.8	33.1
70-79	2,595	12.6	13.4	2,819	13.4	13.8	3,196	16.1	16.3
80+	774	3.8	4.7	849	4	5.1	1,108	5.6	6.3
missing	43	0.2	0.2	98	0.5	0.6	65	0.3	0.3
Gender									
male	9,752	47.5	47.3	10,062	47.7	47.4	9,341	47.1	47.5
female	10,791	52.5	52.7	11,030	52.3	52.6	10,475	52.9	52.5
missing	0	0	0	5	0	0	0	0	0
Hukou status									
urban hukou	18,104	90	87.7	4,155	19.7	22.2	4,171	21	26.1
rural hukou	1,838	9.1	11.1	14,207	67.3	65.5	13,927	70.3	66
missing	167	0.8	1.1	2,707	12.8	12.1	1,693	8.5	7.8
do not know	0	0	0	0	0	0	0	0	0
no hukou	10	0	0.1	28	0.1	0.2	25	0.1	0.1
refuse to answer	0	0	0	0	0	0	0	0	0
Total	20,543	100	100	21,097	100	100	19,816	100	100

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS. The percentages shown in Table 5.3 include unweighted and weighted results.

5.4.2 The analytical samples used for the first set of research questions

Three groups of analytical samples were used for the first set of research questions, which explored older Chinese people's contemporary needs and unmet needs for social care. The analytical samples used to address social care needs was composed of respondents meeting the following criteria: 1a) having taken part in the 2014 Life History Survey and Wave 4 (2018) of the CHARLS, 1b) aged 60 years or older at Wave 4, 1c) having complete information regarding the independent and outcome variables, and finishing the Health Status and Functioning module during the interview without the help of a proxy. In addition to these requirements, the analytical samples used for addressing unmet needs for ADLs and IADLs included respondents meeting another criterion: 1d) needing help with at least one ADL or IADL at Wave 4. Taking into account these requirements, the processes of screening the analytical samples addressing the first set of research questions are explained in Figures 5.1.

As shown in Figure 5.1, three steps of sample screening were conducted to construct the analytical sample employed to address questions concerning contemporary social care needs. There were 20,543 respondents in the 2014 survey and 19,816 respondents in the Wave 4. Respondents who did not take part in the 2014 or Wave 4 surveys were excluded (n=5,633), leaving 17,324 respondents who took part in both the 2014 and Wave 4 surveys. Then, respondents who were younger than 60 years old at Wave 4 were excluded (n=7,563), leaving 9,761 respondents. The next step was excluding respondents with missing values for each chosen variable or finishing the Health Status and Functioning module with the help of a proxy (n=497+737=1,234), **leaving 8,527 respondents who meet 1a, 1b and 1c criteria and comprised the analytical sample utilised to understand social care needs.**

An extra step was required to obtain the analytical sample used to address unmet needs, which involved excluding respondents who did not need help

with ADLs (n=7,775) or IADLs (n=6,366). **Thus, the analytical sample addressing unmet needs for ADLs included 752 respondents meeting above 1a, 1b, 1c, and 1d four criteria, while 2,161 respondents were included in the analytical sample addressing unmet needs for IADLs.** The basic descriptive profile of the analytical sample used to address social care needs is shown in Table 6.1, while the descriptive profiles of the analytical samples used to address unmet needs for ADLs and IADLS are displayed in Tables 7.1 and 7.6, respectively.
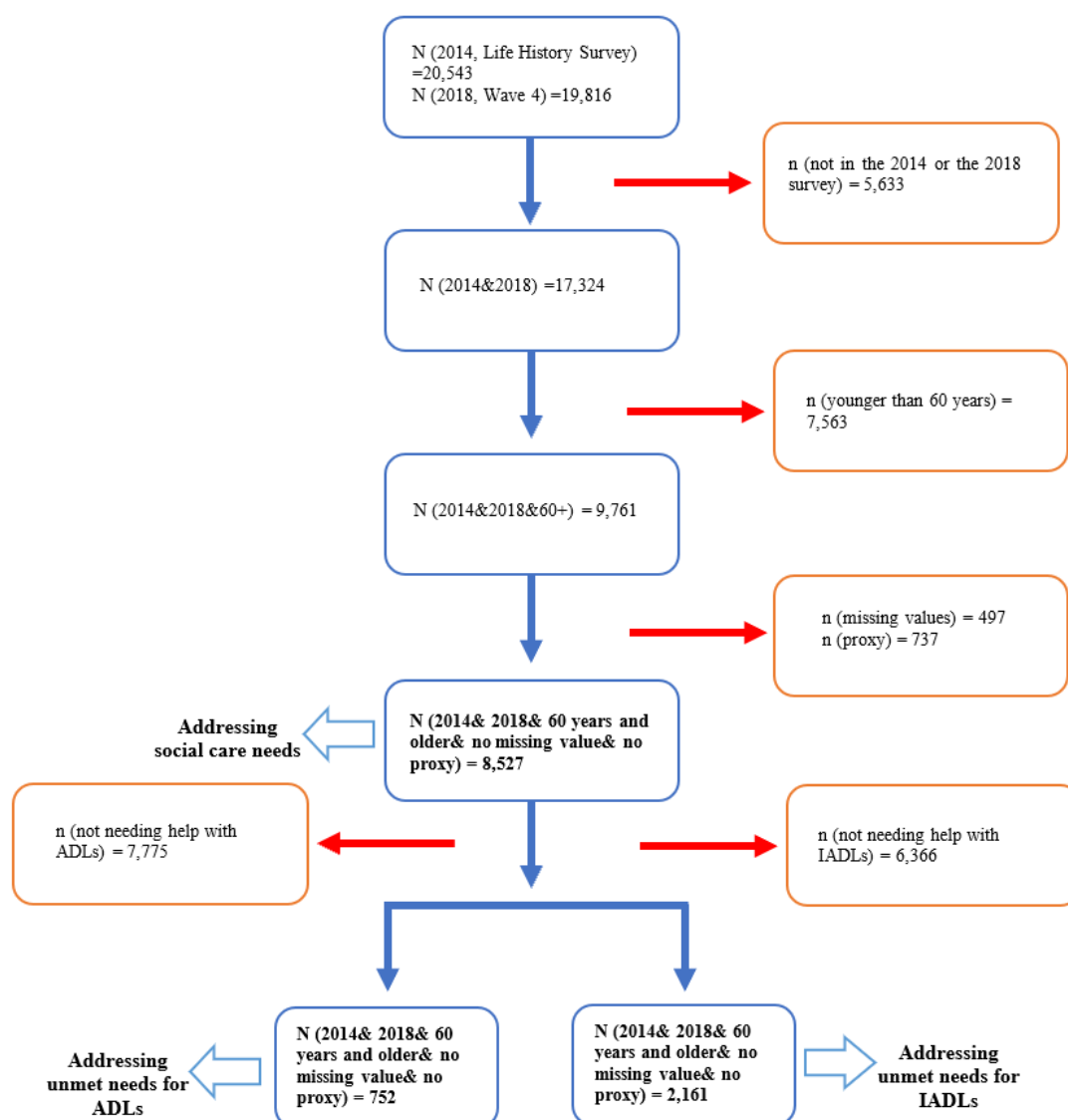
Figure 5.1 The process of screening the analytical samples for the first research question
Source: Author's analysis based on the 2014 Life History Survey and 2018 Wave 4 of the CHARLS.

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5.4.3 The analytical samples used for the second set of research questions

For the second set of research questions, the analytical sample was composed of respondents who met the following requirements: 2a) having taken part in the 2014 Life History Survey and Waves 3 (2015) and 4 (2018) of the CHARLS, 2b) aged 60 years or older at Wave 3, reporting complete information for each variable, finishing the Health Status and Functioning module during the interview without the help of a proxy, and 2c) needing help with at least one ADL or IADL at Wave 3.

Figure 5.2 displays the screening process regarding the analytical sample used to address the second set of research questions, which addressed the dynamics of social care needs and unmet needs in later life. Three screening steps were conducted to obtain the final analytical sample. The first step was excluding respondents who did not take part in the 2014 Survey, Wave 3, or Wave 4 of the CHARLS (n=7,226), leaving 16,493 respondents who had taken part in all three surveys. The second step was to exclude respondents who were younger than 60 years old at Wave 3 (n=8,722), reported missing values for the independent or outcome variables (n=1,493), and completed the interview for the Health Status and Functioning module with the help of a proxy (n=577), leaving 5,701 respondents. Respondents who did need help with ADLs (n=5,317) and IADLs (n=4,443) were also excluded from the final sample in the following step. **Thus, the analytical sample addressing the dynamics of social care needs and unmet needs for ADLs consisted of 384 respondents, while the other sample used for addressing the dynamics of social care needs and unmet needs for IADLs included 1,258 respondents.** The descriptive profile of the analytical sample employed to address the dynamics of social care needs and unmet needs for ADLs is displayed in Table 8.1, while the one used to address such dynamics regarding IADLs is displayed in Table 8.6.
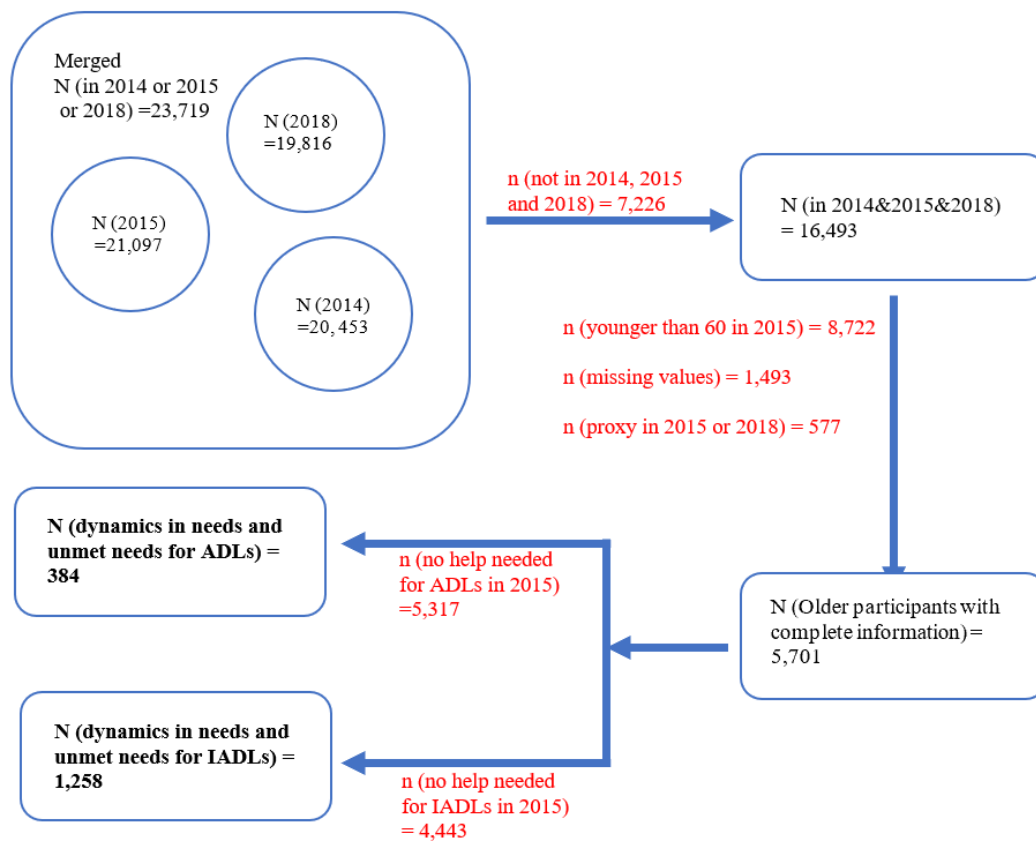
Figure 5.2 The process of screening the analytical samples for the second research question

Source: Author's analysis based on the 2014 Life History Survey, the 2015 Wave 3 and 2018 Wave 4 of the CHARLS.

5.5 Operationalisation of outcome and independent variables using the CHARLS

5.5.1 Operationalising the conceptual framework using the CHARLS

Underlying predictors of social care needs, unmet needs, and their dynamics
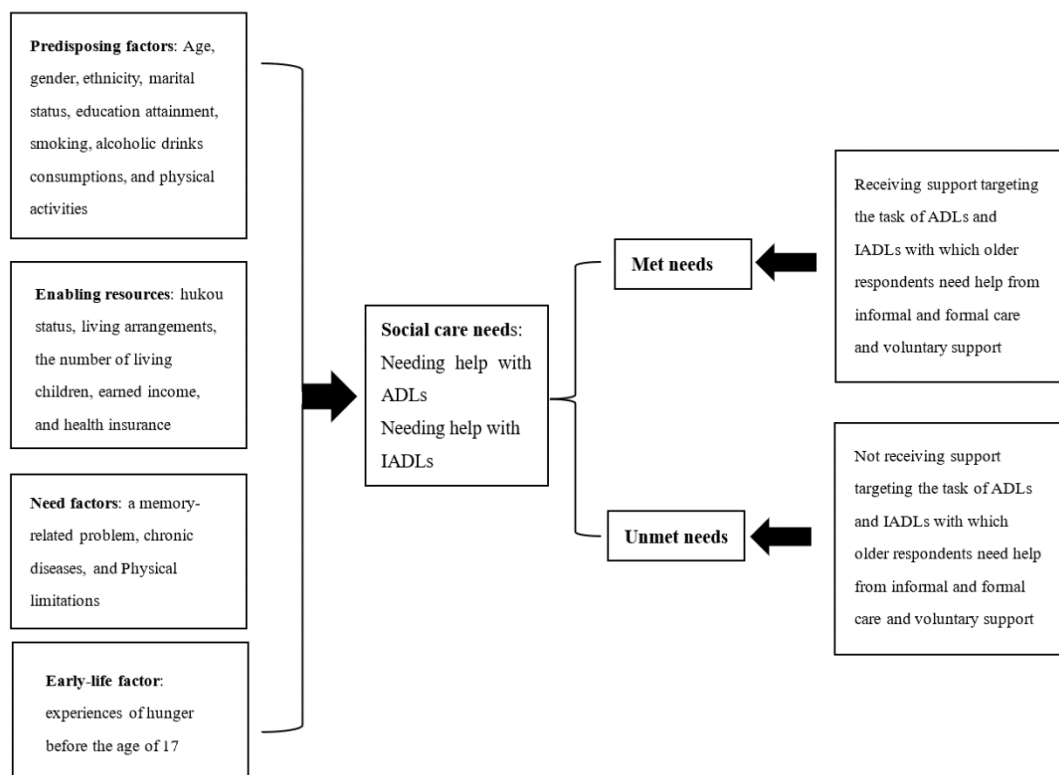
Figure 5.3 Operationalising the conceptual framework displayed in Figure 4.1 based on data from the CHARLS

Source: Author's work based on the information from the CHARLS dataset.

Figure 5.3 illustrates how the conceptual framework displayed in Figure 4.1 was operationalised based on the CHARLS dataset. The CHARLS offers abundant information on respondents' basic demographics, socioeconomic status, health status, and physical functioning, as well as their income, expenditure, and household assets. Based on the information available in the CHARLS datasets and existing evidence for the predictors of needs and unmet needs, predisposing factors included age, gender, ethnicity, marital status, educational attainment, smoking, alcoholic drinks consumption, and physical activities. Enabling resource factors consisted of hukou status, living

arrangements, the number of living children, earned income, and health insurance. Need factors comprised memory-related problems, chronic diseases, and physical limitations regarding ADLs and IADLs. Since there was little information about genetic and organisational factors, these were not considered when operationalising the predictors. Social care needs were operationalised based on respondents reporting that they required assistance with ADLs and IADLs. Unmet needs were operationalised based on the information concerning whether respondents who reported social care needs received sufficient help. The detailed measures of key variables are demonstrated in the following sections. The specific operationalisation and construction of each variable using data of the CHARLS are listed in Appendix A and B.

5.5.2 Measures of outcome variable

As discussed in Sections 3.2 and 4.2.1, respondents needing help with at least one ADL or IADL were identified as reporting **social care needs** for ADLs or IADLs (World Health Organization, 2015, World Bank, 2015). **Unmet needs** in this study were conceptualised as needing help with ADLs and IADLs but not getting adequate support (Vlachantoni et al., 2011).

The measurement of social care needs and unmet needs for ADLs and IADLs can be demonstrated with the help of an example drawn from the questionnaire of Wave 4 of the CHARLS:

"**DB010** *Because of health and memory problems, do you have any difficulty with dressing? Dressing includes taking clothes out from a closet, putting them on, buttoning up, and fastening a belt.*

1. No, I don't have any difficulty

2. I have difficulty but can still do it

3. Yes, I have difficulty and need help

4. I cannot do it

DB010_W2 *Does anyone ever help you dress?*

1. Yes

2. No"

If respondents reported '*Yes, I have difficulty and need help*' or '*I cannot do it*', they were identified as needing help with at least one ADL or IADL. If they further confirmed that no one helped them with that specific daily task, they were identified as reporting unmet needs for at least one ADL or IADL (Hu and Wang, 2019).

In the CHARLS, respondents were asked to evaluate their abilities in performing six ADLs and six IADLs. The ADLs are eating, bathing, dressing, getting into or out of bed, using the toilet, and controlling urination and defecation. The IADLs are cooking, doing housework, shopping for groceries, making phone calls, taking medications, and managing money. As underscored in Section 4.2.1, it is essential to explore social care needs and unmet needs for ADLs and IADLs, respectively. Table 5.3 displays three sets of outcome variables that were created in order to gain an in-depth understanding. For ADLs, the first set of variables was binary, reflecting whether an older respondent reported social care needs or unmet needs for at least one ADL (1=Yes, 0=No) (Teerawichitchainan and Knodel, 2018). The second set of variables was also binary, indicating whether an older respondent required help or reported unmet needs for each ADL task (Chen et al., 2018b). The third outcome variable was the sum number of the tasks for which an older respondent reported social care needs, ranging from 1 to 6 (Yang and Tan, 2021, Hu and Wang, 2019). The group of older respondents with no social care needs or unmet needs was treated as the reference group in the multivariate analysis. The construction of social care needs and unmet needs for IADLs followed the same logic as for ADLs.

Table 5.3 Outcome variables of RQ1 and RQ2

	Variables	ADLs	IADLs
The first set of research questions	Social care needs	a) Needing help with at least one ADL (1=Yes, 0=No) b) Needing help with each ADL task, e.g., needing help with bathing (1=Yes, 0=No) c) Number of social care needs for ADLs (0 to 6)	a) Needing help with at least one IADL (1=Yes, 0=No) b) Needing help with each IADL task, e.g., needing help with cooking (1=Yes, 0=No) c) Number of social care needs for IADLs (0 to 6)
	Unmet needs	a) Unmet needs for at least one ADL (1=Yes, 0=No) b) Unmet needs for each ADL task, e.g., unmet needs for bathing (1=Yes, 0=No)	a) Unmet needs for at least one IADL (1=Yes, 0=No) b) Unmet needs for each IADL task, e.g., unmet needs for cooking (1=Yes, 0=No)
The second set of research questions	Dynamic social care needs and unmet needs	a) No longer having social care for ADLs (1=Yes, 0=No) b) Repeated needs met for ADLs (1=Yes, 0=No) c) Newly arisen unmet needs for ADLs (1=Yes, 0=No) d) Newly arisen met needs for ADLs (1=Yes, 0=No) e) Repeated unmet needs for ADLs (1=Yes, 0=No)	a) No longer having social care for IADLs (1=Yes, 0=No) b) Repeated needs met for IADLs (1=Yes, 0=No) c) Newly arisen unmet needs for IADLs (1=Yes, 0=No) d) Newly arisen met needs for IADLs (1=Yes, 0=No) e) Repeated unmet needs for IADLs (1=Yes, 0=No)

Sources: Author's work

For the longitudinal analysis targeting the second set of research questions, as shown in Figure 4.2, five possible dynamic patterns were identified for how social care needs and unmet needs change from Time Point 1 to Time Point 2. Specifically, using longitudianl data from Waves 3 and 4 of the CHARLS, two sets of variables were created to capture the changes in needs and

unmet needs regarding ADLs and IADLs, respectively: a) no longer having social care needs, denoting that an older respondent reported social care needs in Wave 3 and no longer reported social care needs in Wave 4; b) repeated met needs, referring to a situation where respondents received help with every task with which they reported needing help (sufficient support) in both Waves 3 and 4; c) newly arisen unmet needs, meaning that respondents received sufficient help in Wave 3 but not in Wave 4 ; d) newly arisen met needs, indicating respondents' reported unmet needs in Wave 3 yet received sufficient help in Wave 4; and e) repeated unmet needs, suggesting that older respondents reported unmet needs in both Waves 3 and 4 (Vlachantoni et al., 2022).

5.5.3 Measures of the predisposing factors

The predisposing factors in this study consisted of age, gender, ethnicity, marital status, educational attainment, smoking, alcoholic drinks consumption, and physical activities.

Age was drawn from the Harmonised CHARLS dataset, documenting respondents' age at the year of being interviewed, categorised into three subgroups: the younger-old group, including respondents aged between 60 and 69 years; the middle-old group, consisting of respondents aged from 70 to 79 years; and the oldest-old group, including respondents aged 80 years and above (Ishiwatari et al., 2020). The age group of 60- to 69-year-olds served as the reference group in the regression analysis.

Gender was dichotomised into male and female. As highlighted in the empirical literature review, older women face a higher risk of having met and unmet needs (Qian et al., 2016). The respondents' gender was documented by interviewers. The distribution of males and females was calculated for descriptive and bivariate analysis. Males served as the reference group.

Respondents of the CHARLS were asked about their current marital status and whether they lived with a partner. Seven types of marital status were

identified: married and living with a spouse, partnered but not married, married but temporarily not living with a spouse, separated and not living together anymore, divorced, widowed, and never married. The variable describing older people's current marital status was divided into three categories: married (having a partner), widowed, and separated/ divorced/ never married (Connolly et al., 2017). Older respondents who were married served as the reference group.

Ethnicity as an independent variable has been noted in the literature concerning disparities and inequalities in health and long-term care needs (Gu and Vlosky, 2008). Respondents in this study were sorted into two categories: ethnic Hans and ethnic minorities (Zhu and Walker, 2018). Older Han Chinese individuals served as the reference category.

Education was measured by two variables evaluating whether older respondents completed primary school or received any formal education and were able to read or write (Liu et al., 2017a). These educational measurements were considered because the compulsory education law was only introduced in 1986 (Fang et al., 2012), meaning that older people in China often had limited access to formal education in their early years, although they may have benefited from the three literacy campaigns initiated in the 1950s (Hayford, 2017). The measurement of education was linked to the question, 'What is the highest level of education you have now (not including adult education)?' There were eleven possible options: no formal education (illiterate), did not finish primary school, sishu/home schooled, elementary school, middle school, high school, vocational school, two- or three-year college/ associate's degree, bachelor's degree, master's degree, and doctoral degree

Smoking, alcohol drinks consumption, and physical activities were measured to assess older respondents' lifestyles. The measurement of smoking was achieved with a series of questions inquiring respondents about whether they have chewed tobacco, smoked a pipe, cigarettes, or cigars, and whether they

have stopped smoking. Smoking status was, therefore, divided into three categories, including having never smoked, former smoker, and currently smoking (Green and Polen, 2001). Those who never smoked served as the reference group.

The measurement of alcoholic drinks consumption was based on the question, 'Did you ever drink alcoholic beverages in the past? How often?' The degree of daily alcoholic drinks consumption was divided into five categories: none, less than one alcoholic drink per day, one alcoholic drink per day, two alcoholic drinks per day, and more than two alcoholic drinks per day. The distribution of the analytical sample in terms of their alcoholic drinks consumption was computed and presented in the descriptive analysis results. A binary variable denoting whether an older individual consumed some alcoholic drinks daily was created for bivariate and multivariate analysis. Those who did not consume any alcohol daily served as the reference group.

The CHARLS collects detailed information about the intensity, duration, and purposes of the physical activities of respondents. A binary variable was created to assess whether older respondents performed physical activities every week. Those reporting no physical activities every week served as the reference group.

5.5.4 Measures of enabling factors

Enabling resources comprise hukou status, residential areas, living arrangements, the number of living resources, earned income, and health insurance. These factors indicate the potential resources influencing the access to social care (Andersen, 1995).

Hukou is the household registration system in China, labelling people with urban or rural residents (Afridi et al., 2015). People with different hukou have vast disparities in how they access healthcare and social care due to the fragmented social security system (Chen and Turner, 2015). In the CHARLS, the hukou status of respondents were collected in each wave, choosing from

having agricultural hukou, non-agricultural hukou, unified residence hukou and without hukou. As with previous studies exploring the effect of hukou on older people's health, two types of hukou status are identified for following analysis: rural hukou and urban hukou (Zhang et al., 2017). Older respondents with urban hukou are treated as the reference group. Apart from hukou status, residential area is the factor indicating whether an older individual resides in the rural or urban areas, which is also examined in a previous study examining the rural-urban disparities regarding unmet needs (Zhu and Österle, 2017). The CHARLS collected information about where respondents usually lived: the centre of a city or town, the combination zone between urban and rural areas, villages, and special areas. For the purpose of researching regional disparities, residential area was divided into two categories: living in urban areas (city, town, or combination zone between urban and rural areas) and living in rural areas (villages and special areas) (Zhu and Österle, 2017). The residential area was only presented in the descriptive results.

Living arrangements reflect the household structure which has been noted to be significantly associated with older people's physical and mental health (Djundeva et al., 2019). With respect to unmet needs, older people living alone are less likely to receive adequate care, resulting in unmet needs. The CHARLS provides detailed information on respondents' household members. Based on that information, living arrangements here were divided into two categories: living alone and living with others (Cao et al., 2023).The category of living alone was the reference group.

The number of living children indicates the potential availability of informal care resources inside the family (Cao et al., 2023). Respondents were asked a series of questions about each child, with the answers being computed into the number of living children. The number of living children was a binary variable with two categories: no or one living child and at least two living children (Meng et al., 2021). Reporting no or one living child was the reference group.

Previous studies have suggested older people with lower income are less likely to receive health and social care (Wang et al., 2021a, Penning and Zheng, 2016). Earned income in the Harmonised CHARLS is net value of the sum of bonus and wages after deducting the insurance and tax fees. The income of respondents reporting not receiving any wages or bonus is 0. Earned income was a continuous variable in this study and transformed for log(income+1) in logistic regression models (Kahneman and Deaton, 2010).

Health insurance is important for older adults in China as it helps cover part of medical costs. When other socioeconomic factors are controlled for, older adults with health insurance are more likely to utilize outpatient services (Mao et al., 2020b). The public health insurance scheme was first introduced in late 1998, initially covering only employee in urban public sectors. Since then, the scope of health insurance has expanded significantly. By 2024, the scope of insurance beneficiaries has extended beyond urban employees, to achieve universal coverage for both urban and rural residents through the introduction of Basic Medical Insurance for Urban and Rural Residents and the New Rural Cooperative Medical Scheme (Barber and Yao, 2011, Meng et al., 2015). The CHARLS survey collected respondents' information on more than ten kinds of health insurance, including both public and private health insurance. Based on different types of healthcare insurance, a binary variable suggesting whether older respondents are covered by at least one type of health insurance (Zhu and Österle, 2017). Not being by any health insurance was the reference group.

5.5.5 Measures of need factors

Need factors in this study comprised cognition level, chronic diseases, and physical limitations regarding ADLs and IADLs.

Cognition level has been identified as a significant indicator of developing physical impairments in later life (Kim et al., 2022). Cognition level was measured through one question from the CHARLS, which asked, 'Have you been diagnosed with a memory-related disease by a doctor?' Cognitive

function was then computed as a binary variable based on whether the respondent answered, 'yes' or 'no'. Those reporting no memory-related diseases were treated as the reference group.

Chronic diseases are often considered when measuring individuals' health status. Those who are diagnosed with more chronic diseases tend to face a higher mortality risk (Cheng et al., 2013). The CHARLS collects information of whether respondents are diagnosed with a list of chronic diseases. The number of being diagnosed with chronic diseases are collapsed into three categories: none, one or two diseases, and at least three chronic diseases (Chen et al., 2018a). Respondents having no chronic disease are used as the reference group.

ADL and IADL limitations were employed to measure respondents' physical functions (Lawton et al., 1969, Shelkey and Wallace, 2012). Existing findings have suggested that limitations in terms of ADLs or IADLs are important indicators of receiving social care in later life (Hu and Ma, 2018). Limitations regarding ADLs and IADLs were measured based on the number of tasks respondents reported having difficulties performing. Two groups of variables were created targeting ADL and IADL limitations, respectively. The first group of variables was divided into three categories: no limitations, one or two limitations, and three or more limitations (Hu and Wang, 2019). The distributions of categories are shown in the descriptive results. The second group of variables was binary, indicating whether older individuals reported any limitations regarding ADLs or IADLs (Gao et al., 2022). These binary variables were used for the multivariate analysis, with no limitations serving as the reference group. In addition, two variables measuring *the changes* in ADL and IADL limitations from Wave 3 to Wave 4 of the CHARLS were computed to assess the temporal dynamics of social care needs and unmet needs. The variables denoting such changes were binary and included two categories: those with the same or improved physical status and those with deteriorating physical status (Vlachantoni et al., 2022). Those with the same or improved physical status were treated as the reference group.

5.5.6 Measures of the early-life factor

As discussed in Sections 3.4.3, and 4.2.2.4, 'Experiences of hunger in early life' was selected as the proxy of these early-life adversities (Hu et al., 2020b).

This variable was measured through the following questions drawn from the 2014 Life History Survey questionnaire:

*"**c3_a**. When you were a child before age 17 was there ever a time when your family did not have enough food to eat?*
1. Yes
2. No
***c3_b**. At what age ranges did this (your family had no enough food to eat) happen? (Multiple answers are allowed)*
1. Age 0-5
2. Age 6-12
3. Age 13-17"

Based on the first question, a binary variable denoting whether an older respondent was exposed to hunger prior to the age of 17 was created (0=No, 1=Yes). Based on the second question, another variable (ranging from 0 to 3) was computed, representing the number of hunger experiences prior to the age of 17. If respondents reported having experienced hunger during only one period (e.g., 0 to 5 years old), they were coded as 1. If respondents reported having two episodes of experiences of hunger before the age of 17 (e.g., 0 to 5 years old and 6 to 12 years old), they were coded as 2. If respondents experienced hunger during every age range, they were coded as 3. No experience of hunger prior to the age of 17 served as the reference group (Hu et al., 2020b).

5.6 Analytical plans for each set of research questions

The analytical plans are separately discussed for the first and second set of research questions, respectively.

Targeting Research Question 1

Research question 1a: What is the extent of older people's social care needs and unmet needs?

Research Question 1b: How does the extent of older people's social care needs and unmet needs vary by their demographic and socio-economic characteristics or early life adversities?

The descriptive profile of the analytical samples employed to address social care needs and unmet needs was created first, including current demographic, socioeconomic, and health-related characteristics, along with needs and unmet needs for social care. A series of Chi-2 and Fisher's exact tests were conducted to explore the correlation between the independent variables and the binary outcome variables regarding social care needs and unmet needs for ADLs and IADLs (Bower, 2003, McHugh, 2013). As shown in Table 5.3, the first and second sets of outcome variables are dichotomous, indicating whether an individual reports social care needs and unmet needs for ADLs or IADLs, as well as each daily task. The logistic regression model was selected because it is appropriate for examining the relationship between a group of underlying predictors and a dichotomous outcome variable (Shipe et al., 2019). Apart from binary outcome variables, another set of count variable reflecting the number of ADLs or IADLs with which individuals needed help with was created, ranging from 1 to 6. The Poisson regression model was used to explore the predictors of social care needs for a higher number of ADLs or IADLs, as this type of model is suitable for examining the associations between multiple independent variables and a count outcome variable (Coxe et al., 2009).

Based on theoretical and empirical evidence, the independent variables included in the regressions encompass predisposing, enabling, and need factors. The experience of hunger before the age of 17 was included to test the long-term impacts of early-life adversities on social care needs and unmet needs in older age. Following Domínguez-Almendros and colleagues' study

(Domínguez-Almendros et al., 2011), the logistic regression models targeting the binary outcome variables indicating whether an older respondent needed help with at least one ADL or IADL and whether they reported unmet needs for ADLs or IADLs, were estimated as follows:

$$ln\left(\frac{Need}{1-Need}\right)=\beta_0+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_i X_i \qquad (1)$$

$$ln\left(\frac{Eneed}{1-Eneed}\right)=\beta_0+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_i X_i \qquad (2)$$

$$ln\left(\frac{Unmet}{1-Unmet}\right)=\beta_0+\beta_1 X_1+\beta_2 X_2+\cdots+\beta_i X_i \qquad (3)$$

where *Need* denotes the predicted probability of older respondents needing help with at least one ADL or IADL (social care needs for (I)ADLs = 1, 0 otherwise). *Eneed* denote the predicted probability of older respondents needing help with every task of (I)ADLs. *Unmet* denotes the predicted probability of unmet needs (unmet needs = 1, 0 otherwise). Additionally, β_0 denotes the intercept. X_i denotes risk factors. β_i denotes the coefficient of risk factor X_i.

Following Coxe and colleague's work (Coxe et al., 2009), the Poisson regression models were constructed in order to explore the predictors of the number of reported social care needs for ADLs and IADLs (1 to 6), which are shown below:

$$ln(Sneed)=\beta_0+\beta_1 x_1+\beta_2 x_2+\ldots+\beta_i X_i \qquad (4)$$

where *Sneed* is the predictor count of the number of ADLs and IADLs tasks with which older respondents needing help. All regression models were tested for the goodness-of-fit statistics. Multicollinearity is a common issue in regression models, which arises when two or more predictor variables are correlated. It becomes a concern when it affects the interpretation of significance and parameter estimates (Lavery et al., 2019). The variance inflation factor (VIF) was used for detecting the presence of multicollinearity in

each regression model (Midi et al., 2010). Odds ratios, statistical significance levels of the coefficients are displayed.

Targeting Research Question 2

Research question 2a: How do older people's social care needs and unmet needs change over time?

Research question 2b: What are the underlying factors associated with different dynamic patterns of these needs?

Descriptive statistical methods were utilised to examine the sample characteristics and the proportion distributions of different dynamic patterns. A series of Chi-2 and Fisher's exact tests were conducted to test the differences in the prevalence of different dynamic between older people featuring various characteristic (Bower, 2003, McHugh, 2013). For each of the five outcome variables, logistic regression models were used (Shipe et al., 2019). Independent variables used to address the second set of research questions included predisposing, enabling, need, and early-life factors. Two extra variables were considered to document the changes in limitations regarding ADLs and IADLs from Waves 3 to 4 of the CHARLS (Vlachantoni et al., 2022).

Following Vlachantoni and colleagues' work (Vlachantoni et al., 2022), the following logistic regression models were constructed in order to explore the predictors of the dynamics of social care needs and unmet needs for ADLs or IADLs.

$$ln\left(\frac{Dynamic_k}{1-Dynamic_k}\right)=\beta_0+\beta_1X_1+\beta_2X_2+\cdots+\beta_iX_i \qquad (5)$$

Where $Dynamic_k$ denotes predicted probability of reporting a certain dynamic pattern (yes = 1, 0 otherwise), $k=1,2,3,4,5$. $Dynamic_1$ denotes the pattern, no longer having needs. $Dynamic_2$ denotes repeated met needs. $Dynamic_3$ denotes newly arisen unmet needs. $Dynamic_4$ denotes delayed met needs. $Dynamic_5$ denotes repeated unmet needs. Above models were run for outcome

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variables regarding ADLs and IADLs, respectively. All regression models were tested for the goodness-of-fit statistics. The VIF of was computed to detect the multicollinearity in each regression in terms of the dynamic social care needs and unmet needs. Odds ratios, statistical significance levels of the coefficients are displayed.

5.7 Chapter summary

This chapter provided a detailed and structured discussion of the methodology employed in this thesis, focusing on the justification of quantitative methods, the introduction of the dataset, the explicit measures of key variables, and the detailed statistical plan targeting each research question. The following chapters present the results concerning the contemporary social care needs for ADLs and IADLs based on the analytical strategy presented in this chapter.

Chapter 6 Understanding social care needs for ADLs and IADLs of older Chinese people—Results of the cross-sectional analysis

6.1 Chapter overview

This chapter presents the results based on data from the 2014 Life History Survey and Wave 4 (2018) of the CHARLS, addressing the first set of research questions:

Research Question 1a: What is the extent of older people's social care needs?

Research Question 1b: How does the extent of older people's social care needs vary by their demographic and socioeconomic characteristics or early-life adversities?

The descriptive profile of the analytical sample employed to understand older Chinese people's contemporary social care needs is provided in Section 6.2. Section 6.3 presents the results based on the bivariate analysis examining the detailed prevalence of social care needs for each ADL and IADL task. Section 6.4 elaborates on the predictors of social care needs for ADLs and IADLs based on the multivariate analysis. The hypotheses targeting social care needs are revisited and discussed based on the empirical evidence of this study in Section 6.5.

6.2 Description of the analytical sample employed for understanding social care needs for ADLs and IADLs

The sample was composed of community-dwelling respondents aged 60 years and over, excluding observations with missing data. Table 6.1 shows the distribution of the analytical sample according to demographic and socioeconomic characteristics, experiences of hunger before the age of 17, lifestyle characteristics, and health status. Age, gender, ethnicity, marital

status, hukou status, residential areas, the number of living children, and living arrangements comprised the demographic profile. Over 60% of the total analytical sample was between 60 and 69 years old (61.7%; n=5,263). Less than 10% of respondents were over 80 years old (8.2%; n=695). Around half were female (50.3%; n=4,299), and about 7.3% were from ethnic minority communities (n=624), which aligns with the gender and ethnic distribution of the older Chinese population based on the seventh population census.[13] Nearly 80% of older respondents were married or had a partner (79.2%; n=6,755), while 19.1% were widowed (n=1,630). The proportion of those who were divorced, separated, or never married was relatively small (1.7%; n=142). Less than 1% of older respondents reported having no living children (0.9%; n=81), while 12.3% reported living alone (n=1,047), suggesting that having more than one living child does not necessarily translate into co-residence with them (Sereny, 2011).

Table 6.1 Descriptive profile of respondents aged 60 years and above in Wave 4 of the CHARLS (N=8,527)

				Chi-2	
				Needing help with ADLs	Needing help with IADLs
	%	Weighted %	N		
Age group					
60-69	61.7	61.0	5,263	***	***
70-79	30.1	30.0	2,569		
80+	8.2	9.0	695		
Gender					
male	49.6	49.6	4,228	**	***
female	50.4	50.4	4,299		
Ethnicity					
Han ethnicity	92.7	92.8	7,903	***	**
ethnic minorities	7.3	7.2	624		
Marital status					
married/ partnered	79.2	78.4	6,755	***	***
widowed	19.1	19.9	1,630		
separated/ divorced/ never married	1.7	1.7	142		
The number of living children					
none	0.9	1.0	80	***	***
one	10.0	12.4	853		
at least two	89.1	86.6	7,594		
Living arrangement					
living alone	12.3	12.2	1,047	**	

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[13]The data of the Seventh Chinese Population Census, accessible at: https://www.stats.gov.cn/sj/pcsj/rkpc/7rp/zk/indexch.htm

living with others	87.7	87.8	7,480		
Hukou status					
urban hukou	23.1	28.7	1,967	*	***
rural hukou	76.9	71.3	6,560		
Residential area					
urban communities	36.5	43.4	3,112	*	***
rural villages	63.5	56.6	5,415		
Education attainment					
lower than primary school	4,378	51.3	47.9	***	***
primary school or higher	4,149	48.7	52.1		
Illiterate					
no	69.3	71.5	5,913	***	***
yes	30.7	28.5	2,614		
Health insurance					
none	2.9	2.9	250	**	***
public or other type of health insurance	97.1	97.1	8,277		
Whether having experienced hunger prior the age of 17					
no	21.9	23.6	1,870		
yes	78.1	76.4	6,657		
Number of episodes reported having experienced hunger prior the age of 17[1]					
0	21.9	23.6	1,870		***
1	38.2	37.7	3,257		
2	17.3	16.5	1,472		
3	22.6	22.1	1,928		
Smoking					
having never smoked	53.9	54.0	4,595	***	***
former smoker	18.9	19.3	1,614		
currently smoking	27.2	26.6	2,318		
Daily alcoholic drinks consumption					
none	68.3	67.5	5,825	***	***
less than once per day	16.9	17.5	1,441		
once per day	8.3	8.5	704		
twice per day	4.7	4.8	403		
more than twice per day	1.8	1.7	154		
Weekly physical activities					
no	11.9	11.3	1,015	***	***
yes	88.1	88.7	7,512		
Diagnosed with a memory-related disease by a doctor					
no	94.7	94.9	8,079	***	***
yes	5.3	5.1	448		
Number of chronic diseases					
no chronic disease	13.5	13.1	1,154	***	***
one or two diseases	42.5	42.7	3,620	***	***
at least three diseases	44.0	44.2	3,753		
Number of ADLs limitations					
no limitations	75.3	76.3	6,421		***
one or two limitations	16.7	16.2	1,420		
at least three limitations	8.0	7.4	686		
Number of IADLs limitations					
no limitations	65.5	67.2	5,586	***	
one or two limitations	22.4	21.3	1,913		
at least three limitations	12.1	11.5	1,028		
Having social care needs for ADLs					
no	91.2	91.5	7,775		
yes	8.8	8.5	752		
Having social care needs for IADLs					
no	74.7	75.7	6,366		
yes	25.3	24.3	2,161		
Total analytical sample	**100**	**100**	**8,527**		

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The percentages shown in Table 6.1 include unweighted and weighted results. The individual-level sample weight of Wave 4 provided by the CHARLS was employed. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living.

Hukou status and residential area were selected as the proxies used to examine regional disparities. Nearly 80% of respondents had rural hukou (76.9%; n=6,560). It is worth noting that an individual with a rural hukou status did not necessarily mean that they resided in rural areas. For instance, the distribution of the analytical sample in terms of residential areas shows that 36.5% of older individuals lived in cities and towns, which was higher than the proportion of those having urban hukou (23.1%; n=1,967). This inconsistency is in line with existing findings highlighting the substantial internal migration from rural to urban areas amongst older Chinese people (Zheng et al., 2021).

Socioeconomic status is an important indicator of resources available to older people for coping with emerging adversities in later life (Penning and Zheng, 2016, Yang et al., 2018). More than half of the older respondents never finished primary school (51.3%; n=4,378), and over 30% were illiterate (30.7%; n=2,614). As noted in Section 5.6, many older people in China had few opportunities to receive formal education in their early lives since the compulsory education law was not introduced until 1986 (Fang et al., 2012). The majority of the analytical sample was covered by the national healthcare insurance (93.9%; n=8,006), which corresponds with evidence in previous literature concerning the Chinese government's policy efforts to promote participation in the national healthcare insurance scheme (Wang et al., 2011). Meanwhile, a small proportion (0.8%; n=71) were enrolled in private healthcare insurance, while 2.4% (n=200) were also covered by other healthcare schemes in addition to public healthcare insurance. Experiences of hunger prior to the age of 17 are an indicator of early-life adversities. Nearly 80% of older respondents (78.1%; n=6,567) reported not having had enough food to eat during childhood. Amongst those having experienced hunger,

around half reported more than one episode of hunger before the age of 17 (51.1%).[14]

Lifestyle characteristics are important factors in determining whether individuals will require assistance with ADLs or IADLs in later life (see Section 4.2.2). The proportion of older individuals who regularly smoked was 27.2% (n=2,318), which is higher than the prevalence reported in the UK in 2021, which was 8.0% of the older population.[15] Almost 70% of respondents did not consume alcohol daily (68.3%; n=5,825), and nearly 90% engaged in physical activities every week (n=7,512). It should be noted that the physical activities examined in this study did not exclusively refer to physical exercise; for example, activities like physical labour were also included.

The profile of health status consisted of the cognition level, chronic diseases, and limitations in performing ADLs and IADLs. About 5% reported a memory-related issue diagnosed by a doctor (5.3%; n=448). As discussed in Section 2.2.1, an increasing number of older people live with non-transmissible diseases (Cook and Dummer, 2004). Likewise, over 80% of older individuals reported having at least one chronic disease (86.5%; n=7,373). Nearly a quarter (24.7%; n=2,106) reported limitations regarding performing at least one ADL, and over a third of the sample (33.5%; n=2,941) reported limitations in performing IADLs. Regarding social care needs for ADLs and IADLs, less than 10% of the analytical sample required help with at least one ADL (8.8%, n=752) and 25.3% needed help with at least one IADL (n=2,161).

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[14] (1472+1928) / 6657≈51.1%: This number refers to the proportion of older individuals having experienced hunger in two or three episodes amongst older individuals having experienced hunger before the age of 17.

[15] Data source: Adult smoking habits in the UK 2021. Accessible at: https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/healthandlifeexpectancies/bulletins/adultsmokinghabitsingreatbritain/2021#:~:text=In%202021%2C%2015.1%25%20of%20men,lowest%20(8.0%25)%20in%202021.

6.3 Understanding the prevalence of social care needs for ADLs and IADLs using bivariate analysis

A series of bivariate analyses were carried out to examine the correlations between respondents' characteristics and whether they needed help with ADLs or IADLs. It has been suggested that age, gender, and hukou are demographic characteristics corresponding to social care needs in later life (Qian et al., 2016). The following tables and figures provide an in-depth understanding of the prevalence of social care needs for ADLs and IADLs amongst older Chinese people featuring different characteristics.

6.3.1 The prevalence of social care needs for ADLs and IADLs by age groups and gender

The proportion of individuals who reported needing help with performing at least one ADL according to age and gender is presented in Figures 6.1 a & b. Figure 6.1a on the left displays the proportions by age groups amongst older female respondents, while Figure 6.1b on the right side shows those for older male respondents.[16] In terms of age differences, for both the female and male subsamples, the highest prevalence rate of reporting social care needs for ADLs was observed amongst respondents aged 80 years and over. For instance, about 6% of female respondents aged 60 to 69 years old reported social care needs for ADLs (6.4%), compared to 22.8% for those aged 80 and over. Regarding gender differences, the proportion of social care needs for ADLs was significantly higher amongst female respondents compared with male respondents, and such differences remained significant for those aged between 70 and 79 years. Specifically, within the 70 to 79-year-old age group, the prevalence of social care needs for ADLs amongst older female respondents was 13.4%, substantially higher than that amongst older male respondents (9.1%).

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[16] The rest of the figures are arranged in the same order, with figure a on the left side and figure b on the right side.
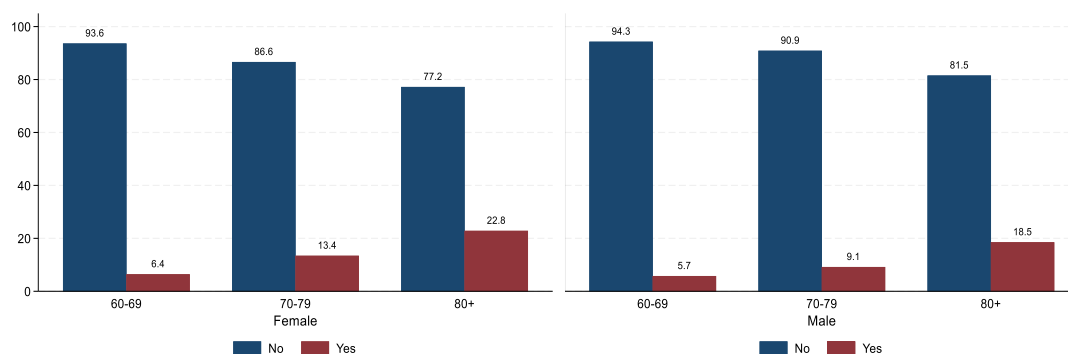
Figures 6.1 a & b The proportion of social care needs for ADLs amongst respondents aged 60 years and over by age groups and gender (N=8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 6.1 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (social care needs for ADLs×gender): 60-69: $\chi^2 = 1.0684$, $p = 0.301$; 70-79: $\chi^2 = 11.6728$ $p < 0.01$; 80+: $\chi^2 = 1.9757$, $p = 0.160$.

As can be seen in Figures 6.2 a & b, two patterns were prominent in terms of gender and age differences for those needing help with at least one IADL. First, the proportion of older women who reported needing help with IADLs for each age group was significantly higher than for older men. Second, there was an increasing trend of needing help with IADLs with ageing. For example, the proportion of male respondents aged between 70 and 79 years (24.4%) was significantly higher than those aged between 60 and 69 years (14.9%). In terms of gender differences, more than half of female respondents aged 80 years and over (52.9%) reported social care needs for IADLs, which was substantially higher than older male respondents in the same age group (39.0%). These findings coincide with prior evidence suggesting that relatively older individuals, especially older women, are more likely to require social care needs than those who are relatively younger and male (Yang et al., 2020).
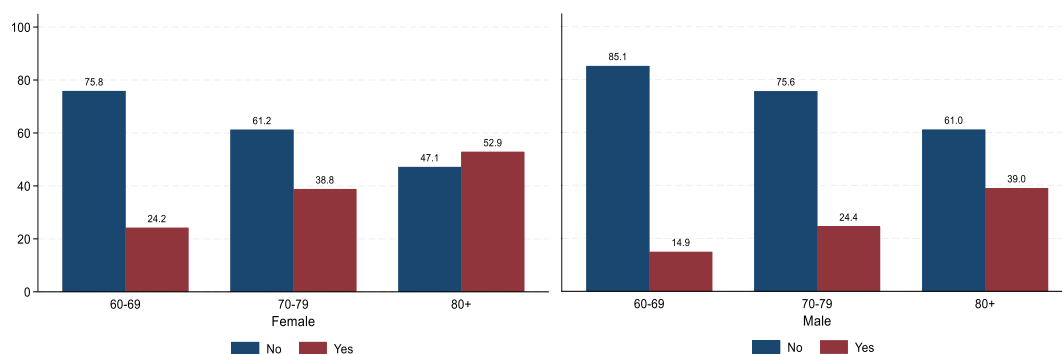
Figures 6.2 a & b The proportion of social care needs for IADLs amongst respondents aged 60 years and over by age groups and gender (N=8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 6.2 a & b are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (social care needs for IADLs×gender): 60-69: $\chi^2 = 71.6258$, $p < 0.001$; 70-79: $\chi^2 = 61.3239$, $p < 0.001$; 80+: $\chi^2 = 13.5138$, $p < 0.001$.

Table 6.2 presents the prevalence rate of needing help with every task of ADLs and IADLs according to gender. Specifically focusing on individual ADL tasks, the prevalence of needing help with bathing (5.9%), using the toilet (3.4%), and getting dressed (2.8%) were higher than eating (1.0%), getting in or out of bed (1.9%), and controlling urination and defecation (1.8%). However, no significant gender differences were observed for requiring assistance with each ADL task. For IADLs, a higher proportion of individuals required help with making phone calls (11.7%), managing money (10.3%), and doing household chores (10.3%) than for cooking (9.2%), shopping for groceries (8.4%), and taking medications (4.2%). Here, significant gender differences were observed in four IADL tasks, including shopping for groceries, making phone calls, taking medications, and managing money, with older female respondents reporting that they required more assistance with these tasks than their male counterparts. For instance, around 15.4% of older female respondents needed help making phone calls, while only 7.9% of older male respondents reported the same.

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Table 6.2 The proportion of respondents aged 60 years and over reporting needing help with each task of ADLs and IADLs by gender (N=8,527, %)

| | Tasks | Gender | | Total | Chi-2 |
		Male	Female		
Needing help with ADLs	Eating	1.1	0.9	1.0	
	Dressing	2.9	2.7	2.8	
	Bathing	5.6	6.3	5.9	
	Getting in or out of bed	1.7	2.2	1.9	
	Using the toilet	3.1	3.7	3.4	
	Controlling urination and defecation	1.9	1.8	1.8	
Needing help with IADLs	Cooking	9.8	8.7	9.2	
	Doing housework	9.8	10.7	10.3	
	Shopping for groceries	5.8	11.0	8.4	***
	Making phone calls	7.9	15.4	11.7	***
	Taking medications	3.3	5.0	4.2	***
	Managing money	7.8	12.8	10.3	***
	N	4,228	4,299	8,527	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The percentages presented in Table 6.2 are unweighted. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③The results of Chi-2 and Fisher's exact tests between each task and gender are presented next the column showing the percentages . * p < 0.05, ** p < 0.01, *** p < 0.001.

6.3.2 The prevalence of social care needs for ADLs and IADLs by age groups and hukou status

This section compares differences in the prevalence of social care needs for ADLs between older people from different age groups according to hukou status. Figure 6.3a shows the proportion of individuals needing help with at least one ADL amongst older respondents with rural hukou, while the results in Figure 6.3b correspond to those with urban hukou. Significant differences regarding the proportion of respondents needing help with ADLs were observed between those with rural hukou and those with urban hukou within the 60 to 69 and 70 to 79-year-old age groups. For instance, amongst respondents aged between 60 and 69 years, about 7% of those with rural hukou reported needing assistance performing one or more ADLs (6.6%), which was significantly higher compared with 4.3% of those with urban hukou.
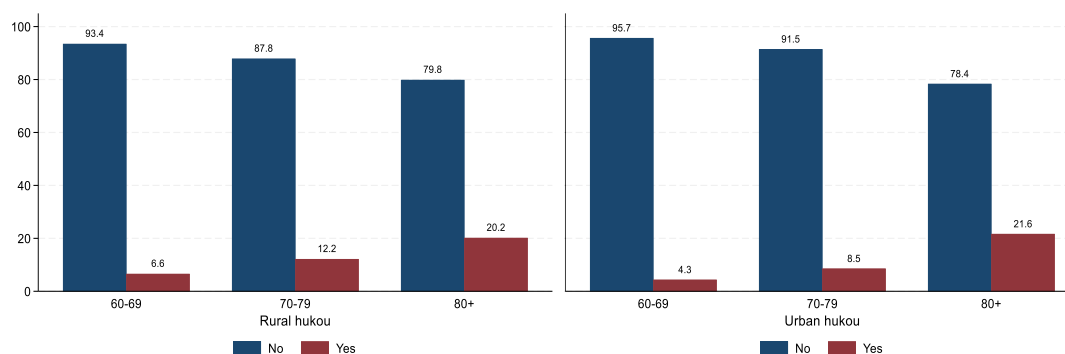
Figures 6.3 a & b The proportion of social care needs for ADLs amongst respondents aged 60 years and over by age groups and hukou status (N= 8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 6.3 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (social care needs for ADLs×hukou status): 60-69: $\chi^2 = 7.6210$, $p < 0.01$; 70-79: $\chi^2 = 6.3180$, $p < 0.05$; 80+: $\chi^2 = 0.1899$, $p = 0.663$.

For requiring help with IADLs, the differences shown in Figure 6.4 a & b were salient between older respondents with rural hukou and those with urban hukou. Within each age group, a higher prevalence of needing help with IADLs was observed amongst older respondents with rural hukou than those with urban hukou. For instance, 22.2% of respondents aged 60 to 69 years with rural hukou reported social care needs for IADLs, while 10.3% of those with urban hukou reported such needs. This is in line with previous findings suggesting that older people with rural hukou face a greater likelihood of reporting social care needs than those with urban hukou (Zhou and Walker, 2016).
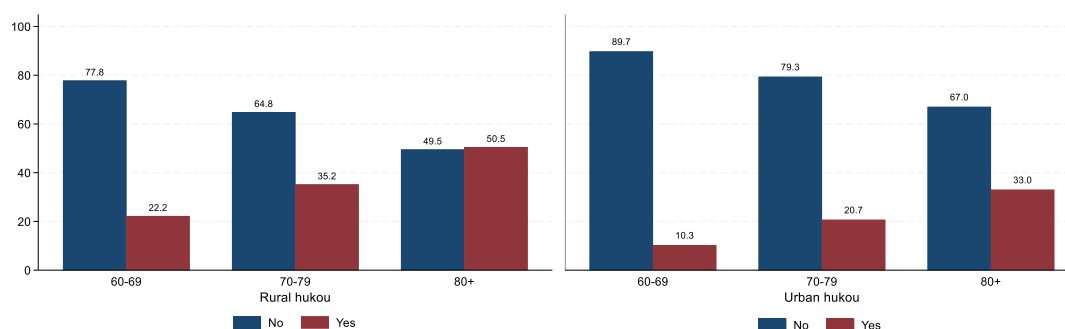
Figures 6.4 a & b The proportion of social care needs for IADLs amongst older respondents aged 60 years and over by age groups and hukou status (N= 8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 6.4 a & b are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (social care needs for IADLs×hukou): 60-69: $\chi^2 = 79.9707$, $p < 0.001$; 70-79: $\chi^2 = 47.1046$, $p < 0.001$; 80+: $\chi^2 = 17.2827$, $p < 0.001$.

Table 6.3 presents the prevalence of needing help with specific tasks of ADLs and IADLs according to hukou status. Although there was no significant difference in the prevalence of needing help with ADL tasks between those with rural hukou and those with urban hukou, a slightly higher prevalence was observed amongst respondents with rural hukou. For example, about 6% of respondents with rural hukou needed help using the toilet (6.2%), while 5.1% of those with urban hukou reported such needs. Looking at each IADL task, respondents with rural hukou were more likely to need help with shopping for groceries, making phone calls, taking medications, and managing money than those with urban hukou. For example, over 10% of older individuals with rural hukou needed help making phone calls (13.8%), while this proportion amongst those with urban hukou was only 4.7%.

Table 6.3 The proportion of respondents aged 60 years and over reporting social care needs each task of ADLs and IADLs by hukou status (N= 8,527, %)

	Tasks	Hukou		Total	Chi-2
		Urban	Rural		
Needing help with ADLs	Eating	0.9	1.1	1.0	
	Dressing	2.6	2.9	2.8	
	Bathing	5.1	6.2	5.9	
	Getting in or out of bed	1.7	2.0	1.9	
	Using the toilet	2.9	3.5	3.4	
	Controlling urination and defecation	1.3	2.0	1.8	
Needing help with IADLs	Cooking	8.3	9.5	9.2	
	Doing housework	9.4	10.5	10.3	
	Shopping for groceries	5.9	9.2	8.4	***
	Making phone calls	4.7	13.8	11.7	***
	Taking medications	3.2	4.5	4.2	*
	Managing money	6.6	11.4	10.3	***
	N	1,967	6,560	8,527	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ①The proportions presented in Table 6.3 are unweighted. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ The results of Chi-2 and Fisher's exact tests between each task and gender are presented next the proportion column. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.00$.

6.3.3 The prevalence of social care needs by age groups and experiences of hunger prior to the age of 17

The relationship between early-life experiences of hunger and social care needs in later life was a central focus of this study. The prevalence of needing help with at least one ADL and IADL amongst older respondents having experienced hunger prior to the age of 17 and those with no such experiences were examined and are presented in the following figures and tables.

Figures 6.5 a & b show the proportion of social care needs for ADLs by older respondents' age groups and their experiences of hunger prior to the age of 17. Significant differences were observed between those reporting experiences of hunger prior to the age of 17 and those with no such experiences within the 60 to 69-year-old age group. Specifically, amongst respondents aged between 60 and 69 years, about 6.4% of those who experienced hunger prior to the age of 17 required assistance with ADLs,

while this was only 4.5% for those with no such experiences, which points to the fact that early-life adversities may persist into later life (Hu et al., 2020b).
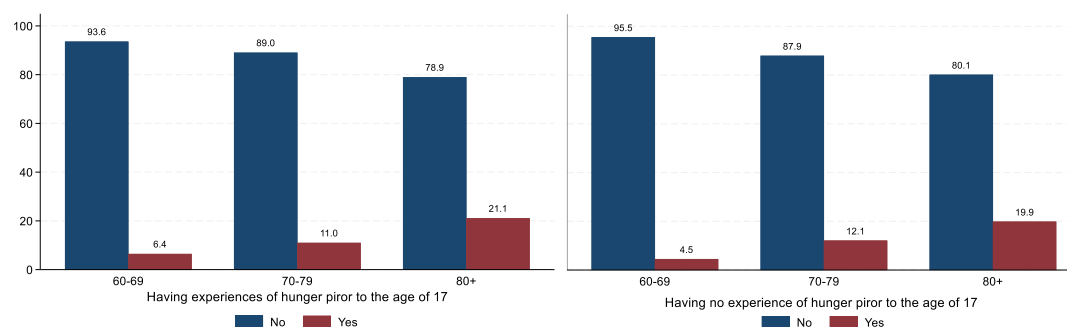
Figures 6.5 a & b The proportion of social care needs for ADLs amongst respondents aged 60 years and over by age groups and experiences of hunger prior to the age of 17 (N= 8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ①The proportions shown in Figures 6.5 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (social care needs for ADLs×hunger experience): 60-69: χ^2＝5.2331, $p<$ 0.05; 70-79: χ^2＝0.5791, $p=$ 0.447; 80+: χ^2＝0.1494, $p=$ 0.699.

Figures 6.6 a & b compare the prevalence of social care needs for IADLs according to age groups and experiences of hunger prior to the age of 17. Significant differences were only observed for the group of respondents aged between 60 and 69 years. Specifically, for this group, the prevalence of social care needs for IADLs amongst those having experienced hunger was 20.3%, compared to 16.6% for those having no such experiences. Again, the significant differences observed here may indicate the important link between early-life experiences and later health status (Shi and Wu, 2018).
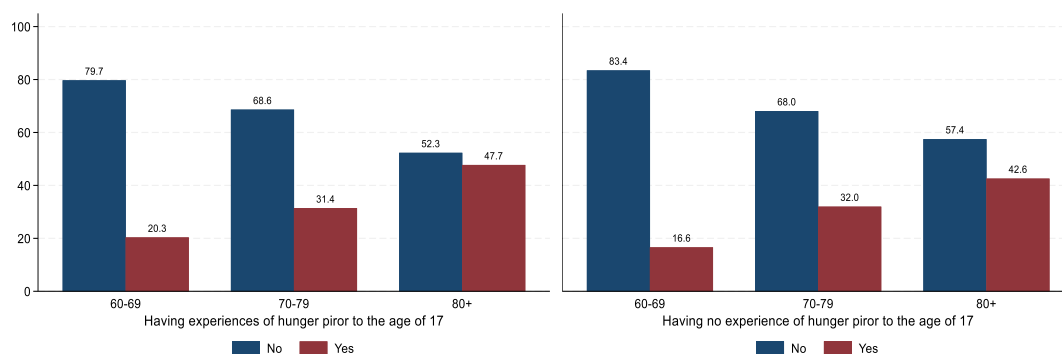
Figures 6.6 a & b The proportion of social care needs for IADLs amongst respondents aged 60 years and over by age groups and experiences of hunger prior to the age of 17 (N= 8,527, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: The proportions shown in Figures 6.6 a & b are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (social care needs for IADLs×hunger experience): 60-69: $\chi^2 = 6.9866$, $p < 0.05$; 70-79: $\chi^2 = 0.0699$, $p = 0.791$; 80+: $\chi^2 = 1.7892$, $p = 0.181$.

Table 6.4 shows the prevalence of needing help with each task of ADLs and IADLs according to experiences of hunger before the age of 17. In terms of ADL tasks, a significantly higher prevalence of needing help with eating, bathing, and getting in or out of bed was found amongst older respondents with no experiences of hunger prior to the age of 17 compared to those reporting such experiences. For example, 7.3% of older respondents with no experience of hunger required assistance with bathing, while only 5.5% of those with such experiences early in their lives reported such needs. Looking at individual IADL tasks, older respondents who reported no experiences of hunger were more likely to need help with cooking, doing housework, and shopping for groceries compared with those with such early-life experiences. For example, about 11.6% of older respondents who did not experience hunger required assistance with doing housework, while about 10% of those with experiences of hunger reported such needs.

The results presented in Table 6.4 suggest that older people who reported no experiences of hunger prior to the age of 17 faced a higher likelihood of needing help with certain ADL tasks and IADL tasks. At the same time, these

observations somewhat contradict the results presented in Figures 6.5 a & b and 6.6 a & b, which suggest that respondents aged between 60 and 69 years with such adverse early-life experiences face a higher risk of needing help with at least one ADL or IADL compared with those with no such early-life experiences of hunger. These findings may indicate that diversities of the far-reaching impact of adverse early-life experiences on social care needs in later life and such impact might be differed by certain daily activities with which older people require assistance as well as their cohorts (Shen and Zeng, 2014, Ferraro and Shippee, 2009).

Table 6.4 The proportion of respondents aged 60 years and over reporting social care needs for each task of ADLs and IADLs by experiences of hunger before the age of 17 (N= 8,527, %)

	Tasks	Whether having experienced hunger prior the age of 17		Total	Chi-2
		No	Yes		
Needing help with ADLs	Eating	1.4	0.9	1.0	*
	Dressing	3.2	2.7	2.8	
	Bathing	7.3	5.5	5.9	**
	Getting in or out of bed	2.5	1.8	1.9	*
	Controlling urination and defecation	2.0	1.8	1.8	
	Using the toilet	3.5	3.4	3.4	
Needing help with IADLs	Cooking	11.0	8.7	9.2	**
	Doing housework	11.6	9.9	10.3	*
	Shopping for groceries	9.7	8.1	8.4	*
	Making phone calls	12.6	11.4	11.7	
	Taking medications	4.9	4.0	4.1	
	Managing money	9.4	10.5	10.3	
	N	1,870	6,657	8,527	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 6.4 are unweighted. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③The results of Chi-2 and Fisher's exact tests between each task and gender are presented next the proportion column. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

6.4 Understanding the predictors of needing help with at least one ADL and IADL, each task of ADLs and IADLs, and numbers of ADLs and IADLs tasks using multivariate analysis

This section discusses the predictors for social care needs for ADLs and IADLs based on the results of a series of logistic and Poisson regression

models. As noted previously, significant gender and hukou disparities in terms of health status, social care needs, and unmet needs have been repeatedly highlighted in previous studies (Zhang et al., 2017, Hu and Wang, 2019, Browne et al., 2022). Therefore, five separate models were run using 1) the whole sample, 2) the female subsample, 3) the male subsample, 4) the rural subsample, and 5) the urban subsample in order to investigate the different predictors of social care needs for ADLs and IADLs across groups with various demographic characteristics.

Table 6.5 presents the odds ratio results based on logistic regression models suggesting the predictors for needing help with at least one ADL. The goodness-of-fit test shows that the logistic regression models constructed in this study were a good fit. The variance inflation factor (VIF) were computed in order to detect the existence of multicollinearity between independent variables (Midi et al., 2010). The values of VIF of the regressions regarding exploration of the predictors of needing help with at least one ADL (in Table 6.5) ranged from 1. 23 to 2.86, indicating that the independent variables were not highly correlated and multicollinearity was not a concern (Shrestha, 2020). Focusing on predisposing factors, age, ethnicity, marital status, illiteracy, smoking, daily alcoholic drinks consumption, and physical activities were significant predictors for reporting social care needs for ADLs. With other factors being controlled for, older respondents aged 80 years and over were more likely to report social care needs for ADLs than those aged between 60 and 69 years old. Older people from ethnic minority communities were more likely to need help with at least one ADL than their Han Chinese counterparts. This is perhaps due to the fact that older Han Chinese people tend to report better health status compared with those from ethnic minority communities (Li et al., 2007). Being married or having a partner was negatively associated with needing help with ADLs, as those who were married or had a partner were less likely to report social care needs for ADLs than those who were widowed, divorced, separated, or never married, which aligns with previous research indicating the protective effects of marriage on health status in older

age (Robards et al., 2012). One interesting finding is that older respondents who could not read or write were less likely to report social care needs for ADLs, an association that was also significant for the female and rural subsamples.

As for lifestyle characteristics, older respondents who are former smokers are more likely to need help with ADLs than those who never smoke. This is in line with earlier findings suggesting the adverse influence of smoking on health status (West, 2017). Older female respondents who have some alcoholic drinks daily are less likely to need help with at least one ADL compared to those not drinking daily. This in line with a previous study finding that people aged from 35 to 79 years in Western New York who never drink or quit drinking tend to report poor health status compared with those who current have alcoholic drinks (Stranges et al., 2006). Doing physical activities weekly is significantly associated with a lower risk of needing help with ADLs. This can be explained by previous findings that doing physical activities is beneficial for maintaining good health in later life (McPhee et al., 2016).

Table 6.5 Predictors of needing help with at least one ADL using logistic regression models (N=8,527)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.178	1.405**	0.941	1.188	1.13
80+	1.936***	2.344***	1.652*	1.766***	2.695**
Gender					
male (ref)					
female	0.922			0.946	0.918
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.463**	1.306	1.832**	1.417*	1.759
Marital status					
not married (ref)					
married	0.764*	0.728*	0.852	0.733*	1.031
Illiterate					
no (ref)					
yes	0.821*	0.779*	0.932	0.795*	0.988
Smoking					
having never smoked (ref)					
former smokers	1.590***	1.309	2.035***	1.611**	1.451
currently smoking	0.877	0.709	1.066	0.858	1.039
Daily alcoholic drink consumptions					
no (ref)					

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yes	0.813	0.631[*]	0.924	0.782	0.979
Weekly physical activities					
no (ref)					
yes	0.334[***]	0.395[***]	0.270[***]	0.347[***]	0.258[***]
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.074	1.246	0.924		
Living arrangements					
living alone (ref)					
living with others	1.217	1.131	1.507	1.266	1.011
The number of living children					
no or one living child (ref)					
at least two living children	1.029	0.968	1.056	0.815	1.629
Earned income	0.947[*]	0.904[*]	0.968	0.933[*]	0.997
Health insurance					
none (ref)					
public or other type of health insurance	0.833	0.871	0.758	0.835	0.84
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	2.077[***]	2.119[***]	2.075[***]	2.244[***]	1.6
Number of chronic diseases					
none (ref)					
one or two chronic diseases	2.009[**]	2.705[**]	1.579	1.708[*]	9.516[*]
at least three chronic diseases	3.123[***]	4.505[***]	2.325[**]	2.742[***]	12.56[*]
Number of IADL limitations					
none (ref)					
at least one IADL limitation	11.62[***]	7.403[***]	20.20[***]	10.66[***]	15.55[***]
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	1.089	0.992	1.254	1.061	1.306
two	0.975	0.946	1.045	0.93	1.223
three	0.968	0.945	0.98	0.979	0.849
N	**8,527**	**4,299**	**4,228**	**6,560**	**1,967**

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income was computed as log(income+1)

In line with previous findings, cognition level and physical functions were important indicators of needing help in one's daily life (Che and Cheung, 2022, Wang et al., 2021b). Older respondents who were more likely to need help with ADLs were those diagnosed with a memory-related problem, chronic diseases, and who had limitations related to IADLs.

Table 6.6 presents the series of logistic regression models used to gain a better understanding of the predictors for needing help with specific ADL tasks. The values of VIF of the regressions regarding needing help with each

ADL (in Table 6.6) ranged from 1.01 to 2.55, indicating that multicollinearity was not a concern (Shrestha, 2020). The associations between predisposing, enabling, and need factors and needing help with ADL tasks were consistent with the predictors for needing help with at least one ADL shown in Table 6.5. Specifically, those aged 80 years and over were more likely to need help with eating, bathing, using the toilet, and controlling urination and defecation. Older female respondents were less likely to need help with dressing than their male counterparts. Older respondents from ethnic minority communities were more likely to need help with bathing and getting in and out of bed than their Han Chinese counterparts. Former smokers were more likely to need help eating and bathing compared with those who never smoked. Daily alcoholic drinks consumption was significantly associated with reporting social care needs for bathing and using the toilet. Doing weekly physical activities weekly corresponded with a significantly lower risk of needing help with every ADL. Need factors were significant determinants for requiring assistance with each ADL task. Older respondents with a memory-related problem and at least one IADL limitation were more likely to need help with each ADL task compared with those with no memory-related problems or IADL limitations. Older respondents with at least two chronic diseases were more likely to report social care needs for dressing, bathing, and using the toilet. The results regarding need factors and needing help with every ADL are also in line with previous findings that older people with worse health status are more likely to report social care needs for ADLs (Gu and Vlosky, 2008).

In addition to the consistency with the results in Table 6.5, those presented in Table 6.6 regarding the predictors for needing help with bathing and getting in or out of bed yielded some novel findings. Older respondents who smoked at the time of the survey were less likely to need help with getting in and out of bed compared to those who never smoked, and older respondents living with others were more likely to need help with bathing than those living alone. It is noteworthy that older respondents who reported experiencing hunger before the age of 17 for two or three episodes were less likely to report needing help

with bathing compared with those with no such experiences. This is consistent with the bivariate results shown in Table 6.4 and previous research on the Chinese context, which has found that mortality risks are higher amongst older people with more favourable childhood conditions (Shen and Zeng, 2014), which may be explained by the survival effect (Markides and Machalek, 2020).

Table 6.6 Predictors of needing help with each task of ADLs using logistic regression models (N=8,527)

	Eating	Dressing	Bathing	Using the toilet	Controlling urination and defecation	Getting in or out of bed
	(1)	(2)	(3)	(4)	(5)	(6)
Predisposing factors						
Age						
60–69 (ref)						
70–79	1.284	1.079	1.096	1.19	1.446	0.942
80+	2.680**	1.543	2.097***	1.900**	2.424***	1.616
Gender						
male (ref)						
female	0.583	0.571**	0.755	0.767	0.737	0.723
Ethnicity						
Han ethnicity (ref)						
ethnic minorities	1.723	1.24	1.471*	1.367	1.305	1.860*
Marital status						
not married (ref)						
married	0.745	0.878	0.650**	0.984	0.715	0.562*
Illiterate						
no (ref)						
yes	1.087	0.877	0.818	0.902	0.868	1.094
Smoking						
having never smoked (ref)						
former smokers	1.940*	1.217	1.614**	1.378	1.556	1.43
currently smoking	0.631	0.642	0.786	0.709	0.98	0.483*
Daily alcoholic drinks consumption						
no (ref)						
yes	0.786	0.984	0.716*	0.663*	0.881	0.938
Weekly physical activities						
no (ref)						
yes	0.138***	0.243***	0.265***	0.241***	0.244***	0.163***
Enabling factors						
Hukou Status						
urban hukou (ref)						
rural hukou	1.346	0.984	1.073	1.057	1.482	1.03
Living arrangements						
living alone (ref)						
living with others	1.464	1.46	1.707**	0.878	1.497	1.673
The number of living children						
no or one living child (ref)						
at least two living children	0.515	0.835	0.82	1.001	0.997	0.821
Earned income	0.976	0.903	0.925*	0.955	0.947	0.782*
Health insurance						
none (ref)						

public or other type of health insurance	0.871	0.991	0.795	0.829	0.836	0.815
Need factors						
Diagnosed with a memory-related disease						
none (ref)						
a memory-related disease	4.396***	2.748***	2.341***	1.981***	3.062***	3.088***
Number of chronic diseases						
none (ref)						
one or two chronic diseases	2.614	1.912	1.804*	1.642	1.52	2.028
at least three chronic diseases	2.506	2.193*	2.433***	2.459**	2.181	2.809
Number of IADL limitations						
none (ref)						
at least one IADL limitation	35.36***	28.13***	21.11***	8.509***	11.74***	30.15***
Early-life factors						
Numbers of episodes reported having experienced hunger prior to the age of 17						
zero (ref)						
one	0.798	1.066	0.94	1.26	1.176	0.864
two	0.75	0.851	0.694*	1.032	1.098	0.866
three	0.782	0.868	0.728*	1.081	0.956	0.716
N	**8,527**	**8,527**	**8,527**	**8,527**	**8,527**	**8,527**

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Earned income was computed as log(income+1)

Table 6.7 presents the results based on the Poisson regression model in order to explore the underlying predictors of needing help with more ADLs amongst older respondents needing help with at least one ADL (N=754). The outcome variable is the number of ADL tasks with which older respondents need help (ranging from 1 to 6). The goodness-of-fit tests show good model fit. The values of VIF of the regression models regarding needing help with more ADL (in Table 6.7) ranged from 1.06 to 4.55, which is an acceptable level and multicollinearity was not a problem in these regression (Shrestha, 2020). Gender, weekly physical activity, a memory-related problem, and IADL limitations are found to be important determinants of reporting needing help with more ADLs. Older female respondents are less likely to report needing help with more ADLs compared with their male counterparts. Older people with a memory-related problem face greater likelihood of needing help with more ADLs compared with those with no such problem.

Table 6.7 Predictors of the number of ADL tasks reported needing help with (ranging from 1-6) using Poisson regression models (N=752)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.033	1.047	1.014	1.043	0.93
80+	1.131	1.265	1.014	1.106	1.184
Gender					
male (ref)					
female	0.826*			0.831*	0.786
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.101	1.161	1.076	1.067	1.147
Marital status					
not married (ref)					
married	0.966	1.04	0.895	0.918	1.375
Illiterate					
no (ref)					
yes	1.048	1.029	1.067	1.059	0.956
Smoking					
having never smoked (ref)					
former smokers	0.999	1.01	1.005	1.019	0.836
currently smoking	0.86	0.817	0.87	0.894	0.664
Daily alcoholic consumptions					
no (ref)					
yes	0.952	1.01	0.928	0.996	0.77
Weekly physical activities					
no (ref)					
yes	0.633***	0.628***	0.641***	0.639***	0.565***
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.038	0.995	1.063		
Living arrangements					
living alone (ref)					
living with others	1.053	0.998	1.159	1.125	0.709
The number of living children					
no or one living child (ref)					
at least two living children	0.919	0.923	0.929	0.852	1.226
Earned income	0.968	0.959	0.968	0.973	0.94
Health insurance					
none (ref)					
public or other type of health insurance	0.977	0.942	1.093	0.964	1.231
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	1.327***	1.254*	1.401***	1.385***	1.106
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.09	1.409	0.982	1.053	2.513
at least three chronic diseases	1.033	1.351	0.903	1.035	1.836
Number of IADL limitations					
none (ref)					
at least one IADL limitation	1.504***	1.475**	1.543*	1.488**	1.716*
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	0.975	0.997	0.939	1.007	0.961

two	0.911	0.918	0.885	0.914	0.96
three	0.947	0.965	0.937	0.993	0.772
N	**752**	**419**	**333**	**606**	**146**

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The Poisson regression models were run for older respondents aged 60 years and over needing help with at least one ADL (N=752) ②Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ③ ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ④Earned income was computed as log(income+1).

Tables 6.8, 6.9, and 6.10 present the results based on regression models regarding the predictors for social care needs for IADLs of older Chinese people.

The results in Table 6.8 show the statistically significant predictors of needing help with at least one IADL. The values of VIF of the regressions in Table 6.8 ranged from 1.01 to 2.87, indicating that the multicollinearity was not a concern (Shrestha, 2020). In terms of predisposing factors, age, marital status, literacy, daily alcohol consumption, and weekly physical activities were important risk factors associated with needing help with at least one IADL. Respondents aged between 70 and 79 years or 80 years and above were more likely to report social care needs for IADLs compared to those aged between 60 and 69 years. The protective influence of marriage on physical functions in later life was supported (Xu et al., 2021). Respondents who were married or had a partner were less likely to report needing help with IADLs compared to those who were widowed, divorced, or separated. Older people who were illiterate seemed to face a higher risk of needing help with IADLs compared to those who received some formal education and were capable of reading and writing. This is in line with previous findings noting that people with higher educational attainment tend to report better health statuses (Arpino and Solé-Auró, 2019) , and it also indicates that older Chinese people who have never received any formal education and cannot read or write face more barriers in terms of living independently in their communities. Older respondents who reported moderate alcohol consumption or regular physical activity were less likely to report social care needs for IADLs compared with those who abstained from alcohol or physical activities. This may be due to the fact that older individuals who consume moderate amounts of alcohol

daily are those in relatively good health to begin with, and regulated drinking may be beneficial for enhancing their later-life experiences (Kelly et al., 2018).

Hukou status, living arrangements, and earned income proved to be the enabling factors significantly associated with needing help with IADLs. Older respondents with rural hukou were more likely to report social care needs for IADLs compared to those with urban hukou. This is in line with previous findings suggesting that older Chinese people with rural hukou are more likely to report worse health statuses than their counterparts with urban hukou (Hung, 2022). Older respondents living with others also faced a greater likelihood of reporting social care needs for IADLs compared to those living alone. Additionally, respondents with higher income levels were less likely to need help with at least one IADL than those reporting lower income levels. Each need factor examined in this study was a significant predictor for social care needs for IADLs. Specifically, older respondents with a memory-related problem, a higher prevalence of chronic diseases, and ADL-related limitations were more likely to require assistance with IADLs than those having no chronic conditions.

Table 6.8 Predictors of reporting needing help with at least one IADL using logistic regression models (N=8,527)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.551***	1.648***	1.416***	1.488***	1.951***
80+	2.231***	2.120***	2.411***	2.235***	2.357***
Gender					
male (ref)					
female	1.131			1.14	1.148
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.001	1.053	0.903	0.963	1.144
Marital status					
not married (ref)					
married	0.785*	0.716**	1.01	0.724**	1.247
Illiterate					
no (ref)					
yes	2.287***	2.168***	2.518***	2.261***	2.438***
Smoking					
having never smoked (ref)					
former smokers	1.056	1.4	1.023	1.016	1.258
currently smoking	1.192	0.819	1.390*	1.165	1.385

Daily alcoholic consumptions					
no (ref)					
yes	0.675***	0.826	0.588***	0.702***	0.552**
Weekly physical activities					
no (ref)					
yes	0.510***	0.532***	0.474***	0.575***	0.271***
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.753***	1.945***	1.582***		
Living arrangements					
living alone (ref)					
living with others	1.896***	2.009***	1.597*	1.983***	1.389
The number of living children					
no or one living child (ref)					
at least two living children	1.111	1.142	1.061	1.159	0.921
Earned income	0.938***	0.950*	0.932***	0.925***	1.008
Health insurance					
none (ref)					
public or other type of health insurance	1.005	1.204	0.721	1.004	0.678
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	2.397***	2.311***	2.422***	2.079***	3.475***
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.262*	1.182	1.416*	1.217	1.911
at least three chronic diseases	1.692***	1.644***	1.831***	1.637***	2.538**
Number of ADL limitations					
none (ref)					
one or two ADLs limitations	3.838***	3.114***	5.154***	3.445***	6.336***
at least three ADLs limitations	11.30***	7.631***	20.21***	10.59***	15.73***
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	0.992	0.919	1.117	1.047	0.881
two	1	0.984	1.031	1.087	0.725
three	1.016	0.986	1.039	1.063	0.846
N	8,527	4,299	4,228	6,560	1,967

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income was computed as log(income+1).

Table 6.9 displays the logistic regressions results of whether an older respondent needed help with specific IADL tasks. The values of VIF of the regression in Table 6.9 ranged from 1.01 to 2.57, suggesting that the multicollinearity was not a problem (Shrestha, 2020). Regarding predisposing factors, age, daily alcoholic drinks consumption, and weekly physical activities were significant determinants for needing help with every IADL. Older people aged 80 years and over were more likely to need help with every IADL than

those aged between 60 and 69 years. Older respondents who moderately consumed alcohol or regularly conducted physical activities were less likely to report social care needs for each IADL task compared to those who abstained from drinking or physical activities. Gender was a significant indicator for needing help with cooking, doing housework, and shopping for groceries. Compared to older male respondents, female respondents were less likely to need help with cooking and doing housework, but more likely to need help with shopping for groceries. Such gender disparities may be explained by the gendered division of household labour (Oshio et al., 2013, Liu, 2014). Marital status was a significant predictor for reporting needing help with cooking and doing housework. Older respondents who were married were less likely to need help with cooking and doing housework than those who were unmarried. Additionally, older respondents who were illiterate were more likely to need help taking medications, managing money, shopping for groceries, and making phone calls than those who were literate. Compared to respondents who never smoked, former smokers were more likely to report social care needs for cooking and doing housework, and those who smoked at the time of the survey were less likely to need help with taking medications.

Focusing on enabling factors, older respondents with rural hukou were significantly more likely to need help managing money, shopping for groceries, and making phone calls. Additionally, older respondents living with others were more likely to need help with every IADL task. This is consistent with previous studies, which have found that living with others is an important predictor for reporting social care needs (Gu and Vlosky, 2008). Furthermore, older respondents with higher incomes were less likely to need help with cooking, doing housework, taking medications, managing money, and making phone calls.

As expected, need factors also played a vital role in predicting needing help with each IADL task (Willis et al., 2007, Che and Cheung, 2022). For instance, older respondents with a memory-related problem had a greater likelihood of needing help with each IADL task than those with no such problems. The

experience of hunger prior to the age of 17 was also found to be a significant predictor for needing help with cooking. Respondents who reported having experienced hunger before the age of 17 for three episodes were less likely to need help with cooking in later life compared to those with no such experiences.

Table 6.9 Predictors of reporting needing help with each task of IADLs using logistical regression models (N=8,527)

	Cooking (1)	Doing housework (2)	Taking medicine (3)	Managing money (4)	Shopping for groceries (5)	Making phone calls (6)
Predisposing factors						
Age						
60–69 (ref)						
70–79	1.570***	1.354**	1.249	0.991	1.642***	1.885***
80+	3.597***	2.629***	2.049***	1.717***	3.475***	2.181***
Gender						
male (ref)						
female	0.606***	0.739*	0.79	1.139	1.390*	1.144
Ethnicity						
Han ethnicity (ref)						
ethnic minorities	1.101	1.12	1.078	0.772	1.224	0.936
Marital status						
not married (ref)						
married	0.618***	0.625***	1.146	1.053	0.905	0.903
Illiterate						
no (ref)						
yes	0.988	0.911	2.221***	1.946***	1.542***	3.316***
Smoking						
having never smoked (ref)						
former smokers	1.375*	1.352*	1.027	1.085	1.201	0.86
currently smoking	1.318	1.119	0.609*	1.145	1.016	1.047
Daily alcoholic drinks consumption						
no (ref)						
yes	0.594***	0.535***	0.594**	0.604***	0.482***	0.815*
Weekly physical activities						
no (ref)						
yes	0.310***	0.294***	0.510***	0.559***	0.306***	0.723***
Enabling factors						
Hukou Status						
urban hukou (ref)						
rural hukou	1.086	1.024	1.124	1.453***	1.377*	2.463***
Living arrangements						
living alone (ref)						
living with others	4.892***	2.531***	1.781*	2.178***	2.213***	1.562**
The number of living children						
no or one living child (ref)						
at least two living children	0.869	0.897	0.972	1.04	0.909	1.106
Earned income	0.934**	0.890***	0.992	0.921***	0.908**	0.953**
Health insurance						
none (ref)						
public or other type of health insurance	1.004	1.364	1.117	1.228	0.945	1.289
Need factors						

Diagnosed with a memory-related disease						
none (ref)						
a memory-related disease	2.208***	2.029***	3.594***	2.633***	2.503***	3.003***
Number of chronic diseases						
none (ref)						
one or two chronic diseases	1.579*	2.033***	1.529	1.157	1.15	1.305*
at least three chronic diseases	2.135***	3.075***	1.843*	1.534**	1.506*	1.234
Number of ADL limitations						
none (ref)						
one or two ADLs limitations	5.047***	5.458***	3.294***	3.034***	4.164***	2.056***
at least three ADLs limitations	20.34***	18.28***	10.54***	7.158***	12.87***	3.805***
Early-life factors						
Numbers of episodes reported having experienced hunger prior to the age of 17						
zero (ref)						
one	0.901	0.918	0.801	1.156	0.907	0.886
two	0.865	0.858	0.746	1.271	0.982	0.92
three	0.665**	0.901	0.942	1.095	0.87	0.897
N	8,527	8,527	8,527	8,527	8,527	8,527

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonized CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income was computed as log(income+1).

Table 6.10 displays the predictors for needing help with one or more IADLs (ranging from 1 to 6) using the sample composed of older respondents needing help with at least one IADL. The values of VIF of the regressions in Table 6.10 ranged from 1.01 to 3.90, suggesting that the multicollinearity was not a concern here (Shrestha, 2020). The Poisson models constructed here were run for older individuals needing help with at least one IADL (N=2,161). Amongst predisposing and enabling factors, age, daily alcoholic drinks consumption, weekly physical activities, and living arrangements were significantly associated with needing help with more IADLs. Specifically, older respondents aged 80 years and over were more likely to need help with more IADLs compared to those aged between 60 and 69 years. In line with results shown in previous tables, older respondents who moderately consumed alcohol or engaged in regular physical activity were more likely to need help with more IADLs compared with those who abstained from alcohol or regular physical activity. Reporting a memory-related disease or more ADL limitations corresponded with a higher prevalence of needing help with more IADLs. In particular, for the male and rural subsamples, respondents reporting

experiences of hunger prior to the age of 17 for three episodes were less likely to need help with more IADLs.

Table 6.10 Predictors of the number of IADL tasks reported needing help with (ranging from 1-6) using Poisson regression models (N=2,161)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.076*	1.098*	1.044	1.068	1.136
80+	1.328***	1.422***	1.243**	1.317***	1.401**
Gender					
male (ref)					
female	0.949			0.933	1.043
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	0.997	0.987	1.007	1.023	0.852
Marital status					
not married (ref)					
married	0.988	1.015	0.961	0.995	0.968
Illiterate					
no (ref)					
yes	1.033	0.995	1.109	1.03	1.046
Smoking					
having never smoked (ref)					
former smokers	1.065	1.059	1.018	1.069	1.038
currently smoking	0.973	1.053	0.913	0.966	0.989
Daily alcoholic drinks consumption					
no (ref)					
yes	0.864***	0.853*	0.858**	0.861**	0.896
Weekly physical activities					
no (ref)					
yes	0.772***	0.773***	0.785***	0.768***	0.778**
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.98	0.951	1.012		
Living arrangements					
living alone (ref)					
living with others	1.316***	1.298***	1.359**	1.311***	1.356*
The number of living children					
no or one living child (ref)					
at least two living children	0.929	0.906	0.965	0.882	1.058
Earned income	0.984	0.976	0.989	0.985	0.978
Health insurance					
none (ref)					
public or other type of health insurance	1.072	1.056	1.111	1.091	1.084
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	1.284***	1.321***	1.244***	1.311***	1.220*
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.098	1.138	1.064	1.08	1.341
at least three chronic diseases	1.136	1.235*	1.016	1.133	1.263
Number of ADL limitations					
none (ref)					
one or two ADLs limitations	1.256***	1.183***	1.384***	1.244***	1.323**

at least three ADLs limitations	1.723***	1.599***	1.950***	1.713***	1.776***
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	0.963	0.973	0.946	0.943	1.046
two	0.98	0.979	0.984	0.968	0.99
three	0.923	0.962	0.862*	0.906*	0.986
N	2,161	1,320	841	1,848	313

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The Poisson regression models were run for older respondents aged 60 years and over needing help with at least one IADL (N=2,161) ②Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ③ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ④ Earned income was computed as log(income+1).

6.5 Chapter summary

The results discussed in this chapter provide a detailed understanding of the extent of social care needs for ADLs and IADLs along with their predictors. The results shown above suggest the validity of the conceptual framework constructed in Section 4.7 and shown in Figure 4.1 regarding the predictors for social care needs for ADLs and IADLs. It is worth noting that experiences of hunger prior to the age of 17 was found to be significantly associated with reporting needing help with bathing, cooking, and more IADLs (see Tables 6.6, 6.9, and 6.10), expanding the current understanding of the underlying predictors for social care needs of older Chinese people.

As outlined previously in Section 1.2 and expanded upon in Section 4.2.2, four hypotheses concerning older people's social care needs were proposed based on existing findings. As illustrated in Table 6.11, H1a posited that older people's social care needs are determined by their demographic characteristics and that the risks of needing help in daily life increase with age. H1a was fully supported by the results in Tables 6.5, 6.6, 6.8, 6.9, and 6.10. H1b speculated that older women are more likely to report social care needs compared to their male counterparts. This was partially supported by the results in Tables 6.6, 6.7, and 6.9 since the associations between gender and needing help with specific ADLs and IADLs varied (see Table 6.9). H1c focused on the relationship between education and social care needs, which was partially supported as well. As shown in Tables 6.5, 6.8, and 6.9, while older individuals who could read or write were more likely to need help with

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ADLs, they were less likely to have social care needs for IADLs. H1d pointed to the lasting influence of early-life adversities on social care needs in later life, which was not supported based on the results shown in Tables 6.6, 6.9, and 6.10. This study found that older people with experiences of hunger prior to the age of 17 were less likely to need daily assistance. The results addressing the unmet needs part of the first set of research questions are presented in the next chapter.

Table 6.11 Hypotheses regarding social care needs

Hypotheses	Supported	Partially supported	Not supported
1a: The extent of social care needs varies by older people's demographic characteristics and the risk of needing social care needs in later life increases with age.	✔		
1b: Older women are more likely to report social care needs for ADLs and IADLs compared to their male peers.		✔	
1c: Older people with higher educational attainment or income are less likely to report social care needs compared to those with relatively lower educational attainment or income.		✔	
1d: Older people who experienced hunger early in their lives are more likely to require assistance with ADLs and IADLs than those with no such experiences.			✔

Source: Author's work based on hypotheses of the first set of research questions and empirical evidence in Chapter 6.

Chapter 7 Understanding unmet needs for ADLs and IADLs of older Chinese people——Results of the cross-sectional analysis

7.1 Chapter overview

This chapter addresses the unmet needs aspect of the first set of research questions, aiming to gain a better understanding of the prevalence of older Chinese people's contemporary unmet needs in terms of ADLs and IADLs, as well as their significant predictors. The first set of research questions addressing unmet needs were as follows:

Research Question 1a: What is the extent of older people's unmet needs?

Research Question 1b: How does the extent of older people's unmet needs vary by their demographic and socioeconomic characteristics and early-life adversities?

As discussed in Chapter 4, unmet need for social care was conceptualised as the gap between the report of social care needs by older adults and the assistance they receive for such needs, indicating that the care provided falls short of meeting their needs (Vlachantoni et al., 2011). In line with previous studies (Hu and Wei, 2022), older adults who reported requiring assistance with specific ADLs and IADLs, but did not receive help with at least one of these activities, were identified as having unmet needs for ADLs and IADLs (see Section 5.5.1). Section 7.2 focuses on the results based on unmet needs for ADLs, while Section 7.3 discusses the results regarding unmet needs for IADLs. The data employed to understand unmet needs for ADLs and IADLs was derived from the Life History Survey and Wave 4 of the CHARLS. Specifically, the descriptive profile of the analytical sample employed for addressing unmet needs is discussed first. Then, the results based on the bivariate analysis are demonstrated in order to show the prevalence of unmet needs amongst older people with different characteristics. Finally, the results

based on the multivariate analysis are discussed in terms of comprehensively exploring the underlying predictors for unmet needs. The hypotheses regarding unmet needs are reviewed in Section 7.4.

7.2 Understanding unmet needs for ADLs of older Chinese people

This section is divided into three subsections, which discuss the results that address the unmet needs for ADLs according to the descriptive, bivariate, and multivariate analyses.

7.2.1 Description of the analytical sample employed for understanding unmet needs for ADLs

The analytical sample used for understanding unmet needs for ADLs was restricted to older respondents requiring help with at least one ADL (see Section 5.4). Table 7.1 includes three main aspects: the descriptive profile, the prevalence of unmet needs for ADLs, and the bivariate results based on a series of Chi-2 tests. Regarding respondents' demographic profiles, those aged 80 years and over accounted for 19.0% of the analytical sample (n=143). Over half were female (55.7%; n=419), while more than 10% were ethnic minorities (11.2%; n=84). Nearly 30% of older respondents needing help with at least one ADL were widowed (29.7%; n=223), and 15.8% lived alone (n=119). Around 80% had rural hukou (80.6%; n=606), and nearly 70% still resided in rural areas (67.6%; n=508). In terms of socioeconomic characteristics, nearly 60% of the analytical sample did not finish primary school (58%; n=436), and 37.8% were illiterate (n=284). Public healthcare insurance covered 95% of respondents (n=714). Almost 80% experienced hunger prior to the age of 17 (76.7%; n=577), with nearly a quarter having three episodes of such experiences (24.3%; n=183).

As for health status, about 54.9% of older respondents needing help with at least one ADL never smoked (n=413), and over 80% did not drink on a daily basis (81%; n=609). Although the sample in this analysis specifically encompassed older individuals needing help with ADLs, around 64.6% reported still engaging in regular physical activities (n=486). Around 16% of

the analytical sample reported a memory-related disease (16.4%; n=123), and 66.9% reported being diagnosed with at least two chronic diseases (66.9%; n=503). The number of ADL and IADL limitations were included to address older respondents' physical functions. Amongst the analytical sample, about half reported limitations in performing at least three ADLs (52.8%; n=397), and 59% reported limitations in at least three IADLs (n=444). Nearly 30% of older respondents with social care needs for ADLs reported unmet needs (28.5%; n=214).

As shown in the column furthest to the right in Table 7.1, marital status, the number of living children, living arrangements, weekly physical activities, and IADL-related limitations were important indicators of unmet needs for ADLs according to the series of Chi-2 tests. About 26.3% of older respondents who were married reported unmet needs for ADLs, lower than those who were widowed, divorced, separated, or never married (56.3%). About half of the respondents living alone reported unmet needs for ADLs (47.1%), which was higher than those living with others (25%). This aligns with the previous discussion in Section 4.3 regarding living alone being a significant indicator of reporting unmet needs for ADLs (Cao et al., 2023).

Table 7.1 The descriptive profile of respondents aged 60 years and over needing help with at least one ADL at Wave 4 of the CHARLS (N=752)

	%	Weighted %	N	The prevalence of unmet needs for ADLs (%)	Chi-2 Unmet needs for ADLs
Age group					
60-69	42.6	41.0	320	30.3	
70-79	38.4	36.6	289	28.0	
80+	19.0	22.4	143	25.2	
Gender					
male	44.3	43.7	333	26.7	
female	55.7	56.3	419	29.8	.
Ethnicity					
Han ethnicity	88.8	89.4	668	28.1	
ethnic minorities	11.2	10.6	84	31.0	
Marital status					
married/ partnered	68.2	64.6	513	26.3	*
widowed	29.7	33.5	223	31.4	
separated/ divorced/ never married	2.1	1.9	16	56.3	
The number of living children					
none	1.3	1.1	10	80.0	***
one	6.2	6.7	47	19.2	
at least two	92.4	92.2	695	28.4	
Living arrangement					
living alone	15.8	16.9	119	47.1	***

living with others	84.2	83.1	633	25.0	
Hukou status					
urban hukou	19.4	22.1	146	23.3	
rural hukou	80.6	77.9	606	29.7	
Residential area					
urban communities	32.4	37.8	244	25.0	
rural villages	67.6	62.2	508	30.1	
Education attainment					
lower than primary school	58.0	58.0	436	28.9	
primary school or higher	42.0	42.0	316	27.9	
Illiterate					
no	62.2	61.1	468	28.4	
yes	37.8	38.9	284	28.5	
Health insurance					
none	5.1	6.1	38	31.6	
public or other type of health insurance	95.0	93.9	714	28.3	
Having experienced hunger prior the age of 17					
no	23.3	24.7	175	22.9	
yes	76.7	75.3	577	30.2	
Number of episodes reported having experienced hunger prior the age of 17					
0	23.3	24.7	175	22.9	
1	37.2	35.3	280	30.0	
2	15.2	14.8	114	26.3	
3	24.3	25.2	183	32.8	
Smoking					
having never smoked	54.9	55.4	413	29.3	
former smoker	26.7	26.6	201	24.4	
currently smoking	18.4	18.0	138	31.9	
Daily alcoholic drinks consumption					
none	81.0	81.2	609	29.4	
less than once per day	10.9	11.0	82	20.7	
once per day	4.3	3.8	32	25.0	
twice or more than twice per day	3.9	4.1	29	33.3	
Weekly physical activities					
no	35.4	35.1	266	22.6	**
yes	64.6	64.9	486	31.7	
Diagnosed with a memory-related disease by a doctor					
no	83.6	83.9	629	30.8	
yes	16.4	16.1	123	16.3	
Number of chronic diseases					
no chronic disease	3.5	3.6	26	30.8	
one or two diseases	29.7	30.9	223	27.8	
at least three diseases	66.9	65.4	503	28.6	
Number of ADLs limitations					
one or two limitations	47.2	49.8	355	31.6	
at least three limitations	52.8	50.2	397	25.7	
Number of IADLs limitations					
no limitations	12.4	12.9	93	43.0	***
one or two limitations	28.6	28.0	215	36.3	
at least three limitations	59.0	59.2	444	21.6	
Unmet needs for ADLs					
no	71.5	71.7	538		
yes	28.5	28.3	214		
Total analytical sample	**100**	**100**	**752**		

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The percentages shown in Table 7.1 include unweighted and weighted results. The individual-level sample weight of Wave 4 provided by CHARLS was employed. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③The significance results of the Chi-2 tests: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

7.2.2 Understanding the prevalence of unmet needs for ADLs using bivariate analysis

The following figures and tables present the prevalence of unmet needs for ADLs, as well as each ADL task, amongst older respondents distinguished by age groups, marital status, living arrangements, and experiences of hunger prior to the age of 17.

7.2.2.1 The prevalence of unmet need for ADLs by age groups and marital status

Figures 7.1 a & b illustrate the prevalence of unmet needs for ADLs amongst older respondents categorised by their age and marital status. A significant difference was observed amongst respondents aged from 60 to 69 years between those who were married and unmarried. Specifically, around 45.1% of those who were unmarried reported unmet needs for ADLs compared to 27.5% of married respondents. Although not significant, amongst older respondents aged between 70 and 79 years and those aged 80 years and over, a higher proportion of unmet needs for ADLs was observed for respondents who were unmarried than for those who were married.
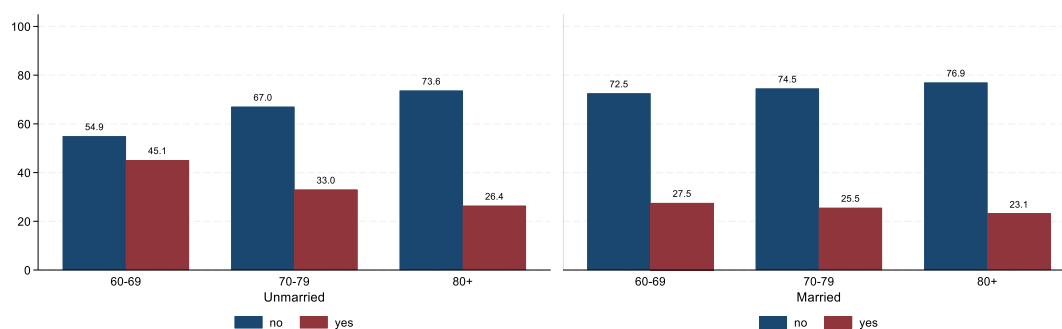
Figures 7.1 a & b The proportion of unmet needs for ADLs amongst respondents aged 60 years and over and needing help with ADLs by age groups and marital status (N=752, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 7.1 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (unmet needs for ADLs×marital status): 60-69: $\chi^2 = 6.6064$, $p < 0.05$; 70-79: $\chi^2 = 1.7821$, $p = 0.182$; 80+: $\chi^2 = 0.1909$, $p = 0.662$.

Table 7.2 presents the prevalence of unmet needs for specific ADL tasks according to marital status. There was a higher proportion of unmet needs for using the toilet (18.8%) and bathing (8.5%) than eating (1.5%), dressing (3.5%), and getting in and out of bed (3.5%). The significant differences between respondents who were married and those who were unmarried were observed regarding dressing, bathing, and getting in and out of bed. Specifically, older respondents who were married were less likely to report unmet needs for dressing, bathing, and getting in and out of bed than those who were unmarried. For instance, 13% of older respondents who were widowed, divorced, separated, or never married reported unmet needs for bathing, while the prevalence amongst those who were married was 6.4%.

Table 7.2 The proportion of unmet needs for each task of ADLs amongst respondents aged 60 years and over needing help with at least one ADL by marital status (N=752, %)

ADLs tasks	Marital status		Total	Chi-2
	Unmarried	Married		
Eating	2.5	1.0	1.5	
Dressing	5.4	2.5	3.5	*
Bathing	13.0	6.4	8.5	**
Using the toilet	18.4	18.9	18.8	
Getting in or out of beds	6.3	2.1	3.5	**
N	**239**	**513**	**752**	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 7.2 are unweighted. ②ADLs stands for Activities of Daily Living ③The Chi-2 results between each task and gender are presented next the proportion column. * p < 0.05, ** p < 0.01, *** p < 0.001.

7.2.2.2 The prevalence of unmet need for ADLs by age groups and living arrangements
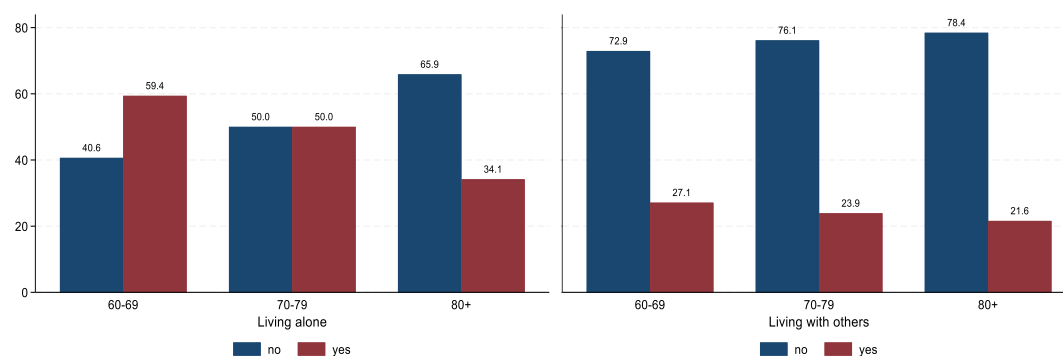
Figures 7.2 a & b The proportion of unmet needs for ADLs amongst older respondents aged 60 years and over and needing help with ADLs by age groups and living arrangements (N=752, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Note: ①The proportions shown in Figures 7.2 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (unmet needs for ADLs×living arrangement): 60-69: $\chi^2 = 14.0556$, $p < 0.001$; 70-79: $\chi^2 = 13.0933$, $p < 0.001$; 80+: $\chi^2 = 2.4561$, $p = 0.117$.

The prevalence of unmet needs regarding ADLs according to respondents' age and living arrangements are shown in Figures 7.2 a & b. There was a significantly higher prevalence of unmet need for ADLs amongst those who lived alone than for those living with others. Such differences were significant amongst older respondents aged from 60 to 69 years and 70 to 79 years. For instance, amongst older respondents aged 60 to 69 years, 59.4% of those living alone reported unmet needs for ADLs compared to 27.1% of those living with others. A more detailed prevalence rate of unmet needs regarding specific ADL tasks distinguished by living arrangements is presented in Table 7.3. The proportion of older respondents reporting unmet needs for each task of ADLs was significantly higher amongst older respondents living alone than those living with others. For instance, nearly 30% of older respondents living alone reported unmet needs for using the toilet (29.4%). By comparison, this prevalence rate amongst those living with others was 16.7%.

Table 7.3 The proportion of unmet needs for each task of ADLs amongst respondents aged 60 years and over needing help with at least one ADL by living arrangements (N=752, %)

ADLs tasks	Living arrangements		Total	Chi-2
	Living alone	Living with others		
Eating	4.2	0.9	1.5	**
Dressing	9.2	2.4	3.5	***
Bathing	15.1	7.3	8.5	**
Using the toilet	29.4	16.7	18.8	***
Getting in or out of beds	8.4	2.5	3.5	***
N	**119**	**633**	**752**	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 7.3 are unweighted. ②ADLs stands for Activities of Daily Living. ③The Chi-2 results between each task and gender are presented next the proportion column. * p < 0.05, ** p < 0.01, *** p < 0.001.

7.2.2.3 The prevalence of unmet need for ADLs by age groups and experiences of hunger prior to the age of 17

As shown in Figures 7.3 a & b, although differences in the prevalence of unmet needs for ADLs between older respondents distinguished by their experiences of hunger were not significant for all three age groups, a higher prevalence was observed amongst those having experienced hunger before the age of 17 than those with no such experiences. For instance, about 18% of older respondents aged 80 years and over and having no experiences of hunger prior to the age of 17 reported unmet needs for ADLs (17.9%), while the proportion amongst their counterparts with such experiences was nearly 30% (29.9%).
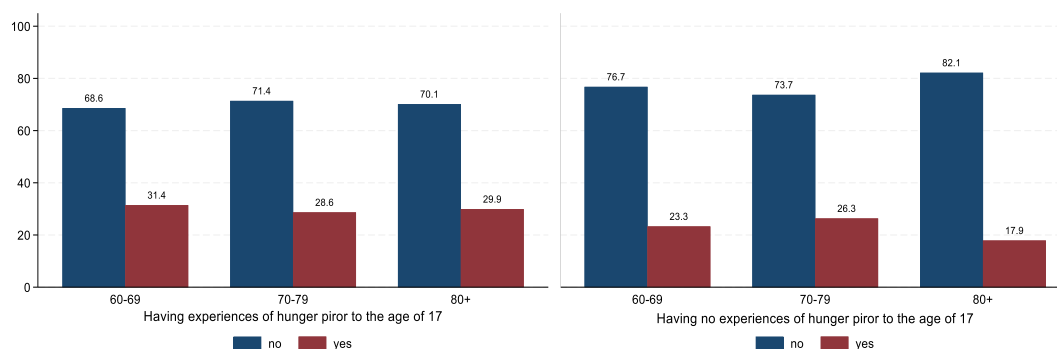
Figures 7.3 a&b The proportion of unmet needs for ADLs amongst older respondents aged 60 years and over and needing help with ADLs by age groups and experiences of hunger prior to the age of 17 (N=752, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ①The proportions shown in Figures 7.3 a & b are unweighted. ②ADLs stands for Activities of Daily Living. ③Chi-2 significance (unmet needs for ADLs× hunger experiences): 60-69: χ^2＝1.4300, p＝0.232; 70-79: χ^2＝0.232, p＝ 0.699; 80+: χ^2＝2.6166, p＝ 0.106.

The prevalence of unmet needs for specific ADL tasks categorised by older respondents' experiences of hunger is displayed in Table 7.4. Unlike the clear pattern shown in Tables 7.2 and 7.3, those who experienced hunger before the age of 17 were not necessarily more likely to report unmet needs regarding specific ADL tasks than those with no such experiences. However, it is worth noting that the prevalence of unmet needs for using the toilet was higher amongst older respondents having experienced hunger prior to the age of 17 (20.3%) than for those with no such experiences (13.7%).

Table 7.4 The proportion of unmet needs for each task of ADLs amongst respondents aged 60 years and over needing help with at least one ADL by experiences of hunger prior to age of 17 (N=752, %)

ADLs tasks	Having experienced hunger prior the age of 17		Total	Chi-2
	No	Yes		
Eating	1.7	1.4	1.5	
Dressing	5.1	2.9	3.5	
Bathing	8.0	8.7	8.5	
Using the toilet	13.7	20.3	18.8	
Getting in or out of beds	3.4	3.5	3.5	
N	**119**	**633**	**752**	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 7.4 are unweighted. ②ADLs stands for Activities of Daily Living. ③The Chi-2 results between each task and gender are presented next the proportion column. * p < 0.05, ** p < 0.01, *** p < 0.001.

7.2.3 Understanding the predictors of unmet needs for ADLs using multivariate analysis

Table 7.5 presents the predictors for unmet needs for ADLs based on the results of the logistic regressions. The goodness-of-fit test showed that the logistic regression models constructed for exploring the predictors of unmet needs were a good fit. The values of VIF of the regressions in Table 7.4 ranged from 1. 03 to 3.06, suggesting that multicollinearity was not a concern (Shrestha, 2020). Weekly physical activities, living arrangements, a memory-related problem, the number of IADL limitations, and experiences of hunger prior to the age of 17 were significantly associated with reporting unmet needs for one or more ADLs. Specifically, older female respondents who engaged in regular physical activities were more likely to report unmet needs for ADLs compared to those who abstained from physical activities. Additionally, older respondents living alone were more likely to report unmet needs for ADLs than those living with others. Surprisingly, older female respondents with at least two living children were more likely to report unmet needs for ADLs compared with those with no or one living child. This may be due to the out-migration of adult children driven by rapid urbanisation and the significant salary gap between rural and urban areas (Liu, 2014). Reporting a memory-

related disease and IADL limitations were significantly associated with a lower likelihood of unmet needs for ADLs. This is in line with previous findings that physical limitations are significant predictors of receiving informal care in later life (Hu and Ma, 2018). Meanwhile, this result may suggest that older people facing greater risks of unmet needs are not those who are actually most in need for social care (Vlachantoni et al., 2022). Furthermore, experiencing hunger before the age of 17 was an important predictor for older female respondents and those with rural hukou. Older female respondents having experienced hunger prior to the age of 17 for one and two episodes were more likely to report unmet needs for ADLs than those with no such experiences. This is in line with an earlier study suggesting the important link between childhood adversities and unmet needs in later life (Hu and Wei, 2022).

Table 7.5 Predictors of unmet needs for ADLs using logistic regression models (N=752)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.946	0.901	0.993	0.895	1.523
80+	0.845	0.84	0.802	0.789	1.115
Gender					
male (ref)					
female	0.992			1.052	0.974
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.165	1.125	1.021	1.322	0.553
Marital status					
not married (ref)					
married	1.274	1.566	0.77	1.28	1.781
Illiterate					
no (ref)					
yes	0.923	0.999	0.634	0.886	1.055
Smoking					
having never smoked (ref)					
former smokers	0.878	0.984	1.273	0.887	1.395
currently smoking	1.253	0.849	1.98	1.158	2.498
Daily alcoholic drinks consumption					
no (ref)					
yes	0.654	0.632	0.657	0.724	0.331
Weekly physical activities					
no (ref)					

yes	1.413	1.706*	1.302	1.275	2.118
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.292	1.108	1.211		
Living arrangements					
living alone (ref)					
living with others	0.305***	0.374**	0.271*	0.288***	0.406
The number of living children					
no or one living child (ref)					
at least two living children	1.04	4.039*	0.554	0.837	2.287
Earned income	1.018	1.045	0.997	1.045	0.904
Health insurance					
none (ref)					
public or other type of health insurance	0.85	0.709	1.366	1.021	0.242
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.508*	0.290**	0.739	0.537*	0.459
Number of chronic diseases					
none or one chronic disease (ref)					
at least two chronic diseases	0.83	0.924	0.718	0.887	0.37
Number of IADL limitations					
none (ref)					
at least one IADLs limitations	0.592*	0.584	0.684	0.743	0.173**
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	1.376	1.891*	0.929	1.47	1.585
two	1.183	2.155*	0.435	1.381	0.285
three	1.522	1.732	1.408	1.731	0.922
N	752	419	333	606	146

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ② ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income was computed as log(income+1).

7.3 Understanding unmet needs for IADLs of older Chinese people

This section discusses the descriptive, bivariate, and multivariate results addressing unmet needs for IADLs.

7.3.1 Description of the analytical sample employed for understanding unmet needs for IADLs

Table 7.6 depicts the analytical sample composed of older respondents needing help with at least one IADL in Wave 4 employed for addressing unmet needs for IADLs. In terms of basic demographic characteristics, about 14.7% of the analytical sample were 80 years old and over (n=317), and

61.1% were female (n=1,320). About 70% of older respondents needing help with at least one IADL were married (72.7%; n=1,572), and around a quarter were widowed (25.7%; n=556). The majority reported having at least two living children (93.2%; n=2,013) and living with others (86.8%; n=1,875). Conversely, around 1% had no living children (n=21), and 13.2% lived alone (n=286).

Table 7.6 The descriptive profile of older respondents aged 60 years and over needing help with at least one IADL at Wave 4 of the CHARLS (N=2,161)

	%	Weighted %	N	The prevalence rate of unmet needs for IADLs %	Chi-2 Unmet needs for IADLs
Age group					
60-69	47.8	46.1	1,034	31.4	
70-79	37.5	36.4	810	32.2	
80+	14.7	17.4	317	32.5	
Gender					
male	38.9	39.0	841	33.1	
female	61.1	61	1,320	31.1	
Ethnicity					
Han ethnicity	91.3	91.2	1,973	31.8	
ethnic minorities	8.7	8.8	188	33.0	
Marital status					
married/ partnered	72.7	70.7	1,572	28.5	***
widowed	25.7	27.6	556	40.5	
separated/ divorced/ never married	1.5	1.7	33	48.5	
Hukou status					
urban hukou	14.5	17.5	313	28.1	
rural hukou	85.5	82.5	1,848	32.5	
Residential area					
urban communities	26.7	31.6	576	29.2	
rural villages	73.3	68.4	1,585	32.9	
The number of living children					
none	1.0	1.1	21	42.9	*
one	5.9	7.0	127	21.3	
at least two	93.2	91.9	2,013	32.4	
Living arrangement					
living alone	13.2	13.0	286	52.1	***
living with others	86.8	87.0	1,875	28.8	
Education attainment					
lower than primary school	68.1	66.3	1,471	32.8	
primary school or higher	31.9	33.7	690	30.0	
Illiterate					
no	51.7	53.4	1,117	32.0	
yes	48.3	46.6	1,044	31.8	
Health insurance					
none	4.3	4.5	93	33.3	
public or other type of health insurance	95.7	4.5	2,068	31.8	
Whether having experienced hunger prior the age of 17					
no	22.2	23.7	480	29.0	
yes	77.8	76.3	1,681	32.7	
Number of episodes reported having experienced hunger prior the age of 17					
0	22.2	23.7	480	29.0	
1	35.8	34.2	773	34.0	
2	16.0	16.2	346	32.1	
3	26.0	26.0	562	31.3	
Smoking					
having never smoked	60.3	60.2	1,303	31.0	
former smoker	18.0	18.2	388	32.2	

currently smoking	21.7	21.6	470	34.0
Daily alcohol consumption				
none	79.6	79.4	1,720	31.7
less than once per day	10.9	11.0	235	29.8
once per day	5.1	5.3	110	34.6
twice per day	2.9	2.6	63	38.1
more than twice per day	1.5	1.6	33	33.3
Weekly physical activities				
no	23.2	23.3	501	30.5
yes	76.8	76.7	1,660	32.3
Diagnosed with a memory-related disease by a doctor				
no	88.9	88.7	1,921	32.4
yes	11.1	11.3	240	27.5
Number of chronic diseases				
no chronic disease	7.6	7.2	165	38.2
one or two diseases	35.6	36.9	769	30.0
at least three diseases	56.8	56.0	1,227	32.2
Number of ADLs limitations				
no limitations	45.3	45.7	979	30.3
one or two limitations	30.5	30.7	660	33.0
at least three limitations	24.2	23.5	522	33.3
Number of IADLs limitations				
one or two limitations	56.7	56.5	1,226	68.0
at least three limitations	43.3	43.5	935	32.0
Having unmet needs for IADLs				
no	68.1	68.1	1,472	
yes	31.9	31.9	689	
Total analytical sample	**100**	**100**	**2,161**	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The percentages shown in Table 7.6 include unweighted and weighted results. The individual-level sample weight of Wave 4 provided by CHARLS was employed. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③*p < 0.05, ** p < 0.01, *** p < 0.001

Turning to socioeconomic characteristics, over 80% of respondents had rural hukou (85.5%; n=1,848), while 73.3% lived in rural areas (n=1,585). Nearly 70% of the analytical sample did not finish primary school (68.1%; =1,471), and nearly half were illiterate (48.3%; n=1,044). Around 80% of older respondents needing help with IADLs reported having experienced hunger prior to the age of 17 (77.8%; n=1,681). In terms of health status profile, about 60% never smoked (60.3%; n=1,303), and 80% did not consume alcohol on a daily basis (79.6%; n=1,720). Around one-tenth of the analytical sample was diagnosed with a memory-related problem (11.1%; n=240), and over 90% had at least one chronic disease. Around half reported no limitations regarding ADLs (45.3%; n=979), while 43.3% reported limitations in at least three IADLs (n=935). Around 30% of older respondents needing help with IADLs reported unmet needs in this regard (31.9%; n=689).

The results of the Chi-squared tests show that marital status, the number of living children, and living arrangements significantly correlated with reporting

unmet needs for IADLs. The prevalence of unmet needs for IADLs was higher amongst older respondents who were not married, had no living child, and lived alone than those who were married, had at least one living child, and lived with others. For instance, the prevalence of unmet needs for IADLs amongst older respondents living alone was 52.1%, significantly higher than amongst those living with others (28.8%).

7.3.2 Understanding the prevalence of unmet needs for IADLs using bivariate analysis

The following figures and tables demonstrate the prevalence of unmet needs for IADLs in general and for specific IADL tasks amongst older individuals categorised according to age groups, marital status (Figures 7.4 a & b and Table 7.7), living arrangements (Figures 7.5 a & b and Table 7.8), and experiences of hunger prior to the age of 17 (Figures 7.6 a & b and Table 7.9).

7.3.2.1 The prevalence of unmet need for IADLs by age groups and marital status

The proportions of unmet needs regarding IADLs by age group and marital status are displayed in Figures 7.4 a & b. The prevalence of unmet needs for IADLs was significantly higher amongst older respondents who were not married than those who were married or had a partner for all age groups. For instance, amongst older respondents aged between 60 and 69 years, about half of those who were unmarried (48.4%) reported unmet needs for IADLs, while only 28.5% of married respondents reported similar unmet needs.
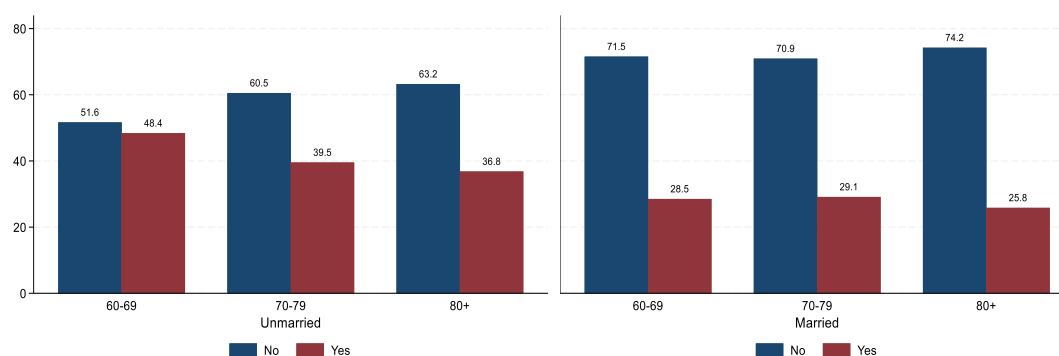
Figures 7.4 a & b The proportion of unmet needs for IADLs amongst respondents aged 60 years and over and needing help with IADLs by age groups and married status (N=2,161, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Note: ①The proportions shown in Figures 7.4 a & b are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (unmet needs for IADLs× marital status): 60-69: $\chi^2 =$ 24.8919, $p < 0.001$; 70-79: $\chi^2 = 8.4333$, $p < 0.001$; 80+: $\chi^2 = 4.1503$, $p < 0.05$.

Table 7.7 presents the prevalence of unmet needs regarding each task of IADLs according to marital status. Higher proportions of unmet needs in terms of housework (10.5%), making phone calls (10.1%), and managing money (9.1%) were observed, compared with cooking (5.7%), shopping for groceries (3.4%), and taking medications (2.4%). Differences in the prevalence of unmet needs between respondents who were married and unmarried were significant in terms of cooking, doing housework, and managing money. For example, 14.3% of those who are unmarried reported unmet needs for doing housework, while less than 10% of those who were married reported such unmet needs.

Table 7.7 The proportion of unmet needs for each task of IADLs amongst respondents aged 60 years and over needing help with at least one IADL by marital status (N=2,161, %)

IADLs tasks	Marital status		Total	Chi-2
	Unmarried	Married		
Cooking	8.1	4.8	5.7	**
Doing housework	14.3	9.1	10.5	***
Shopping for groceries	4.6	3.0	3.4	
Making phone calls	12.1	9.4	10.1	
Taking medicines	3.1	2.1	2.4	

Managing money	13.1	7.6	9.1	***
N	589	1,572	2,161	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 7.7 are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③The Chi-2 results between each task and gender are presented next the proportion column. * p < 0.05, ** p < 0.01, *** p < 0.001.

7.3.2.2 The prevalence of unmet need for IADLs by age groups and living arrangements

As shown in Figures 7.5 a & b, the proportion of unmet needs for IADLs was significantly lower amongst older respondents living with others compared to those living alone. For example, amongst older respondents aged 80 years and above, around half of respondents living alone reported unmet needs for IADLs (45.3%), compared to 27.0% of those living with others. One proportion standing out in Figure 7.5 a & b is that 64.4% of respondents between the ages of 60 and 69 who lived alone reported unmet needs for IADLs.
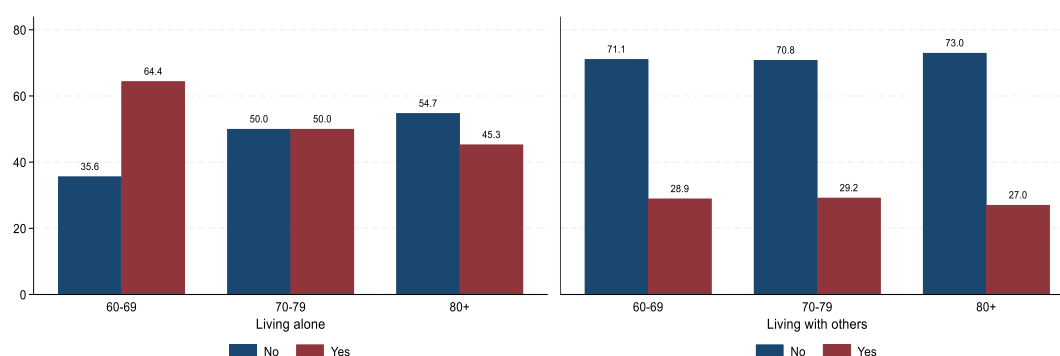
Figures 7.5 a & b The proportion of unmet needs for IADLs amongst respondents aged 60 years and over and needing help with IADLs by age groups and living arrangements (N=2,161, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ①The proportions shown in Figures 7.5 a & b are unweighted. ② IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (unmet needs for IADLs×living arrangements): 60-69: $\chi^2 =$ 39.0470, $p < 0.001$; 70-79: $\chi^2 = 19.9882$, $p < 0.01$; 80+: $\chi^2 = 10.0867$, $p < 0.01$.

Table 7.8 shows the proportion of unmet needs for specific IADL tasks by living arrangements. In line with the results shown in Figures 7.5 a & b, there was a higher proportion of unmet needs for each task of IADLs amongst older respondents living alone than for those living with others. For instance, nearly 20% of older respondents living alone reported unmet needs for doing

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housework (18.9%) and making phone calls (17.1%). Comparatively, less than 10% of those living with others reported unmet needs for doing housework (9.2%) and making phone calls (9.0%). These observed disparities support previous studies, which have suggested the importance of co-residence for older individuals needing assistance in daily life (Zhu, 2015)

Table 7.8 The proportion of unmet needs for each task of IADLs amongst respondents aged 60 years and over needing help with at least one IADL by living arrangements (N=2,161, %)

IADLs tasks	Living arrangements		Total	Chi-2
	Living alone	Living with others		
Cooking	8.0	5.3	5.7	
Doing housework	18.9	9.2	10.5	***
Shopping for groceries	5.6	3.1	3.4	*
Making phone calls	17.1	9.0	10.1	***
Taking medicines	3.5	2.2	2.4	
Managing money	15.4	8.2	9.1	***
N	589	1,572	2,161	

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The proportions presented in Table 6.4 are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③The Chi-2 results between each task and gender are presented next the proportion column. * p < 0.05, ** p < 0.01, *** p < 0.001.

7.3.2.3 The prevalence of unmet need for IADLs by age groups and experiences of hunger prior to the age of 17

Figures 7.6 a & b compare the proportions of unmet needs for IADLs categorised by age groups and experiences of hunger prior to the age of 17. Looking at each age group, no significant differences were observed in the prevalence rate for IADLs between older respondents with experiences of hunger before the age of 17 and those with no such experiences. For example, amongst older respondents aged 80 years and over, the proportion of unmet needs for IADLs amongst those with childhood experiences of hunger (32.5%) was the same as for those with no such experiences (32.5%).
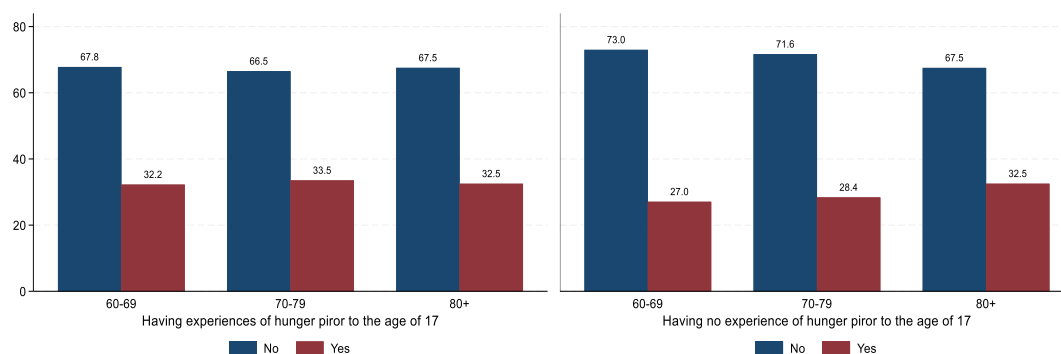
Figures 7.6 a & b The proportion of unmet needs for IADLs amongst respondents aged 60 years and over and needing help with IADLs by age groups and experiences of hunger prior to the age of 17 (N=2,161, %)

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The proportions shown in Figures 7.6 a & b are unweighted. ② IADLs stands for Instrumental Activities of Daily Living. ③Chi-2 significance (unmet needs for IADLs×hunger experiences): 60-69: $\chi^2 = 1.9532$, $p = 0.162$; 70-79: $\chi^2 = 1.8277$, $p = 0.176$; 80+: $\chi^2 = 0.0000$, $p = 0.998$.

Table 7.9 demonstrates the detailed prevalence of unmet needs for specific IADL tasks amongst older respondents needing help with IADLs according to their experiences of hunger before the age of 17. Much like the results presented in Figures 7.6 a & b, there were no significant differences in the prevalence of unmet needs for each IADL task in terms of experiences of hunger prior to the age of 17. For instance, about 5.9% of respondents with experiences of hunger prior to the age of 17 reported unmet needs for IADLs, which was close to the proportion amongst those with no such experiences (4.8%).

Table 7.9 The proportion of unmet needs for each IADL task amongst respondents aged 60 years and over needing help with at least one IADL task by experiences of hunger prior to the age of 17 (N=2,161, %)

IADLs tasks	Having experiences of hunger prior to the age of 17		Total	Chi-2
	No	Yes		
Cooking	4.8	5.9	5.7	
Doing housework	9.8	10.7	10.5	
Shopping for groceries	2.9	3.6	3.4	
Making phone calls	9.8	10.2	10.1	

Taking medicines	2.5	2.3	2.4
Managing money	7.1	9.7	9.1
N	589	1,572	2,161

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Note: ① The proportions presented in Table 7.9 are unweighted. ②IADLs stands for Instrumental Activities of Daily Living. ③The Chi-2 results between each task and gender are presented next the proportion column. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

7.3.3 Understanding the predictors of unmet needs for IADLs using multivariate analysis

Table 7.10 shows the determinants for older people's unmet needs regarding one or more IADLs based on a series of regression analyses. The goodness-of-fit test showed that the logistic regression models relating to unmet needs for IADLs were a good fit. The values of VIF of the regressions in Table 7.10 ranged from 1. 03 to 2.37, indicating that the multicollinearity was not a problem (Shrestha, 2020). Literacy, weekly physical activities, living arrangements, the number of living children, and experiences of hunger before the age of 17 were the factors significantly associated with reporting unmet needs for IADLs. For the urban subsample, illiterate older respondents were more likely to report unmet needs for IADLs compared to those who were literate. Additionally, older respondents who regularly engaged in physical activities demonstrated a higher risk of reporting unmet needs for IADLs than those who did not. Living arrangements were also an important indicator of unmet needs for IADLs for the whole sample, the male and female subsamples, and the rural subsample. Living with others was negatively associated with reporting unmet needs regarding IADLs. However, this association was not significant for the urban subsample. This may be due to the fact that older people with urban hukou have more access to community and formal care systems as supplements to informal care (Li et al., 2013). The number of living children was statistically associated with unmet needs for IADLs amongst the whole sample, as well as the male and rural subsamples, specifically. Older respondents with at least two living children were more likely to report unmet needs for IADLs compared with those with no or one living child. As discussed above, this may be because having more living

children does not necessarily mean that they are available for caregiving (Phillips and Feng, 2015).

Turning to the impacts of early life, the relationship between experiences of hunger before the age of 17 and unmet needs for IADLs was only significant amongst older respondents with rural hukou, for whom such experiences correlated with a higher risk of reporting unmet needs for IADLs. This is in line with previous research suggesting the adverse consequences of unfavourable childhood experiences on health and socioeconomic status in later life (Hu and Wei, 2022, Ferraro et al., 2016).

Table 7.10 Predictors of reporting unmet needs for IADLs using logistic regression models (N=2,161)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.954	1.083	0.772	0.932	1.078
80+	0.805	0.945	0.634	0.857	0.484
Gender					
male (ref)					
female	0.849			0.872	0.738
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.066	0.883	1.317	1.107	1.149
Marital status					
not married (ref)					
married	0.793	0.85	0.725	0.804	0.542
Illiterate					
no (ref)					
yes	0.964	0.79	1.349	0.863	2.582**
Smoking					
having never smoked (ref)					
former smokers	1.007	1.002	0.882	1.029	0.992
currently smoking	1.118	1.498	0.908	1.139	0.885
Daily alcoholic drinks consumption					
no (ref)					
yes	0.962	0.977	0.971	0.954	0.95
Weekly physical activities					
no (ref)					
yes	1.137	0.982	1.426	1.016	2.585**
Enabling factors					
Hukou Status					

urban hukou (ref)					
rural hukou	1.143	1.146	1.18		
Living arrangements					
living with others (ref)					
living alone	0.396***	0.411***	0.345**	0.343***	1.043
The number of living children					
no or one living child (ref)					
at least two living children	1.621*	1.487	1.900*	1.957**	0.812
Earned income	1.014	1.049	0.989	1.018	1
Health insurance					
none (ref)					
public or other type of health insurance	1.094	0.835	1.845	1.223	0.539
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.801	0.651	0.965	0.699	1.139
Number of chronic diseases					
none or one chronic disease (ref)					
at least two chronic diseases	0.996	0.996	0.951	0.977	1.407
Number of ADL limitations					
none (ref)					
at least one ADLs limitations	1.157	1.092	1.294	1.18	1.207
Early-life factors					
Numbers of episodes reported having experienced hunger prior to the age of 17					
zero (ref)					
one	1.275	1.378	1.126	1.373*	0.789
two	1.183	1.11	1.223	1.27	0.679
three	1.132	1.273	0.959	1.219	0.753
N	2161	1320	841	1848	313

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income was computed as log(income+1).

7.4 Chapter summary

The analyses and findings presented in this chapter examined the unmet needs for ADLs and IADLs of older Chinese people using descriptive, bivariate, and multivariate analyses. Predisposing, enabling, and need factors were found to be important predictors for unmet needs in later life (See Tables 7.5 and 7.10). Particularly, older people who experienced hunger prior to the age of 17 were more likely to report unmet needs for ADLs and IADLs than those with no such experiences. Regarding the hypotheses focusing specifically on unmet needs outlined in Section 1.2, the results are as follows.

H1e, concerning the relationships between the number of living children, living arrangements, and unmet needs, was partially supported. As shown in Tables 7.5 and 7.10, older individuals living with others were less likely to report unmet needs for ADLs and IADLs. However, older respondents with more than two living children were more likely to report unmet needs for ADLs and IADLs. H1f, which posited that older people with rural hukou would be more likely to have unmet needs compared to those with urban hukou, was not supported because a significant association between hukou status and unmet needs for ADLs and IADLs was not found. H1g, which hypothesised the potential influence of early-life adversities on unmet needs amongst older Chinese people, was supported based on the results in Tables 7.5 and 7.10, suggesting that older people who experienced hunger early in life faced a higher risk of reporting unmet needs for ADLs and IADLs than those with no such experiences.

Table 7.11 Hypotheses regarding unmet needs

Hypotheses	Supported	Partly supported	Not supported
1e: Older people with fewer living children or living alone are more likely to report unmet needs compared to those with more living children and living with others.		✔	
1f: Older people with rural hukou are more likely to have unmet needs compared to those with urban hukou.			✔
1g: Early-life experiences of hunger increase the risk of reporting unmet needs in later life.	✔		

Sources: Author's work based on hypotheses of the first set of research questions and empirical findings in Chapter 7.

Chapter 8 Understanding the dynamic social care needs and unmet needs for ADLs and IADLs of older Chinese people—Results of the longitudinal analysis

8.1 Chapter overview

This chapter presents the empirical results that address the second set of research questions using descriptive, bivariate, and multivariate analyses based on the longitudinal data from the 2014 Life History Survey and Waves 3 (2015) and 4 (2018) of the CHARLS. The second set of research questions are as follows:

Research Question 2a: How do older Chinese people's social care needs and unmet change over time?

Research Question 2b: What are the underlying factors associated with the different dynamic patterns of these needs?

Targeting Research Question 2a, five dynamic patterns for needs and unmet needs for ADLs were conceptualised in Figure 4.2 in Section 4.7, which are revisited in Section 8.2. The dynamic patterns of social care needs and unmet needs were conceptualised and measured based on the social care needs and unmet needs of older respondents between two time points (Vlachantoni et al., 2022). Social care needs were operationalised in a subjective way based on the respondents' self-assessment of their physical functional abilities. Unmet need was experienced when older adults required help with ADLs and IADLs but did not receive any assistance with such tasks (Vlachantoni, 2019).The rest of Chapter 8 is arranged as follows. Section 8.3 provides insights into understanding the dynamic social care needs and unmet needs of IADLs. The hypotheses for the second set of research questions outlined in Section 1.2 and expanded upon in Section 4.4 are discussed in Section 8.4 as the chapter's summary and conclusion.

8.2 Understanding the dynamic social care needs and unmet needs for ADLs

This section consists of three subsections that highlight the results of the descriptive, bivariate, and multivariate analyses investigating the dynamic social care needs and unmet needs, respectively, for ADLs.

8.2.1 Description of the analytical sample employed for understanding dynamic social care needs and unmet needs for ADLs

Table 8.1 presents the descriptive profile of the analytical sample employed in this study to examine the dynamic social care needs and unmet needs for ADLs amongst older Chinese people. This analytical sample was composed of respondents aged 60 years and over who required assistance with at least one ADL in Wave 3 and were interviewed during the Life History Survey and Wave 4 of the CHARLS. This descriptive profile consists of demographic and socioeconomic characteristics, experiences of hunger prior to the age of 17, and health status characteristics. Focusing specifically on the demographic characteristics, approximately 60% of the analytical sample was aged between 60 and 69 years (58.3%; n=224), while only 6.8% were 80 years old and over (n=26). Around 60% were female (61.7%; n=237), and nearly 90% were Han Chinese (n=342), which generally corresponds with the gender and ethnic distribution of the older Chinese population based on the seventh population census.[17] Older respondents with rural hukou (82.6%; n=317) or residing in rural areas (70.6%; n=271) accounted for the majority of the analytical sample, which is also in line with the composition of the older Chinese population (Zhu and Österle, 2017). Most older respondents were married or had a partner (79.4%; n=305). Notably, among the 79 unmarried respondents, 74 were widowed. Over 90% had more than one living child (91.4%; n=351) and lived with others (93.5%; n=359).

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[17] The data of the Seventh China Population Census is accessible at:
https://www.stats.gov.cn/sj/pcsj/rkpc/7rp/zk/indexch.htm

Table 8.1 The descriptive profile of respondents aged 60 years and above who needed help with at least one ADL in Wave 3 and took part in the Life History Survey and Wave 4 of the CHARLS (N=384)

	%	Weighted %	N
Age group			
60–69	58.3	56.2	224
70–79	34.9	35.8	134
80+	6.8	8.0	26
Gender			
male	38.3	40.7	147
female	61.7	59.3	237
Ethnicity			
Han ethnicity	89.1	88.6	342
ethnic minorities	10.9	11.4	42
Marital status			
married/ partnered	79.4	78.4	305
unmarried	20.6	21.6	79
Hukou status			
urban hukou	17.4	21.4	67
rural hukou	82.6	78.6	317
Residential area			
urban communities	29.4	33.3	113
rural villages	70.6	66.7	271
The number of living children			
none or one	8.6	10.5	33
at least two	91.4	89.5	351
Living arrangements			
living with others	93.5	95.2	359
living alone	6.5	4.8	25
Education attainment			
lower than primary school	60.7	58.1	233
primary school or higher	39.3	41.9	151
Illiterate			
no	60.9	62.2	234
yes	39.1	37.8	150
Health insurance			
none	10.9	11.2	42
public or other	89.1	88.8	342
Whether having experienced hunger prior to the age of 17			
no	23.7	25.4	91
yes	76.3	74.6	293
Number of episodes reported having experienced hunger prior to the age of 17			
0	23.7	25.4	91
1	36.7	37.7	141
2	13.3	11.8	51
3	26.3	25.1	101
Smoking			
having never smoked	57.8	55.9	222
former smoker	20.1	21.2	77
currently smoking	22.1	22.9	85
Daily alcoholic drinks consumption			
no	78.1	76.5	300
yes	21.9	23.5	84
Diagnosed with a memory-related disease			
no	90.6	89.4	348
yes	9.4	10.6	36
Number of chronic diseases			
none	5.7	5.5	22
one or two chronic diseases	33.6	33.6	129
at least three chronic diseases	60.7	60.9	233

Number of ADL limitations			
one or two limitations	56.5	58.3	217
at least three limitations	43.5	41.7	167
Changes in ADL limitations from Wave 3 to 4			
same status	21.9	23.6	84
improved status	56.0	54.5	215
deteriorated status	22.1	21.8	85
Number of IADL limitations			
none	18.8	19.5	72
one or two limitations	36.7	35.6	141
at least three limitations	44.5	44.9	171
Changes in IADL Limitations from Wave 3 to 4			
same status	31.8	33.1	122
improved status	36.5	35.5	140
deteriorated status	31.8	31.3	122
Social care needs for ADLs in Wave 3			
met needs	56.0	54.7	215
unmet needs	44.0	45.3	169
Social care needs for ADLs in Wave 4			
no needs	56.8	57.0	218
met needs	33.3	33.4	128
unmet needs	9.9	9.6	38
Total analytical sample	**100**	**100**	**384**

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The percentages shown in Table 8.1 include unweighted and weighted results. The individual-level sample weight of Waves 3 and 4 provided by the CHARLS was employed. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables were measured using data from Wave 3 of the CHARLS; the experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS.

Looking at respondents' socioeconomic status, educational attainment, illiteracy, and health insurance were examined. Around half of the analytical sample did not complete primary school (60.7%; n=233), and 39.1% were illiterate (n=150). Additionally, nearly 90% of the sample reported being covered by at least one type of health insurance (89.1%; n=342), which corroborates previous studies suggesting the expansion of and continuous improvements to public health insurance in China (Yu, 2015). In terms of early-life adversities, around 80% of the analytical sample had experienced hunger prior to the age of 17 (76.3%; n=293). Specifically, approximately 40% of respondents reported experiencing one episode of hunger before the age of 17 (36.7%; n=141), while 26.3% reported at least three episodes of hunger prior to the age of 17 (n=101).

The lifestyle characteristics examined included smoking, daily alcohol consumption, and engaging in regular physical activities, the importance of which for maintaining a healthy lifestyle was previously discussed in Section

4.2.2. However, it is worth noting that physical activities were not included in the longitudinal analysis examining the dynamic social care needs and unmet needs. This is because only a random half of the respondents were interviewed about their physical activities in Wave 3 of the CHARLS. About half of the respondents have never smoked (57.8%; n=222), while 20.1% were former smokers (n=77). Health characteristics encompassed reports of memory-related problems, chronic diseases, and physical limitations regarding ADLs and IADLs. Less than 10% of respondents reported being diagnosed with a memory-related problem (9.4%; n=36). Around 5.7% had no chronic diseases (n=22), while over 60% of respondents were diagnosed with at least three chronic diseases (60.7%; n=233). Amongst older respondents with social care needs for ADLs and IADLs in Wave 3, 43.5% reported having at least three ADL limitations (n=167), and 44.5% reported limitations with performing at least three IADL tasks (n=171). From Waves 3 to 4, 56.0% of respondents reported an improved status for ADLs (n=215), while 36.5% reported an improved status in terms of IADLs (n=140). Around 20% of respondents experienced a deteriorated status regarding ADL performance (22.1%; n=85) between the two waves, and 31.8% reported a deteriorated physical status in terms of IADLs (N=122). Thus, the proportion of respondents reporting a deteriorated physical status regarding ADLs or IADLs from Waves 3 to 4 was lower compared to those who reported an improved status across the two waves. This coincides with previous findings suggesting the improving physical status of ADLs and IADLs amongst older Chinese people (Feng et al., 2013).

The last few rows of Table 8.1 present the distributions of respondents regarding their social care needs, and unmet needs in Waves 3 and 4. A significant drop in the prevalence of unmet needs for ADLs in Wave 4 compared to Wave 3 was observed. Over 40% of the analytical sample reported unmet needs for ADLs in Wave 3 (44%; n=169), while the prevalence of unmet needs in Wave 4 was 9.9% (n=38). This decrease is in line with earlier findings suggesting the diminishing prevalence of unmet needs

amongst older Chinese people with urban hukou from 2005 to 2008 (Peng et al., 2015).

2015 Wave 3   **2018 Wave 4**

No social care needs for ADLs
No longer having social care needs for ADLs
56.8% (n=218)

Social care needs for ADLs
100% (n=384)

Met needs for ADLs
54.7% (n=215)

Met needs for ADLs
Repeated met needs for ADLs
24.0% (n=92)

Unmet needs for ADLs
Newly arisen unmet needs for ADLs
2.9% (n=11)

Met needs for ADLs
Newly arisen met needs for ADLs
9.4% (n=36)

Unmet needs for ADLs
45.3% (n=169)

Unmet needs for ADLs
Repeated unmet needs for ADLs
7.0% (n=27)

Figure 8.1 Distribution of the analytical sample across the dynamic patterns of social care needs and unmet needs for ADLs between Waves 3 and 4 of the CHARLS

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

As shown in Figure 8.1, five dynamic patterns of social care needs and unmet needs for ADLs were examined, including no longer having social care needs, repeated met needs, newly arisen unmet needs, newly arisen met needs, and repeated unmet needs. No longer having social care needs for ADLs referred to situations where older individuals potentially recovered from needing assistance with performing daily activities (Gill et al., 2006). Nearly 60% of respondents reported having social care needs for ADLs in Wave 3 but no

longer needed help with these in Wave 4 (56.8%; n=218). The other four dynamic patterns corresponded with whether an older individual's social care needs remained met or unmet in Wave 4. About 24% reported receiving sufficient assistance in both Waves 3 and 4, indicating repeated met needs (n=92). Around 2.9% of respondents reported no unmet needs for ADLs in Wave 3 but then had unmet needs in Wave 4, thereby demonstrating newly arisen unmet needs for ADLs (n=11). About 9.4% had unmet needs for ADLs in Wave 3 but received sufficient help to meet their social care needs in Wave 4, corresponding with newly arisen met needs. About 7% of respondents reported unmet needs in Waves 3 and 4, indicating repeated unmet needs (n=27). The distribution of the analytical sample over the five patterns of the dynamic social care needs and unmet needs for ADLs provides a general understanding of how social care needs and unmet needs of older Chinese people change over time, addressing Research Question 2a.

8.2.2 Understanding the dynamic social care needs and unmet needs for ADLs using bivariate analysis

This section discusses the results of the bivariate analyses examining the correlations between each predisposing, enabling, need, and early-life factor, along with the five dynamic patterns of social care needs and unmet needs for ADLs, which are displayed in Tables 8.2, 8.3, and 8.4, respectively.

8.2.2.1 The correlations between the dynamic social care needs and unmet needs for ADLs and predisposing factors

Table 8.2 presents the series of Chi-square and Fisher's exact tests conducted for each predisposing factor and pattern of dynamic social care needs and unmet needs for ADLs. The prevalence rates of the five dynamic patterns of social care needs and unmet needs for ADLs by predisposing factors are also shown in Table 8.2. The prevalence rate of no longer needing help with ADLs (Column 1) was the highest compared with that of repeated met needs (Column 2), newly arisen unmet needs (Column 3), newly arisen met needs (Column 4), and repeated unmet needs for ADLs (Column 5).

Ethnicity was found to be significantly correlated with reporting no longer having social care needs and repeated met needs for ADLs. On the one hand, older Han respondents demonstrated a greater likelihood of no longer needing help with ADLs in Wave 4 compared to respondents from ethnic minority communities. Nearly 60% of Han respondents reported no longer needing help with ADLs (58.8%), while around 40% of ethnic minority respondents reported no longer having social care needs for ADLs (40.5%). This may be explained by the fact that older Chinese people from ethnic minority communities tend to report poorer health statuses and lower incomes compared to their ethnic Han compatriots (Li et al., 2007). Additionally, older Chinese people from ethnic minority communities usually reside in remote and rural areas, where the health and social care systems are underdeveloped compared to urban areas (Gill et al., 2006, Evandrou et al., 2016). On the other hand, older people from ethnic minority communities were more likely to report repeated met needs for ADLs compared with their Han counterparts. The reasons behind this difference may be twofold. First, older people from ethnic minority communities tend to live in larger families since they were less impacted by the One-Child policy compared with their Han Chinese compatriots (Chen et al., 2021a). Second, compared to older Han individuals, there has generally been a lower prevalence of migration amongst adult children from ethnic minority families because they tend to reside in more remote or rural areas of China (Chen et al., 2021a).

Moreover, alcohol consumption was statistically significantly related to no longer having social care needs for ADLs. About 60% of older respondents who consumed alcoholic drinks semi-regularly reported no longer needing social care for ADLs in Wave 4 (66.6%), while 54% of those abstaining from alcohol reported such a dynamic pattern for ADLs.

Apart from above two factors (ethnicity and daily alcoholic drinks consumption) significantly correlated with dynamic patterns, Table 8.2 also presents noteworthy results regarding repeated unmet needs for ADLs. First, a lower proportion of respondents aged 80 years and above reported

repeated unmet needs for ADLs compared to those aged 60 to 69 or 70 to 79 years old. Around 4% of the oldest-old (80+) had repeated unmet needs for ADLs (3.8%), while about 7% of those aged 60 to 69 (7.1%) or 70 to 79 years old (7.5%) reported repeated unmet needs. Second, the prevalence of repeated unmet needs for ADLs was higher amongst unmarried respondents compared to married respondents. Specifically, 12.7% of unmarried respondents reported repeated unmet needs across the two waves, while only 5.6% of married respondents reported similarly. This is consistent with earlier findings suggesting that older people with a spouse or partner are less likely to report unmet needs compared to unmarried older people (Jain and Sheehan, 2023).

Table 8.2 Results of the bivariate analyses conducted for each dynamic pattern of social care needs and unmet needs for ADLs and predisposing factors (N=384, %)

	No longer having social care needs for ADLs	Repeated met needs for ADLs	Newly arisen unmet needs for ADLs	Newly arisen met needs for ADLs	Repeated unmet needs for ADLs
	(1)	(2)	(3)	(4)	(5)
Predisposing factors					
Age					
60-69	58.5	21.4	3.6	9.4	7.1
70-79	52.2	29.9	2.2	8.2	7.5
80+	65.4	15.4	0.0	15.4	3.8
Gender					
male	55.1	28.6	2.7	7.5	6.1
female	57.8	21.1	3.0	10.5	7.6
Ethnicity	*	*			
Han ethnicity	58.8	22.2	2.6	9.4	7.0
ethnic minorities	40.5	38.1	4.8	9.5	7.1
Marital status					
married/ partnered	56.4	24.9	3.3	9.8	5.6
unmarried	58.2	20.2	1.3	7.6	12.7
Illiteracy					
no	56.8	26.5	2.6	8.1	6.0
yes	56.7	20.0	3.3	11.3	8.7
Smoking					
having never smoked	58.1	23.3	3.2	9.5	5.9
former smoker	49.4	28.6	1.3	11.6	9.1
currently smoking	60.0	21.2	3.5	7.1	8.2
Daily alcoholic drinks consumption	*				
no	54.0	25.3	3.3	9.7	7.7
yes	66.6	19.1	1.2	8.3	4.8

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.
Notes: ① The prevalence rates shown in Table 8.2 are unweighted. * $p < 0.05$, ** $p < 0.01$, *** $p< 0.001$. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③Time-invariant variables were measured using data from Wave 3 of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS.

8.2.2.2 The correlations between the dynamic social care needs and unmet needs for ADLs and enabling factors

Table 8.3 presents the results of the bivariate analyses conducted between each enabling factor and different dynamic patterns of social care needs and unmet needs for ADLs. Hukou status was found to be significantly correlated with reporting repeated met needs for ADLs. Around 20% of older respondents with rural hukou reported repeated met needs for ADLs (21.7%), which was lower than that of respondents with urban hukou (34.3%). This is probably due to older Chinese people with urban hukou having more access to medical help and social care than those with rural hukou (Zhu and Österle, 2017). Living arrangements also significantly correlated with reporting no longer needing help with ADLs. Nearly 80% of respondents living alone reported no longer needing help with ADLs (76%), while 55.3% of respondents living with others no longer needed help with ADLs in Wave 4. This coincides with previous findings suggesting that older people who maintain self-care abilities are more likely to live alone (Sereny, 2011). Although the associations between living arrangements and reporting repeated unmet needs for ADLs were not statistically significant, a higher proportion of reporting unmet needs for ADLs was observed amongst respondents living alone (12%) compared to those living with others (6.7%). This is consistent with earlier studies indicating that older people living with others are more likely to receive daily assistance than those living alone (Hu and Ma, 2018).

Table 8.3 Results of the bivariate analyses conducted between each dynamic pattern of social care needs and unmet needs for ADLs and enabling factors (N=384, %)

	No longer having social care needs for ADLs (1)	Repeated met needs for ADLs (2)	Newly arisen unmet needs for ADLs (3)	Newly arisen met needs for ADLs (4)	Repeated unmet needs for ADLs (5)
Enabling factors					
Hukou status		*			
urban hukou	49.2	34.3	4.5	7.5	4.5
rural hukou	58.4	21.7	2.5	9.8	7.6
Living arrangements	*				
living with others	55.3	25.1	3.1	9.8	6.7
living alone	76.0	8.0	0.0	4.0	12.0
The number of living children					
none or one	48.4	30.3	0.0	15.2	6.1
at least two	57.6	23.4	3.1	8.8	7.1
Health insurance					
none	59.5	23.8	0.0	11.9	4.8
public or other health insurance	56.4	24.0	3.2	9.1	7.3

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The prevalence rates shown in Table 8.3 are unweighted. * p < 0.05, ** p < 0.01, *** p< 0.001. ② ADLs stands for Activities of Daily Living. ③Time-invariant variables are measured using data from Wave 3 of CHARLS; time-variant variables are measured using data from Wave 3 and 4 of CHARLS.

8.2.2.3 The correlations between the dynamic social care needs and unmet needs for ADLs and need factors

Table 8.4 shows the results of the bivariate analyses conducted between each need factor and five dynamic patterns of social care needs and unmet needs for ADLs. Reporting a memory-related problem was significantly associated with repeated met needs for ADLs. Nearly 40% of respondents with a memory-related problem reported repeated met needs (38.9%), while this prevalence rate was 22.4% amongst respondents having no memory-related problems. The number of chronic diseases was also found to be a significant determinant for reporting no longer having social care needs and repeated met needs for ADLs. About 70% of respondents without a chronic disease in Wave 3 no longer reported social care needs for ADLs in Wave 4 (72.7%), which was higher than respondents with at least three chronic diseases (51.5%). Moreover, the proportion of those reporting repeated met needs for ADLs was higher amongst respondents with at least three chronic diseases (28.8%) than amongst those with no chronic diseases (9.1%).

Changes in ADL limitations from Wave 3 to 4 were associated with reporting no longer needing help, repeated met needs, and repeated unmet needs for ADLs. Older respondents with a deteriorated physical status from Wave 3 to 4 were less likely to report no longer having social care needs and more likely to report repeated met needs and unmet needs for ADLs than those reporting the same or improved status of performing ADLs across the two waves. Specifically, over 60% of respondents reporting the same or improved status regarding performing ADLs from Wave 3 to 4 no longer reported social care needs for ADLs in Wave 4 (64.2%), while 30.6% of those reporting a deteriorated status in performing ADLs across the two waves no longer needed help with ADLs in Wave 4.

IADL limitations were significantly associated with three dynamic patterns: no longer needing help, repeated met needs, and newly arisen unmet needs for ADLs. Amongst respondents with no IADL limitations, over 80% no longer

needed help with ADLs (84.7%), which was higher than those with at least three limitations (46.2%). About 5.6% of respondents with at least three IADL limitations reported newly arisen unmet needs regarding ADLs, while not a single respondent without an IADL limitation reported newly arisen unmet needs for ADLs.

Finally, changes in IADL limitations from Wave 3 to 4 were significantly associated with no longer needing help, repeated met needs, and newly arisen met needs for ADLs. Compared with older respondents reporting the same or improved physical status across the two waves, those with a deteriorated status regarding performing IADLs from Wave 3 to 4 were less likely to report no longer needing help with ADLs, while they were more likely to report repeated met needs and newly arisen met needs for ADLs. For instance, 14.8% of respondents with a worse physical status in IADL performance across the two waves reported newly arisen met needs for ADLs in Wave 4, while 6.9% of those reporting the same or improved status for performing ADLs from Wave 3 to 4 had newly arisen met needs for ADLs.

8.2.2.4 The correlations between the dynamic social care needs and unmet needs for ADLs and early-life factors

Table 8.4 also includes the results of the bivariate analyses conducted between the five dynamic patterns of social care needs and unmet needs for ADLs and experiences of hunger prior to the age of 17. Experiencing hunger before the age of 17 significantly correlated with reporting no longer having social care needs and newly arisen unmet needs for ADLs. Older respondents who experienced hunger prior to the age of 17 were more likely to report no longer needing help with ADLs and less likely to report repeated met needs for ADLs compared with those with no early-life experiences of hunger. For instance, about 60.1% of respondents who experienced hunger before the age of 17 no longer reported social care needs for ADLs. By comparison, a lower proportion of respondents no longer needing help with ADLs was observed amongst those with no experiences of hunger in early life (46.2%).

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The mortality selection bias and the ability to adapt to adversities in later life may explain why older respondents who faced early-life adversities were more likely to no longer need help in daily life activities (Hsu and Tung, 2011, Shen and Zeng, 2014). In addition, previous studies have noted that people reporting more adversities over the course of their lives are more likely to develop psychological resilience than those experiencing less or no early-life adversities. These experiences of early-life adversities may help older people develop psychological resilience to bounce back from adversities emerging in later life (McMillen, 1999, Linley and Joseph, 2004, Louie et al., 2023).

Table 8.4 Results of the bivariate analyses conducted between each dynamic pattern of social care needs and unmet needs for ADLs and need and early-life factors (N=384, %)

	No longer having social care needs for ADLs (1)	Repeated met needs for ADLs (2)	Newly arisen unmet needs for ADLs (3)	Newly arisen met needs for ADLs (4)	Repeated unmet needs for ADLs (5)
Need factors					
Diagnosed with a memory-related disease by a doctor		*			
no	58.0	22.4	3.2	8.9	7.5
yes	44.4	38.9	0.0	13.9	2.8
Number of chronic diseases	*	*			
none	72.7	9.1	0.0	9.1	9.1
one or two chronic diseases	63.6	17.8	3.1	10.1	5.4
at least three chronic diseases	51.5	28.8	3.0	9.0	7.7
Changes in ADL limitations from Wave 3 to 4	***	***			*
same or improved status	64.2	21.1	2.3	7.0	5.4
deteriorated status	30.6	34.1	4.7	17.7	12.9
Number of IADL limitations	***	***	**		
no limitations	84.7	5.6	0.0	2.8	6.9
one or two limitations	55.3	24.8	0.7	12.1	7.1
at least three limitations	46.2	31.0	5.9	9.9	7.0
Changes in IADL Limitations from Wave 3 to 4	***	*		*	
same or improved status	64.1	20.6	3.1	6.9	5.3
deteriorated status	41.0	31.1	2.4	14.8	10.7
Early-life factors					
Whether having experienced hunger prior to the age of 17	*		*		
no	46.2	33.0	6.6	6.5	7.7
yes	60.1	21.2	1.7	10.2	6.8
Number of episodes reported having experienced hunger prior to the age of 17					
0	46.1	33.0	6.6	6.6	7.7
1	58.2	23.4	2.8	7.1	8.5
2	62.8	13.7	1.9	15.7	5.9
3	61.4	21.8	0.0	11.9	5.0

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The prevalence rates shown in Table 8.4 are unweighted. * p < 0.05, ** p < 0.01, *** p< 0.001. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables were measured using data from Wave 3 of the CHARLS; the experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS.

8.2.3 Understanding the predictors of each pattern of the dynamic social care needs and unmet needs for ADLs using multivariate analysis

Table 8.5 presents the odds ratio results of the logistic regression models. The values of VIF of all regressions conducted in order to examine the underlying predictors of the dynamic patterns of needs and unmet needs for ADLs ranged from 1.07 to 4.02 , suggesting that the multicollinearity was not a concern in these models (Shrestha, 2020). Dynamic patterns were investigated using multivariate analyses and included no longer needing help, repeated met needs, newly arisen met needs, and repeated unmet needs for ADLs. The predictors of reporting newly arisen unmet needs were not explored using the logistic model because only 11 respondents fit into this category. Additionally, the multivariate analyses were carried out using the whole sample due to the limited size of the female and male subsamples, as well as the rural and urban subsamples. For instance, only 11 male respondents reported newly arisen met needs and three respondents with urban hukou reported repeated unmet needs for ADLs.

Focusing on those who no longer had social care needs for ADLs (Column 1), IADL limitations, changes in ADL or IADL limitations from Wave 3 to 4, and experiences of hunger before the age of 17 proved to be significant predictors. When all other factors were controlled for, older respondents with more limitations in IADLs were less likely to no longer need help with ADLs than those with no IADL limitation. Older respondents with deteriorated ADL or IADL functions from Wave 3 to 4 were less likely to no longer report social care needs for ADLs compared with those reporting the same or improved ADL or IADL functions across the two waves. Furthermore, the experience of hunger prior to the age of 17 was significantly associated with no longer needing help with ADLs. That is, older respondents who experienced hunger prior to the age of 17 were more likely to no longer need help with ADLs than those with no experience of hunger in their early lives. This supports previous findings suggesting that older people with more unfavourable childhood

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experiences are more likely to have lower mortality risks in later life than those reporting more favourable early-life experiences (Shen and Zeng, 2014).

Moving on to repeated met needs for ADLs (Column 2), IADL limitations and experiences of hunger prior to the age of 17 were significant predictors. Respondents having one or two or at least three IADL limitations were more likely to report having repeated met needs for ADLs compared with respondents with no IADL limitations. This is consistent with previous studies suggesting that physical limitations are the key determinants of receiving social care for older people (Vlachantoni et al., 2015, Hu and Ma, 2018). Respondents who experienced hunger two or three times prior to the age of 17 were less likely to have repeated met needs regarding ADLs compared to those with no experiences of hunger. This may be explained by the cumulative advantages and disadvantages hypothesis, indicating the widened gap in economic wellbeing and health status in later life (Crystal and Shea, 1990, Leopold, 2016, Lu and Shelley, 2019). Particularly, people experiencing more adversities in early life tend to report lower socioeconomic status in adulthood and later life (Flores and Kalwij, 2014), and a previous study conducted by Wang and colleagues focusing on the Chinese context found that older people with lower socioeconomic statuses were less likely to receive a higher intensity of daily care (Gao et al., 2022).

As for newly arisen met needs for ADLs (Column 3), changes in ADL limitations from Wave 3 to 4 were found to be a critical determinant. Older respondents reporting a deteriorated status in terms of ADL performance from Wave 3 to 4 were more likely to have newly arisen met needs compared to those reporting the same or improved status in ADL performance.

Marital status was a statistically significant predictor of reporting repeated unmet needs for ADLs (Column 4). Unmarried respondents were observed to be at a greater risk of reporting repeated unmet needs for ADLs than those who were married or had a partner. This is consistent with earlier studies suggesting that informal care provided by one's spouse plays an essential role

in meeting the social care needs of older Chinese people (Jain and Sheehan, 2023).

Table 8.5 Predictors of each pattern of the dynamic social care needs and unmet needs for ADLs using logistic regression models (N=384)

	No longer having social care needs for ADLs (1)	Repeated met needs for ADLs (2)	Newly arisen met needs for ADLs (3)	Repeated unmet needs for ADLs (4)
Predisposing factors				
Age				
60–69 (ref)				
70–79	1.062	1.199	0.946	0.877
80+	1.591	0.599	2.627	0.397
Gender				
male (ref)				
female	1.18	0.541	1.883	1.686
Ethnicity				
Han ethnicity (ref)				
ethnic minorities	0.6	1.881	0.841	1.071
Marital status				
married (ref)				
not married	0.718	1.159	0.616	3.639*
Illiterate				
no (ref)				
yes	1.214	0.669	1.1	1.12
Smoking				
having never smoked (ref)				
former smoker	0.907	0.714	1.321	2.705
currently smoking	1.033	0.538	1.064	2.861
Daily alcoholic drinks consumption				
no (ref)				
yes	1.752	0.612	1.224	0.673
Enabling factors				
Hukou Status				
urban hukou (ref)				
rural hukou	1.484	0.628	1.166	1.486
Living arrangements				
living with others (ref)				

living alone	3.234	0.303	0.344	0.781
The number of living children	0.968	1.022	0.919	1.005
Earned income	1.016	1.022	1.375	0.911
Health insurance				
none (ref)				
public or other type of health insurance	0.71	1.163	0.583	2.766
Need factors				
Diagnosed with a memory-related disease				
none (ref)				
a memory-related disease	0.659	2.046	1.589	0.253
Number of chronic diseases				
none (ref)				
one or two chronic diseases	0.895	1.546	0.834	0.607
at least three chronic diseases	0.651	2.553	0.627	1.002
Changes in ADL limitations from Wave 3 to 4				
same or improved status (ref)				
deteriorated status	0.372**	1.375	2.570*	1.629
Number of IADL limitations				
none (ref)				
one or two IADL limitations	0.191***	7.967***	4.188	0.806
at least three IADL limitations	0.133***	9.686***	3.671	0.869
Changes in IADL Limitations from Wave 3 to 4				
same or improved status (ref)				
deteriorated status	0.486*	1.544	1.872	1.851
Early-life factors				
Numbers of episodes reported having experienced hunger prior to the age of 17				
zero(ref)				
one	1.783	0.565	1.294	1.021
two	2.131	0.273*	3.633	0.713
three	2.174*	0.475*	2.57	0.492
N	384	384	384	384

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables are measured using data from Wave 3 of the CHARLS.; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS. ④Earned income and the number of living children were continuous variables, and earned income is the log(income)

8.3 Understanding the dynamic social care needs and unmet needs for IADLs.

This section is composed of three subsections discussing the results of examining dynamic social care needs and unmet needs for IADLs using descriptive (Table 8.6), bivariate (Tables 8.7, 8.8, and 8.9) and multivariate analyses (Tables 8.10, 8.11, and 8.12).

8.3.1 Description of the analytical sample employed for understanding the dynamic social care needs and unmet needs for IADLs

Table 8.6 presents the characteristics of older respondents who needed help with at least one IADL in Wave 3 and who took part in the 2014 Life History Survey and Wave 4 of the CHARLS. The demographic profile consists of age, gender, ethnicity, marital status, hukou, residential area, the number of children, and living arrangements. Nearly 60% of older respondents were aged 60 to 69 years (59.2%; n=745), and 6% were aged 80 years old and over (n=75). Over 60% were female (65.5%; n=824), and most respondents were Han Chinese (91.3%; n=1,148). As for marital status, around 80% of respondents were married (78%; n=981), while 22% were unmarried (n=277). Additionally, older respondents who were widowed accounted for the majority of unmarried respondents (270 out of 277 respondents). Almost 90% of respondents had rural hukou (88.3%; n=1,111), and 73.1% lived in rural areas (n=919). Nearly 95% of respondents had at least two living children (94.4%; n=1,188), and less than 7% lived alone (6.8%; n=86). Socioeconomic characteristics included educational attainment, illiteracy, earned income, and health insurance. Over 70% of respondents never completed primary school education (73.2%; n=921). Furthermore, over half of the respondents were illiterate (52.5%; n=661). Regarding early-life adversities, most respondents experienced hunger prior to the age of 17 (79.6%; n=1,001), while about a quarter of respondents experienced hunger three times prior to the age of 17 (24.4%; n=307).

Table 8.6 The descriptive profile of older respondents aged 60 years and above needing help with at least one IADL in Wave 3 and took part in the Life History Survey and Wave 4 of the CHARLS (N=1,258)

	%	Weighted %	N
Age group			
60-69	59.2	57.3	745
70-79	34.8	35.8	438
80+	6.0	6.9	75
Gender			
male	34.5	33.7	434
female	65.5	66.3	824
Ethnicity			
Han ethnicity	91.3	91.0	1,148
ethnic minorities	8.7	9.0	110
Marital status			
married/ partnered	78.0	76.4	981
unmarried	22.0	23.6	277
Hukou			
urban hukou	11.7	11.9	147
rural hukou	88.3	88.1	1,111
Residential area			
urban communities	26.9	28.0	339
rural villages	73.1	72.0	919
The number of living children			
none or one	5.6	5.9	70
at least two	94.4	94.1	1,188
Living arrangements			
living with others	93.2	93.6	1,172
living alone	6.8	6.4	86
Education attainment			
lower than primary school	73.2	71.1	921
primary school or higher	26.8	28.9	337
Illiteracy			
no	47.5	47.6	597
yes	52.5	52.4	661
Health insurances			
none	9.1	9.7	115
public or other health insurance	90.9	90.3	1,143
Having experienced hunger prior to the age of 17			
no	20.4	22.7	257
yes	79.6	77.3	1,001
Number of episodes reported having experienced hunger prior to the age of 17			
0	20.4	22.7	257
1	38.6	37.1	485
2	16.6	16.4	209

3	24.4	23.8	307
Smoking			
having never smoked	62.7	63.0	789
former smokers	17.6	17.2	222
currently smoking	19.6	19.8	247
Daily alcoholic drinks consumption			
no	77.3	77.9	973
yes	22.7	22.1	285
Diagnosed with a memory-related disease by a doctor			
no	94.2	94.3	1,185
yes	5.8	5.7	73
Number of chronic diseases			
none	11.6	11.5	146
one or two chronic diseases	42.6	43.7	536
at least three chronic diseases	45.8	44.7	576
Number of ADL limitations			
none	51.3	50.6	645
one or two limitations	31.5	31.8	396
at least three limitations	17.2	17.6	217
Changes in ADL limitations from Wave 3 to 4			
same status	45.2	45.9	568
improved status	25.6	25.8	322
deteriorated status	29.3	28.3	368
Number of IADL limitations			
one or two limitations	68.0	67.6	856
at least three limitations	32.0	32.4	402
Changes in IADL Limitations from Wave 3 to 4			
same status	20.9	20.1	263
improved status	53.7	54.7	675
deteriorated status	25.4	25.3	320
Social care needs for IADLs in wave 3			
met needs	67.2	66.6	845
unmet needs	32.8	33.4	413
Social care needs for IADLs in wave 4			
no needs	44.0	44.5	554
met needs	38.6	38.5	486
unmet needs	17.3	17.0	218
Total analytical sample	100.0	100.0	1,258

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The percentages shown in Table 8.6 include unweighted and weighted results. The individual-level sample weight of Wave 3 and Wave 4 provided by CHARLS was employed. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant independent variables were measured using data from Wave 3 of the CHARLS; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS.

In terms of health status, smoking, drinking, memory-related problems, chronic diseases, and limitations in ADLs and IADLs were examined. Around 20% of respondents smoked at the time of being surveyed (19.6%; n=247), while 62.7% had never smoked (n=789). Almost 80% did not consume alcohol on a daily basis (77.3%; n=973). In terms of chronic conditions, 5.8% of older respondents were diagnosed with a memory-related problem (n=73), and 45.8% had at least three chronic diseases (n=576). Around 31.5% reported limitations in performing one or two ADL tasks (n=396), and 17.2% reported limitations in performing at least three ADL tasks (n=217). Nearly 30% of respondents reported a deteriorated physical status regarding ADLs from Wave 3 to 4 (29.3%; n=368), and 25.4% reported a deteriorated physical status for IADLs (n=320). A decrease in the prevalence of unmet needs for IADLs was observed in Wave 4 compared with that in Wave 3. Over 30% of respondents had unmet needs for IADLs in Wave 3 (32.8%; n=413), while less than 20% reported unmet needs for IADLs in Wave 4 (17.3%; n=218). This decrease in the prevalence of unmet needs for IADLs may suggest improvements in terms of social care provided for older Chinese people (Shi and Hu, 2020).
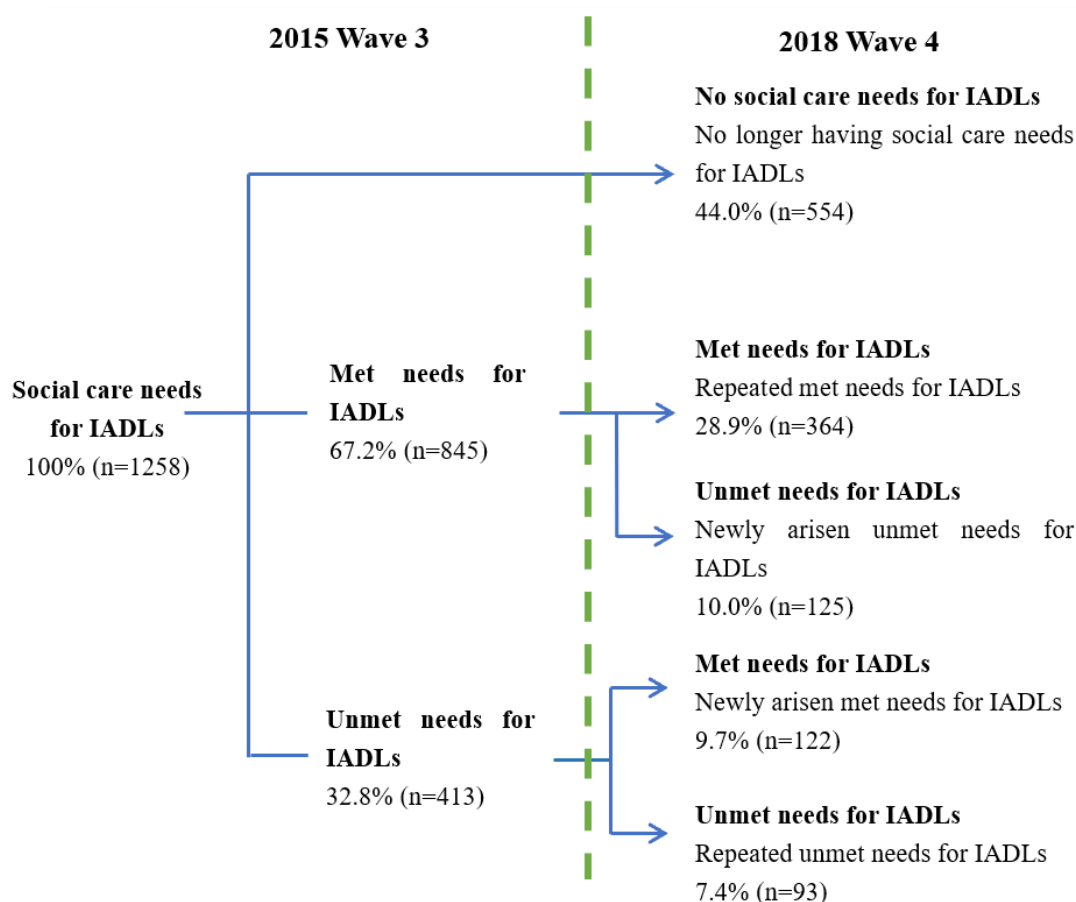
Figure 8.2 Distribution of the analytical sample across the dynamic patterns of social care needs and unmet needs for IADLs between Waves 3 and 4 of the CHARLS

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

The distribution of respondents according to five dynamic patterns of social care needs and unmet needs for IADLs is shown in Figure 8.2. There were about 44% of respondents no longer needing help with IADLs from Wave 3 to Wave 4 (n=554), and 28.9% reported met needs for IADLs at both waves (n=364). About 10% of respondents had newly arisen unmet needs (n=125), and 9.7% reported newly arisen met needs (n=122). The proportion of respondents reporting repeated unmet needs for IADLs across the two waves was the lowest compared with the other four dynamic patterns at around 7.4% (n=93).

8.3.2 Understanding the dynamic social care needs and unmet needs for IADLs using bivariate analysis

This section discusses the results of a series of Chi-Square and Fisher's exact tests conducted for the purpose of investigating the correlations between each predisposing, enabling, need, and early-life factor across the five dynamic patterns of social care needs and unmet needs for ADLs, which are shown in Tables 8.7, 8.8, and 8.9.

8.3.2.1 The correlations between the dynamic social care needs and unmet needs for IADLs and predisposing factors

Table 8.7 presents the results of the bivariate analyses conducted between each predisposing factor and the five dynamic patterns regarding social care needs and unmet needs for IADLs. Age was significantly correlated with no longer needing help with IADLs (Column 1). About 30% of respondents aged 80 years and over no longer reported needing help with IADLs (28%), while nearly half of those aged 60 to 69 years no longer had social care needs for IADLs in Wave 4 (48.1%). Marital status significantly correlated with reporting repeated met needs for IADLs (Column 2). Around 30% of married respondents reported repeated met needs for IADLs (30.5%), compared to 23.5% of unmarried respondents. The correlation between ethnicity and newly arisen met needs was statistically significant (Column 4). Older respondents from ethnic minority backgrounds were more likely to have newly arisen met needs for IADLs (17.2%) compared to 9.0% of Han Chinese respondents. As discussed above in Section 8.2.2.1, older Chinese people from ethnic minority communities have been shown to receive more informal care provided by families compared to their Han compatriots (Chen et al., 2021a). Age and marital status were significant indicators for reporting repeated unmet needs for IADLs (Column 5). The prevalence of repeated unmet needs for IADLs was lower amongst respondents aged 60 to 69 years (5.5%) than amongst respondents aged 70 to 79 (10.3%) or 80 years old and above (9.3%). The prevalence of repeated unmet needs for IADLs was also significantly higher amongst unmarried respondents (14.1%) than married respondents (5.5%),

again indicating the critical role that informal care provided by a spouse plays in one's later life (Jain and Sheehan, 2023).

Table 8.7 Results of bivariate analyses conducted between each dynamic pattern of social care needs and unmet needs for IADLs and predisposing factors (N=1,258, %)

	No longer having social care needs for IADLs	Repeated met needs for IADLs	Newly arisen unmet needs for IADLs	Newly arisen met needs for IADLs	Repeated unmet needs for IADLs
	(1)	(2)	(3)	(4)	(5)
Predisposing factors					
Age	***				**
60-69	48.1	28.4	9.1	8.9	5.5
70-79	40.0	27.8	11.0	11.0	10.3
80+	28.0	40.0	12.0	10.7	9.3
Gender					
male	42.2	28.3	10.8	11.3	7.4
female	45.0	29.3	9.5	8.8	7.4
Ethnicity				**	
Han ethnicity	44.5	29.1	10.1	9.0	7.3
ethnic minorities	39.1	27.3	8.2	17.2	8.2
Marital status		*			***
married/ partnered	44.9	30.5	9.3	9.8	5.5
unmarried	41.2	23.5	11.8	9.4	14.1
Illiterate					
no	46.3	29.0	10.1	8.4	6.2
yes	41.9	28.9	9.8	10.9	8.5
Smoking					
having never smoked	43.7	29.5	10.1	9.6	7.1
former smokers	45.5	29.7	9.0	9.0	6.8
currently smoking	43.7	26.3	10.1	10.5	9.4
Daily alcoholic drinks consumption					
no	44.0	29.1	10.3	9.0	7.6
yes	44.2	28.4	8.8	11.9	6.7

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The prevalence rates shown in Table 8.7 are unweighted. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables were measured using data from Wave 3 of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS

8.3.2.2 The correlations between the dynamic social care needs and unmet needs for IADLs and enabling factors

The results of the bivariate analysis examining the correlations between the five dynamic patterns of social care needs and unmet needs for IADLs and each enabling factor are presented in Table 8.8. The number of living children was significantly correlated with reporting repeated met needs for IADLs. Older respondents with at least two living children were less likely to report repeated met needs for IADLs compared with those with none or only one living child. This is in line with previous findings that a higher number of living children does not necessarily translate into older parents receiving care from them due to the geographic separation of families (Phillips and Feng, 2015). Over 40% of respondents with none or one living child reported repeated met needs for IADLs (42.9%) compared to 28.1% of those with at least two living children. Living arrangements and being covered by any form of health insurance were significantly associated with repeated unmet needs regarding IADLs. Older respondents living alone were more likely to report repeated unmet needs for IADLs compared to respondents living with others. Respondents who were covered by any type of health insurance were found to be less likely to report repeated unmet needs for IADLs than those not covered by health insurance. Around 7% of respondents having enrolled in at least one kind of health insurance reported repeated unmet needs for IADLs (6.9%), while the proportion among those without health insurance was 12.2%. This may be because older people with health insurance are more proactive about searching for medical help than those who are not enrolled in any kind of health insurance (Smolderen et al., 2010)

Table 8.8 Results of bivariate analyses conducted between each dynamic pattern of social care needs and unmet needs for IADLs and enabling factors (N=1,258, %)

	No longer having social care needs for IADLs	Repeated met needs for IADLs	Newly arisen unmet needs for IADLs	Newly arisen met needs for IADLs	Repeated unmet needs for IADLs
	(1)	(2)	(3)	(4)	(5)
Enabling factors					
Hukou status					
urban hukou	49.6	29.3	8.8	8.2	4.1
rural hukou	43.3	28.9	10.1	9.9	7.8
Living arrangements					***
living with others	43.7	29.8	10.2	9.8	6.5
living alone	48.8	17.5	5.8	8.1	19.8
The number of living children		**			
none or one	35.6	42.9	4.3	12.9	4.3
at least two	44.5	28.1	10.3	9.5	7.6
Health insurances					*
None	41.7	27.0	7.8	11.3	12.2
public or other insurance	44.3	29.1	10.2	9.5	6.9

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① The prevalence rates shown in Table 8.8 are unweighted. * p < 0.05, ** p < 0.01, *** p< 0.001. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables were measured using data from Wave 3 of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of CHARLS.

8.3.2.3 The correlations between the dynamic social care needs and unmet needs for IADLs and need factors

The results of the bivariate analyses examining the correlations between need factors and each dynamic pattern of social care needs and unmet needs regarding IADLs are displayed in Table 8.9. Need factors here included having a memory-related problem, chronic diseases, ADL limitations, and changes in ADL or IADL limitations from Wave 3 to 4. Regarding no longer having needs for IADLs, every need factor significantly correlated with reporting this dynamic pattern. Older respondents with a memory-related problem were less likely to no longer need help with ADLs compared with those with no such problems. Similarly, older respondents reporting more chronic diseases or ADL limitations faced a lower likelihood of no longer needing help with ADLs than those with no chronic diseases or ADL limitations. Nearly half of respondents without memory-related problems no longer had social care needs for IADLs (45.1%), which was higher than amongst those with a memory-related problem (27.4%). Less than 30% of respondents with at least three ADL limitations reported no longer needing help with IADLs (27.2%), which was lower than amongst those with no ADL limitations (53%). Older respondents with a deteriorated physical status regarding ADLs or IADLs from Wave 3 to 4 were less likely to report no longer needing help with IADLs compared with those reporting the same or improved physical status for ADLs or IADLs across the two waves. Specifically, nearly 60% of older respondents with the same or improved IADLs status from Wave 3 to 4 reported no longer needed help with IADLs (57%), while less than 6% of respondents with a deteriorated status regarding IADLs no longer had social care needs for IADLs (5.9%).

Statistically significant correlations between each need factor and repeated met needs for IADLs were observed as well. Respondents with a memory-related problem were more likely to report repeated met needs for IADLs than those having no such problems. About 40% of respondents with a memory-related disease reported repeated met needs for ADLs (41.1%), compared

with 28.2% of those with no memory-related problems. The prevalence of repeated met needs for IADLs was significantly higher amongst respondents with more chronic diseases than those with no chronic diseases. More than 30% of respondents with at least three chronic diseases (33.7%) had repeated met needs for IADLs, compared with around 20% of those with no chronic disease (21.2%). Next, respondents with additional ADL limitations were more likely to report repeated met needs for IADLs compared with those with no ADL limitations. About 36.4% of respondents with at least three ADL limitations reported repeated met needs for IADLs, while the prevalence of this dynamic amongst those with no ADL limitation was 24.8%. Respondents with a deteriorated physical status regarding ADLs or IADLs from Wave 3 to 4 were more likely to report repeated met needs for IADLs than those reporting the same or improved physical status for ADLs or IADLs across the two waves. For instance, nearly half of respondents with a deteriorated physical status for IADLs across the two waves (47.5%) reported repeated met needs for IADLs, while the same could be said for only 22.6% of respondents with similar or improved physical statuses in terms of IADLs.

Changes in ADL and IADL limitations from Wave 3 to 4 were important indicators of newly arisen unmet needs for IADLs based on the results of the Chi-Square tests. Respondents with a deteriorated status for performing ADLs or IADLs across the two waves were more likely to report newly arisen unmet needs for IADLs compared with those with similar or improved ADL or IADL functions. Nearly 20% of respondents reporting a deteriorated physical status in terms of ADLs (19.1%) and IADLs (19.4%) had newly arisen unmet needs for IADLs in Wave 4, while less than 7% of respondents with the same or improved physical status for ADLs (6.2%) and IADLs (6.7%) reported newly arisen unmet needs for IADLs.

The number of ADL limitations and changes in IADL limitations from Wave 3 to 4 were significantly associated with reporting newly arisen met needs for IADLs. Older respondents with at least three ADL limitations were more likely to report newly arisen met needs for IADLs compared to those with no ADL

limitations. Respondents reporting a deteriorated status regarding IADLs from Wave 3 to 4 were also more likely to report newly arisen met needs for IADLs than those with the same or improved status across the two waves. Specifically, 15% of older respondents with a deteriorated status in IADL functions across the two waves reported newly arisen met needs for IADLs. Meanwhile, only 7.9% of those with the same or improved physical status regarding IADLs reported newly arisen met needs for IADLs.

The number of ADL limitations and changes in ADL or IADL limitations from Wave 3 to 4 were significant indicators of reporting repeated unmet needs for IADLs. Respondents with at least three ADL limitations were at a higher risk of having repeated unmet needs for IADLs than those with no ADL limitations. Around 10.1% of respondents with at least three ADL limitations reported repeated unmet needs for IADLs compared to 5% of those with no ADL limitations. Respondents with a deteriorated status in terms of performing ADLs or IADLs from Wave 3 to 4 were more likely to report repeated unmet needs for IADLs compared with those with the same or improved physical status for ADLs or IADLs across the two waves. For instance, 10.6% of respondents with a deteriorated status in ADL performance from Wave 3 to 4 reported repeated unmet needs for IADLs, while 6.1% of those with the same or improved physical status in ADL performance across the two waves had repeated unmet needs for IADLs. In line with previous research employing the Andersen behaviour model and reporting the determining role of need factors in utilising long-term care (Andersen, 1995, Che and Cheung, 2022, Travers et al., 2020), the results of bivariate analyses displayed in Table 8.9 indicate the significant predictive power of need factors in reporting different dynamic patterns regarding social care needs and unmet needs..

8.3.2.4 The correlations between the dynamic social care needs and unmet needs for IADLs and early-life factors

The results of the bivariate analyses conducted between experiences of hunger prior to the age of 17 and each dynamic pattern of social care needs

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and unmet needs regarding IADLs are also shown in Table 8.9. No significant differences in the prevalence of each pattern were observed between older respondents in terms of whether they experienced hunger prior to the age of 17. However, one noteworthy result was the higher prevalence of reporting repeated unmet needs for IADLs amongst respondents who experienced hunger prior to the age of 17 than for those with no such experiences. Specifically, 8.1% of respondents who experienced hunger before the age of 17 reported repeated unmet needs for IADLs compared to 4.6% of those with no such experiences.

Table 8.9 Results of the bivariate analyses conducted between each dynamic pattern of social care needs and unmet needs for IADLs and need and early-life factors (N=1,258, %)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Need factors					
Diagnosed with a memory-related disease by a doctor	***	**			
no	45.1	28.2	10.2	9.4	7.1
yes	27.4	41.1	5.5	13.7	12.3
Number of chronic diseases	**	*			
none	58.9	21.2	5.5	5.5	8.9
one or two chronic diseases	49.3	25.9	9.7	9.1	6.0
at least three chronic diseases	35.4	33.7	11.3	11.3	8.3
Number of ADL limitations	***	***		**	**
no limitations	53.0	24.8	9.5	7.7	5.0
one or two limitations	38.6	31.6	9.8	10.1	9.9
at least three limitations	27.2	36.4	11.5	14.8	10.1
Changes in ADL limitations	***	**	***		**
same or improved status	52.7	26.3	6.2	8.7	6.1
deteriorated status	22.8	35.3	19.1	12.2	10.6
Changes in IADL Limitations	***	***	***	***	***
same or improved status	57.0	22.6	6.7	7.9	5.8
deteriorated status	5.9	47.5	19.4	15.0	12.2
Early-life factors					
Whether having experienced hunger prior to the age of 17					
no	44.4	30.0	11.3	9.7	4.6
yes	44.0	28.7	9.5	9.7	8.1
Number of episodes reported having experienced hunger prior to the age of 17					
0	44.4	30.0	11.3	9.6	4.7
1	44.1	26.8	11.7	8.9	8.5
2	43.1	32.1	7.2	10.5	7.1
3	44.3	29.3	7.8	10.4	8.2

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①The prevalence rates shown in Table 8.8 are unweighted. * p < 0.05, ** p < 0.01, *** p< 0.001. ②ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③Time-invariant variables were measured using data from Wave 3 of the CHARLS; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS.

8.3.3 Understanding the predictors of each pattern of dynamic needs and unmet needs for IADLs using multivariate analyses

A series of logistic regression models were conducted in order to explore the factors with significant predictive power across the five different patterns of social care needs and unmet needs for IADLs. The odds ratio results of five regression models targeting each pattern of dynamic social care needs and unmet needs for IADLs using the whole sample are shown in Table 8.10. Since gender disparities regarding the long-term influence of early-life adversities on health status in adulthood and later life have been documented in previous empirical studies (Huang et al., 2013, Arpino et al., 2018), each regression model was run for the female (Table 8.11) and male subsamples (Table 8.12). Urban-rural disparities were not examined here due to the limited sample size. Specifically, amongst older respondents with urban hukou, only 12 respondents reported newly arisen met needs for IADLs, and six reported repeated unmet needs for IADLs.

8.3.3.1 Predictors of each pattern of dynamic social care needs and unmet needs for IADLs based on the whole sample

The goodness-of-fit test showed that the logistic regression models run for the exploration of predictors of dynamics in terms of IADLs were a good fit. The values of VIF of all regression models in Table 8.10 ranged from 1.02 to 2.96, suggesting that the multicollinearity was not a problem (Shrestha, 2020). As shown in Table 8.10, predisposing, enabling, and need factors were significantly associated with no longer needing help with IADLs (Column 1). Specifically, amongst predisposing factors, age, gender, illiteracy, and smoking were important predictors of no longer having social care needs for IADLs. When all other independent variables were controlled for, respondents aged 80 years and above were less likely to no longer report social care needs for IADLs compared to those aged between 60 and 69 years old. Older female respondents were more likely to report no longer needing help with IADLs compared with older male respondents. This result coincides with

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previous findings suggesting that female adults are at a lower risk of reporting IADL limitations than male adults (Liang et al., 2017). Older respondents who can read or write are less likely to report no longer having social care needs for IADLs than those who were illiterate. Older respondents who were former smokers are more likely to report no longer needing help with IADLs compared with those who never smoked. This is probably because quitting smoking has been confirmed to be a significant indicator of the improvements in physical health over time (Gasperini et al., 2017).

Regarding enabling factors, hukou status was an important determinant of no longer needing help with IADLs. Respondents with rural hukou were less likely to report no longer needing help with IADLs than those with urban hukou. This is in line with earlier studies suggesting that older people with urban hukou tend to report better physical health status in terms of IADL functions compared to those with rural hukou (Anderson et al., 2015).

Amongst need factors, chronic diseases, ADL limitations, and changes in ADL and IADL limitations from Wave 3 to 4 were significant predictors of no longer needing help with IADLs. Respondents with at least three chronic diseases were less likely to no longer need help with IADLs compared to those with no chronic diseases. Similarly, respondents with more ADL limitations were at a lower likelihood of reporting no longer needing help with IADLs than those with no ADL limitations. Older respondents with a deteriorated physical status for ADLs or IADLs from Wave 3 to 4 were less likely to report no longer having social care needs for IADLs compared to those reporting the same or improved status for ADLs or IADLs across the two waves.

Significant predictors of reporting repeated met needs for IADLs are presented in Column 2 of Table 8.10. Amongst predisposing factors, age was significantly associated with reporting repeated met needs for IADLs. Older respondents 80 years old and over were at a greater likelihood of reporting repeated met needs for IADLs than those aged 60 to 69 years. As for need factors, ADL limitations and changes in IADL limitations from Wave 3 to 4

were significant predictors of reporting repeated met needs for IADLs. Specifically, older respondents with at least three ADL limitations are more likely to report repeated met needs for IADLs than those with no ADL limitation. Respondents with deteriorated IADL functions from Wave 3 to 4 were more likely to report repeated met needs for IADLs compared with those reporting the same or improved IADL functioning across the two waves, again suggesting the determining role of physical limitations regarding ADLs and IADLs in receiving social care(Hu and Ma, 2018).

Living arrangements and changes in ADL and IADL limitations across Waves 3 and 4 are statistically significantly associated with reporting newly arisen unmet needs for IADLs (Column 3). Respondents living alone were less likely to report newly arisen unmet needs compared with those living with others. This may be because older people living alone tend to maintain higher self-care capabilities than those living with others (Sereny, 2011). Older respondents with a deteriorated status regarding ADLs or IADLs from Wave 3 to 4 were more likely to report newly arisen unmet needs for IADLs compared to those with the same or improved status regarding ADLs or IADLs across the two waves.

Turning to newly arisen met needs for IADLs (Column 4), ethnicity and illiteracy were the statistically significant predictors of this pattern. Older respondents from ethnic minority communities were more likely to report newly arisen met needs for IADLs compared to their Han Chinese counterparts. As discussed previously in Section 8.2.2, compared to older Han Chinese people, those from ethnic minority communities are more likely to receive informal care provided by families because they have been less impacted by the One-Child policy and the geographic separation of families (Chen et al., 2021a). Illiterate respondents were more likely to report newly arisen met needs for IADLs than respondents who can read and write. Regarding need factors, respondents with at least three ADL limitations were more likely to report newly arisen met needs for IADLs compared with respondents with no ADL limitations. Additionally, respondents with a

deteriorated status regarding IADL limitations from Wave 3 to 4 were at a higher likelihood of reporting newly arisen met needs regarding IADLs than those reporting the same or improved status for performing IADLs across the two waves.

Marital status, ADL limitations, and changes in IADL limitations from Wave 3 to 4 were important predictors of reporting repeated unmet needs for IADLs (Column 5). Unmarried older respondents were more likely to report repeated unmet needs compared with those who were married or had a partner, further indicating the importance of informal care from a spouse in the Chinese context (Jain and Sheehan, 2023). Respondents with one or two ADL limitations were more likely to have repeated unmet needs for IADLs than those with no ADL limitations. Respondents with a deteriorated status regarding IADLs from Wave 3 to 4 were more likely to report repeated unmet needs for IADLs than those with the same or improved physical status for IADLs across the two waves. One noteworthy result shown in Table 8.10 is the significant association between experiences of hunger prior to the age of 17 for one episode and reporting repeated unmet needs for IADLs. Older respondents with one experience of hunger prior to the age of 17 were more likely to report repeated unmet needs for IADLs than those with no experience of hunger. This coincides with previous studies suggesting that older people with more early-life adversities tend to have worse socioeconomic statuses in later life than those who experienced fewer adversities in early life (Flores and Kalwij, 2014), which may result in limited health and social care resources and an increased risk of having repeated unmet needs (Smolderen et al., 2010, Hu and Wei, 2022).

Table 8.10 Predictors of each dynamic pattern of social care needs and unmet needs for IADLs using logistic regression models (N=1,258)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.842	0.982	1.005	1.177	1.635
80+	0.457*	2.009*	1.244	1.058	1.038
Gender					
male (ref)					
female	1.656*	1.052	0.636	0.581	0.984
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.102	0.815	0.592	1.863*	0.807
Marital status					
married (ref)					
not married	0.855	0.708	1.609	0.849	2.218**
Illiterate					
no (ref)					
yes	0.632**	1.072	0.991	1.642*	1.421
Smoking					
having never smoked (ref)					
former smokers	1.920**	0.899	0.636	0.603	1.024
currently smoking	1.123	0.897	0.827	0.766	1.656
Daily alcoholic drinks consumption					
no (ref)					
yes	0.812	1.136	0.828	1.465	0.821
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.641*	1.089	1.138	1.166	1.739
Living arrangements					
living with others (ref)					
living alone	1.596	0.618	0.334*	0.959	1.88

The number of living children	1.014	0.951	1.068	1.005	1.003
Earned income	1.055	0.945	1.004	1.021	0.98
Health insurance					
none (ref)					
public or other type of health insurance	0.873	1.175	1.326	0.895	0.785
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.594	1.413	0.414	1.229	1.943
Number of chronic diseases					
none (ref)					
one or two chronic diseases	0.881	1.102	1.515	1.538	0.628
at least three chronic diseases	0.543**	1.455	1.702	1.795	0.721
Number of ADL limitations					
none					
one or two ADL limitation (none)	0.655**	1.169	0.875	1.22	2.063**
at least three ADL limitation	0.302***	1.590*	1.357	1.772*	2.047*
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.456***	1.037	2.619***	1.145	1.225
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0558***	2.994***	2.165***	1.870**	2.074**
Early-life factors					
Numbers of episodes having experienced hunger prior to the age of 17					
zero(ref)					
one	0.96	0.819	1.109	0.849	2.328*
two	0.912	1.071	0.669	1.072	2.03
three	1.121	0.917	0.68	0.941	1.932
N	1258	1258	1258	1258	1258

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ② ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables were measured using data from Wave 3 of the CHARLS; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS. ④ Earned income and the number of living children were continuous variables and earned income is the log(income)

8.3.3.2 Predictors of each pattern of dynamic social care needs and unmet needs for IADLs based on the female subsample

Table 8.11 presents the odds ratio results of the five regression models employed for investigating the predictors of each pattern of the dynamic social care needs and unmet needs for IADLs based on the female subsample. The values of VIF of the regressions conducted in order to examine the underlying predictors of the dynamic patterns of needs and unmet needs for IADLs using the female subsample ranged from 1.03 to 3.11, suggesting that the multicollinearity was not a concern in these models (Shrestha, 2020). The statistically significant predictors of no longer needing help with IADLs amongst older female respondents consisted of illiteracy, chronic diseases, ADL limitations, and changes in ADL and IADL limitations from Wave 3 to 4 (Column 1). When all other factors were controlled for, female respondents who were illiterate were less likely to report no longer having social care needs for IADLs compared to those who were literate. This may be due to the protective effects of education on later-life health (Flores and Kalwij, 2014). Female respondents with at least three chronic diseases or ADL limitations were less likely to report no longer needing help with IADLs compared with those with no chronic diseases or ADL limitations. Moreover, female respondents with a deteriorated physical status in terms of ADLs and IADLs from Wave 3 to 4 were less likely to report no longer having social care needs for IADLs than those with the same or better physical status across the two waves.

The number of chronic diseases and changes in IADL limitations from Wave 3 to 4 are significantly predicted whether older women reported repeated met needs for IADLs (Column 2). Female respondents with at least three chronic diseases were more likely to report repeated met needs for IADLs compared with those with no chronic diseases. Female respondents with a deteriorated physical status in IADL from Wave 3 to 4 were more likely to report repeated met needs for IADLs than those with the same or improved physical status across the two waves.

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Predictors for newly arisen unmet needs for IADLs included ethnicity and changes in ADL and IADL limitations from Wave 3 to 4 (Column 3). Female respondents from ethnic minority communities were less likely to report newly arisen unmet needs for IADLs compared to those who were ethnic Han. Female respondents with a deteriorated status in performing ADLs or IADLs from Wave 3 to 4 were more likely to have newly arisen unmet needs for IADLs compared to those reporting the same or improved physical status for ADLs and IADLs across the two waves.

As for newly arisen met needs for IADLs, ethnicity, daily alcohol consumption, and ADL limitations were significant predictors amongst female respondents (Column 4). Compared with female respondents who were Han Chinese, those from ethnic minorities were more likely to report newly arisen met needs for IADLs. Female respondents who moderately consumed alcohol on a daily basis were more likely to report newly arisen met needs for IADLs than those who abstained from alcohol. Additionally, female respondents reporting at least three ADL limitations were more likely to have newly arisen met needs for IADLs compared with those with no ADL limitations.

The significant risk factors for reporting repeated unmet needs for IADLs were marital status, ADL limitations, and having experienced hunger prior to the age of 17 at least twice (Column 5). Specifically, unmarried female respondents were more likely to report repeated unmet needs for IADLs compared to those who were married. Older female respondents with one or two ADL limitations more frequently reported repeated unmet needs for IADLs than those with no ADL limitations. In terms of early-life adversities, female respondents reporting two experiences of hunger prior to the age of 17 were more likely to report repeated unmet needs for IADLs than those with no such early-life experiences. This is in line with the findings of Hu and Wei's study which emphasised that older Chinese people who experienced more early-life adversities are more likely to report unmet needs than those with fewer adverse early-life experiences (Hu and Wei, 2022).

Table 8.11 Predictors of each dynamic pattern of social care needs and unmet needs for IADLs using logistic regression models based on the female subsample (N=824)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.794	0.867	1.257	1.347	1.727
80+	0.528	1.764	0.449	2.214	1.153
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.298	0.646	0.261*	2.934**	0.761
Marital status					
married (ref)					
not married	0.783	0.841	1.266	0.848	2.149*
Illiterate					
no (ref)					
yes	0.584**	1.268	0.953	1.4	1.602
Smoking					
having never smoked (ref)					
former smokers	1.46	0.955	1.151	0.312	0.909
currently smoking	1.398	0.83	0.637	0.825	1.109
Daily alcoholic drinks consumption					
no (ref)					
yes	0.628	1.065	1.234	2.262*	0.8
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.753	0.988	1.295	1.174	1.504
Living arrangements					
living with others (ref)					
living alone	1.543	0.907	0.447	0.932	1.098
The number of living children	1.028	0.958	1.111	0.883	1.056
Earned income	1.044	0.938	1.049	0.991	1.002
Health insurance					

none (ref)					
public or other health insurance	0.875	1.364	0.829	0.854	0.879
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.523	1.658	0.827	1.3	1.224
Number of chronic diseases					
none (ref)					
one or two chronic diseases	0.69	2.321*	1.229	0.85	0.562
at least three chronic diseases	0.413**	3.365***	1.104	1.154	0.743
Number of ADL limitations					
none(ref)					
one or two ADL limitation	0.847	0.792	0.858	1.579	2.040*
at least three ADL limitation	0.411***	1.143	1.461	2.640**	1.547
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.595*	0.991	2.410**	1.023	1.017
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0630***	3.698***	2.704***	1.59	1.63
Early-life factors					
Numbers of episodes having experienced hunger prior to the age of 17					
zero (ref)					
one	1.025	0.691	1.145	1.295	1.855
two	0.77	1.088	0.471	1.472	2.589*
three	1.011	0.768	0.863	1.299	1.807
N	824	824	824	824	824

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ① Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③Time-invariant variables were measured using data from Wave 3 of the CHARLS; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS. ④Earned income and the number of living children are continuous variables, and earned income is the log (income).

8.3.3.3 Predictors of each pattern of dynamic social care needs and unmet needs for IADLs based on the male subsample

Table 8.12 presents the odds ratio results of the five logistic regression models targeting each dynamic pattern of social care needs and unmet needs for IADLs based on the male subsample (N=434). The values of VIF of the regressions models in Table 8.12 ranged from 1.05 to 2.83, indicating that the multicollinearity was in a moderate level and was not a problem (Shrestha, 2020). Focusing on those who no longer had social care needs for IADLs (Column 1), illiteracy, hukou status, ADL limitations, and changes in ADL and IADL limitations from Wave 3 to 4 were important determinants amongst older male respondents. With every other variable being controlled for, male respondents with rural hukou were less likely to report no longer needing help with IADLs than those with urban hukou. This coincides with previous findings highlighting the significant rural-urban disparities regarding health status and the social care system in China (Zhang et al., 2021a). Older male respondents with ADL limitations were less likely to no longer need help with IADLs than those reporting no ADL limitations. Similarly, male respondents with a deteriorated physical status in terms of ADL or IADL functioning across the two waves were less likely to no longer have social care needs for IADLs compared with those with the same or improved status.

In terms of repeated met needs for IADLs (Column 2), marital status, chronic diseases, ADL limitations, and changes in IADL limitations from Wave 3 to 4 were significant determinants amongst older men. Unmarried male respondents were less likely to report repeated unmet needs regarding IADLs compared with those who were married or had a partner. A curious result was the association between having one or two chronic diseases and repeated met needs for IADLs. Male respondents with one or two chronic diseases were less likely to report repeated met needs for IADLs than those with no chronic diseases. By comparison, female respondents with one or two chronic diseases were more likely to report repeated met needs for IADLs than those with no chronic diseases (see Table 8.11, Column 2). This may be due to the

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limited number of male respondents from the analytical sample, a limitation that is elaborated further in the following chapter. Compared to those with no ADL limitations or reporting the same or improved physical status regarding IADL functioning from Wave 3 to 4, male respondents with greater ADL limitations or a deteriorated status in terms of IADLs across the two waves were more likely to report repeated met needs for IADLs.

Marital status, living arrangements, memory-related problems, and changes in ADL limitations from Wave 3 to 4 were significant predictors of reporting newly arisen unmet needs amongst male respondents (Column 3). Unmarried male respondents were more likely to have newly arisen unmet needs for IADLs than those who were married. Older male respondents living alone were at a lower likelihood of reporting newly unmet needs for IADLs compared with those living with others. Male respondents with a memory-related problem were less likely to report newly arisen unmet needs for IADLs than those with no problems relating to memory. Male respondents with a deteriorated physical status regarding ADLs from Wave 3 to 4 were more likely to report newly arisen unmet needs for IADLs compared with those with the same or improved physical status for ADLs across the two waves.

Illiteracy and changes in IADL limitations from Wave 3 to 4 were factors significantly associated with reporting newly arisen met needs for IADLs amongst the male subsample (Column 4). Specifically, illiterate male respondents were more likely to report newly arisen met needs for IADLs than those who were literate. Male respondents with a deteriorated status in performing IADLs from Wave 3 to 4 were more likely to report newly arisen met needs for IADLs compared with those reporting the same or improved status across the two waves.

Moving on to unmet needs for IADLs (Column 5), this dynamic pattern was significantly associated with living arrangements, memory-related problems, changes in IADL limitations from Wave 3 to 4, and experiences of hunger before the age of 17. Specifically, male respondents living alone were faced

with a significantly higher risk of repeated unmet needs for IADLs than those living with others. This is in line with earlier findings suggesting that older people living with others are less likely to report unmet needs than those living alone (Hu and Ma, 2018). Male respondents diagnosed with a memory-related problem were more likely to have repeated unmet needs for IADLs compared with those reporting no problems relating to memory. Furthermore, male respondents who experienced hunger once prior to the age of 17 were more likely to report repeated unmet needs for IADLs compared with those with no such experiences. The association between repeated unmet needs for IADLs and experiences of hunger prior to the age of 17 remains significant across the whole sample, indicating the significant long-term impacts of early-life adversities on social care needs and unmet needs in later life (Hu and Wei, 2022, Hu et al., 2020b).

Table 8.12 Predictors of each dynamic pattern of social care needs and unmet needs for IADLs using logistic regression models based on the male subsample (N=434)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Predisposing factors					
60+	0.988	1.026	0.999	0.99	1.03
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	0.876	1.131	1.258	0.658	0.713
Marital status					
married (ref)					
not married	1.055	0.220**	4.909**	0.482	1.24
Illiterate					
no (ref)					
yes	0.554*	0.943	1.032	2.333*	0.847
Smoking					
having never smoked (ref)					
former smokers	2.044	0.761	0.499	0.806	2.934
currently smoking	1.052	0.821	0.837	0.941	5.673
Daily alcoholic drinks consumption					
no (ref)					
yes	1.05	1.175	0.663	0.925	0.876
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.459*	1.182	1.023	1.174	2.147
Living arrangements					
living with others (ref)					
living alone	2.275		0.0685*	1.53	15.83**
At least two living children (none or one)	0.998	0.928	1.01	1.13	1.053
Earned income	1.079	0.965	0.958	1.026	0.973
Health insurance					
none (ref)					
public or other health insurance	0.853	0.914	7.726	1.126	0.555
Need factors					

Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.594	1.596	0.0784*	1.246	3.797*
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.276	0.485*	2.248	6.385	1.044
at least three chronic diseases	0.846	0.506	3.822	6.417	1.015
Number of ADL limitations					
none					
one or two ADL limitation (none)	0.394**	2.311**	0.891	0.876	1.774
at least three ADL limitation	0.187***	2.872***	1.324	1.178	2.438
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.267***	1.092	2.796**	1.533	1.411
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0311***	2.257**	1.758	2.373*	3.573*
Early-life factors					
Numbers of episodes having experienced hunger prior to the age of 17					
zero (ref)					
one	0.857	1.091	1.135	0.516	7.026*
two	1.269	1.292	0.801	0.653	2.057
three	1.491	1.307	0.519	0.464	4.114
N	434	434	434	434	434

Source: Author's analysis of the Life History Survey (2014), Waves 3 (2015) and 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living, while IADLs stands for Instrumental Activities of Daily Living. ③Time-invariant variables were measured using data from Wave 3 of the CHARLS; experiences of hunger before the age of 17 were measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables were measured using data from Waves 3 and 4 of the CHARLS. ④Age, earned income, and the number of living children are continuous variables, and earned income is the log (income).

8.4 Chapter summary

This chapter provided a comprehensive overview of the empirical results derived from longitudinal analyses that addressed the second set of research questions aiming to examine the dynamic social care needs and unmet needs of older Chinese people and their underlying predictors. Descriptive, bivariate, and multivariate analyses were conducted employing longitudinal data drawn from the Life History Survey (2014), Wave 3 (2015), and Wave 4 (2018) of the CHARLS. The results shown in Tables 8.5, 8.10, 8.11, and 8.12 indicate that predisposing, enabling, and need factors, as well as experiences of hunger prior to the age of 17, are significant predictors of the dynamic social care needs and unmet needs for ADLs or IADLs. This confirms the validity of the conceptual framework presented in Figure 4.1, suggesting the underlying predictors of dynamic social care needs and unmet needs in later life (See Section 4.7). The results for the hypotheses related to the second set of research questions are presented in Table 8.13.

H2a was a general hypothesis proposing that the dynamic patterns of social care needs and unmet needs are associated with the respondents' demographic and socioeconomic characteristics. The results of the bivariate analyses (see Tables 8.2, 8.3, 8.4, 8.7, 8.8, and 8.9) and multivariate analyses (see Tables 8.5, 8.10, 8.11, and 8.12) all suggested that the dynamic patterns of social care needs and unmet needs for ADLs or IADLs are significantly associated with predisposing, enabling, and need factors, in addition to experiences of hunger prior to the age of 17. Therefore, H2a was fully supported.

H2b was concerned with the associations between the changes in ADL limitations from Wave 3 to 4 and the reporting of repeated unmet needs in Wave 4. Based on the results of the multivariate analyses (see Tables 8.5, 8.10, 8.11 and 8.12), H2b was not supported. Older people with a deteriorated physical status in terms of ADL functions from Wave 3 to 4 were not more likely to report repeated unmet needs for ADLs or IADLs compared to older

people with the same or improved physical status for ADLs. However, it should be noted that a significant association between a deteriorated physical status regarding IADLs and repeated unmet needs for IADLs was observed. Older people with a deteriorated status in terms of IADL performance from Wave 3 to 4 were more likely to report repeated unmet needs for IADLs than older people with the same or improved status regarding IADLs across the two waves (see Tables 8.10 and 8.12).

H2c focused on the associations between living arrangements and reporting repeated unmet needs. As shown in Table 8.12, older male respondents living alone were significantly more likely to report repeated unmet needs for IADLs compared to those living with others. However, it should be noted that the association between living arrangements and repeated unmet needs for ADLs were not significant (Table 8.5). Thus, H2c was only partially supported.

The following chapter discusses the key findings presented in Chapters 6, 7, and 8, along with the limitations of the study, and reflects on the original contributions of this study and potential implications for policymakers and further research on these issues.

Table 8.13 Hypotheses regarding the dynamic social care needs and unmet needs

Hypotheses	Supported	Partly supported	Not supported
2a: The dynamic patterns of social care needs and unmet needs are associated with individual characteristics.	✔		
2b: Older people with declining functions in terms of ADLs over time tend to experience repeated unmet needs compared to those reporting similar or improved functions.			✔
2c: Older people living alone are more prone to having repeated unmet needs compared to those living with others.		✔	

Sources: Author's work based on the hypotheses of the second set of research questions and empirical evidence in Chapter 8

Chapter 9 Discussion and conclusion

9.1 Chapter overview

This chapter is comprised of seven sections serving four aims: a) discussing the key findings in relation to existing knowledge, b) emphasising the original contributions of this research both theoretically and empirically, c) demonstrating the implications of the findings for policymakers and other stakeholders, and d) outlining future research directions. Section 9.2 revisits the research rationale and research questions. Section 9.3 summarises the key findings, addressing each set of research questions and comparing these findings with existing literature, concurrently demonstrating the possible explanations of consistencies and inconsistencies in the findings. The implications for policymakers and other stakeholders in the Chinese context are discussed in Section 9.4. Limitations of this study are further considered in Section 9.5. Section 9.6 highlights the theoretical and empirical contributions drawn from the key findings. Recommendations for future research are addressed in Section 9.7. Section 9.8 concludes the thesis by reiterating the principal focus, original contributions, and the implications for policymakers and future research.

9.2 Restatement of research rationale

China's population is ageing rapidly (Mao et al., 2020a). One significant result of this phenomenon is that an increasing number of older people are living with chronic diseases and functional limitations, leading to fast-growing social care needs amongst older people (Wong and Leung, 2012). Addressing the increasing social care needs brought on by the ageing population has become a pressing challenge for the Chinese government and society. China's contemporary social care system relies heavily on informal care from families, relatives, and friends. Informal care is deeply embedded in the Confucian culture, which values filial piety as the most essential virtue (Feng et al., 2020b). However, due to the shrinking size of families caused by the strict

implementation of the One-Child Policy (Ding and Hesketh, 2006), fast-paced trends of modernisation and urbanisation, and the out-migration of adult children (Cai and Cheng, 2014), the sustainability of traditional forms of informal care provision has been challenged (He and Ye, 2014). Meanwhile, massive expansion in the formal care sector, fuelled by the considerable investments from the Chinese government, has not yet translated into an equal increase in the usage of such care services amongst older Chinese people (Shum et al., 2015). Moreover, the formal care sector is in its initial stages, characterised by the uneven distribution of resources and relatively high costs for services that a considerable proportion of older people in China can hardly afford (Wu et al., 2015). Current social care provision can barely meet the growing social care needs, leading to the prevalence of unmet needs amongst older Chinese people (Cao et al., 2023), who tend to report worse physical and mental health status compared to their counterparts without unmet needs (Hu and Wang, 2019, Wang et al., 2024, Zhen et al., 2015). Thus, it is of great importance for the Chinese government and other stakeholders to have empirical evidence and a deeper understanding of the social care needs and unmet needs of older Chinese people in order to make corresponding improvements in the current social care system (Wong and Leung, 2012).

Against this background, social care needs and unmet needs have naturally become one of the foci of gerontology research (Chen et al., 2018b, Wang et al., 2021a, Cao et al., 2023). Social care needs in this thesis have been conceptualised as an individual's reported functional limitations related to ADLs or IADLs and requiring assistance with performing these tasks in daily life (World Bank, 2015, World Health Organization, 2015, Copley et al., 2017). Unmet needs, on the other hand, have referred to circumstances where an individual reports needing help with one or more ADLs or IALDs without receiving any support for these tasks (Vlachantoni et al., 2011). Notwithstanding a large volume of studies investigating social care needs and unmet needs of older people, there are two notable gaps in previous

discussions. One is the scarcity of research that endeavours to examine social care needs and unmet needs from the perspective of conceptualising them as dynamic processes. The majority of existing studies have emphasised social care needs and unmet needs at a particular point in time using cross-sectional analysis (Che and Cheung, 2022, Fu et al., 2017). The other is the absence of the life-course perspective in the examination of predictors associated with reporting needs and unmet needs among older adults. Most existing research fails to examine underlying predictors originating from an individual's early life (Zhu, 2015, Meng et al., 2021). Therefore, this thesis examined the dynamic changes in social care needs and unmet needs through the lens of the life-course perspective in order to comprehensively investigate the predictors of such changes.

9.3 Key findings of this thesis

This section thoroughly discusses the key findings based on the results discussed in Chapters 6 through 8, addressing the first and second sets of research questions, respectively. Furthermore, previous literature is compared in the discussion to show how this thesis intersects with existing findings in a broader context.

9.3.1 Research Questions 1 a&b: a) What is the extent of older people's social care needs? b) How does the extent of older people's social care needs vary by their demographic and socioeconomic characteristics?

This section discusses the findings in terms of older Chinese people's contemporary social care needs and unmet needs using data from the Life History Survey (2014) and the fourth follow-up wave (2018) of the CHARLS. The findings on the extent of social care needs and their predictors amongst older Chinese people are discussed first, followed by the results presented in Chapter 7, which addressed unmet needs. The statistically significant association found between early-life adversities and social care needs and unmet needs in later life are discussed in Section 9.3.3 to underscore the original contribution of this study.

What is the extent of older people's social care needs?

The findings related to the prevalence of social care needs in terms of ADLs, IADLs, and specific ADL and IADL tasks are based on the results discussed in Chapter 6. As demonstrated in Table 6.1, less than 9% of Chinese individuals aged 60 years and over reported social care needs for ADLs, while around 25% reported social care needs for IADLs. This prevalence rate of social care needs for ADLs is lower than that reported by Zhang and colleagues (Zhang et al., 2020), who found that around 40% of older Chinese people reported needing help with ADLs in their assessment of data from the 2014 wave of the CLHLS. The possible explanation for this difference is the age gap between the analytical samples employed in this thesis and the one used by Zhang and colleagues. The average age of the analytical sample employed here was 69 years old, while the average age of the analytical sample employed by Zhang and colleagues was 86 years (Zhang et al., 2020). There has been a general consensus that the risk of developing functional disabilities increases with age, which explains why using a relatively older sample leads to a higher proportion of social care needs (World Health Organization, 2015, Teerawichitchainan and Knodel, 2018).

The prevalence of needing help with IADLs was higher than that for ADLs, which is consistent with earlier findings that older people tend to report more functional limitations in IADLs compared with ADLs (Millán-Calenti et al., 2010). However, the prevalence of needing help with IADLs is higher than that reported by Connolly and colleagues. Connolly et al. (2017) found that 11% of individuals aged 65 years and over reported difficulties in performing IADLs using data from the 2009-2011 Irish Longitudinal Study on Ageing (TILDA). This aligns with previous findings that older people from high-income countries tend to report better physical functions than those from lower-income countries (World Health Organization, 2015).

The prevalence rates for difficulties with specific ADL and IADL tasks were

examined and discussed in Section 6.3. For ADL tasks, higher proportions of older people who reported needing help with bathing (5.9%) and using the toilet (3.4%) were observed compared with those needing help with eating (1.0%), dressing (2.8%), getting in or out of bed (1.9%), and controlling urination and defecation (1.8%). This is in line with earlier findings indicating a higher proportion of functional disabilities in bathing and using the toilet (Zhang et al., 2020). This may be because a higher level of mobility is required for these two tasks, and inadequate bathroom facilities can make bathing or using the toilet independently particularly challenging (Zhang et al., 2020, Liu et al., 2020, Fong and Feng, 2021). In terms of IADLs, a higher prevalence rate of reporting social care needs for making phone calls (11.7%) and doing housework (10.3%) was found compared to cooking (9.2%), shopping for groceries (8.4%), taking medications (4.2%), and managing money (4.2%). This is consistent with existing research, which has suggested a higher proportion of needing help with housework amongst older people aged 60 years and over living in the Netherlands compared to the other IADLs (Bleijenberg et al., 2017).

How does the extent of older people's social care needs vary by their demographic and socioeconomic characteristics?

As discussed in Section 3.3, the Andersen behaviour model postulates that the utilisation of health care can be predicted by three categories of factors: predisposing factors indicating one's inclination to use healthcare services, enabling resources relating to an individual's capacity for accessing support, and need factors aligning the necessity to use health or social care due to health conditions (Andersen, 1995, Willis et al., 2007). Age, gender, ethnicity, marital status, illiteracy, and lifestyle characteristics were the predisposing factors found to be significant determinants of social care needs for ADLs and IADLs in this study. Older people aged 80 and over were more likely to report social care needs for both ADLs and IADLs than those aged 60 to 69 years old. Such a finding is congruent with previous studies (Gu and Vlosky, 2008,

Teerawichitchainan and Knodel, 2018, Zhang et al., 2020), confirming that the deterioration in health and development of chronic conditions inevitably arise along with the process of ageing, which explains the higher prevalence of needing assistance in daily life amongst relatively older individuals (Niccoli and Partridge, 2012).

In terms of gender disparities in social care needs, this thesis found that older women were less likely to report needing help with dressing, cooking, and housework but were more likely to need help with shopping for groceries compared to older men (see Tables 6.6 and 6.9). Meanwhile, older women also faced a lower likelihood of needing help with ADLs (see Table 6.7). These findings are in contrast to previous research showing that older women were more likely to report ADL or IADL-related disabilities (Wang et al., 2009, Crimmins et al., 2011). A possible explanation for this contradiction here is twofold. On the one hand, a study found that older women were more capable of taking care of themselves compared with older men using the primary survey data from older people aged 65 years and above living in Beijing, China (Chen et al., 2022). Another possible explanation of this contradiction is the gendered division of household labour (Blair and Lichter, 1991, Yavorsky et al., 2015, Luo and Chui, 2018, Chen et al., 2022) in combination with the "use it or lose it" theory (Maula et al., 2019). Earlier findings in the American context showed that women tended to conduct more high-frequency and time-consuming housework than men (Blair and Lichter, 1991). Recent evidence in the Chinese context also indicated that women were primarily responsible for the housework and that their share of the housework increased with age (Luo and Chui, 2018). Therefore, older women often shoulder the responsibility of cooking and doing housework on a daily basis, which might explain why older Chinese women are less likely to need help with these tasks than older Chinese men.

Older people from ethnic minority communities were more likely to report social care needs for ADLs, including bathing and getting in and out of bed

(see Tables 6.5 and 6.6). This finding is inconsistent with a previous study found that older Han individuals were more likely to require assistance with at least one ADL than those from ethnic minority communities (Gu and Vlosky, 2008). As noted in Section 8.2.2, this is probably because older Chinese people from ethnic minority communities tend to report poorer health status compared with older Han Chinese people (Li et al., 2007). Additionally, those from ethnic minority communities usually reside in more remote and rural areas, where health and social care systems are underdeveloped and formal care services are largely unavailable (Gill et al., 2006, Evandrou et al., 2016).

Married older people were less likely to report social care needs for ADLs and IADLs (see Tables 6.5 and 6.8). Significant associations were also found between marital status and specific ADLs (bathing and getting in or out of bed) and IADLs (cooking and doing housework) (see Tables 6.6 and 6.9). This aligns with prior investigations suggesting the protective effects of being married on individuals' health in later life (Zhu and Gu, 2010, Rendall et al., 2011). Education is an important indicator of socioeconomic status and a significant determinant of health (Conti et al., 2010, Hahn and Truman, 2015, Arpino and Solé-Auró, 2019). In line with earlier findings (Zhang et al., 2021b, Yang et al., 2018), older people who were illiterate were significantly more likely to report social care needs for IADLs, especially for taking medications, managing money, shopping for groceries, and making phone calls, than those who could read and write (see Tables 6.8 and 6.9). Such findings may indicate that older people who are illiterate face more barriers in terms of living independently in their communities. One unexpected finding of this study was that those who were illiterate were less likely to report social care needs for ADLs than older people capable of reading and writing, which contradicts existing studies suggesting that a lack of formal education is a strong predictor of worse cognition and physical health status and a higher incidence of dementia (Brigola et al., 2019, Arce Rentería et al., 2019, Zhang, 2021). The investigation of the gender distribution of older people who were illiterate may provide further insights. Amongst older respondents who did not receive

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any formal education and could not read or write, nearly 80% were female.[18] As discussed earlier in this section, older women tend to perform better in terms of taking care of themselves (Chen et al., 2022).

Hukou status, living arrangements, the number of living children, and earned income were found to be significant predictors of older persons' social care needs for ADLs and IADLs (see Tables 6.5, 6.6, 6.7, 6.8, 6.9, and 6.10). The uneven distribution of resources and disparities in health status related to hukou status have been highlighted in existing studies (Afridi et al., 2015, Hung, 2022, Allan et al., 2017, Ying et al., 2020, Zhang et al., 2020). Compared to those with urban hukou, older people with rural hukou were more likely to be exposed to hardships over the course of their lives, report cumulative disadvantages in health, and face greater barriers in terms of access to adequate medical help and social support (Song and Smith, 2019). In line with the previous discussion, this thesis found that older people with rural hukou were more likely to need help with at least one IADL, such as managing money, shopping for groceries, and making phone calls, compared to those with urban hukou (see Tables 6.8 and 6.9).

Living arrangements were found to be important determinants of social care needs for IADLs in later life. Older people living with others were at a higher risk of needing help with at least one IADL, each task of IADLs, and a higher number of IADLs compared to those living with others (see Tables 6.8, 6.9, and 6.10). This is consistent with previous studies in the Chinese and American contexts, pointing out that older people living with children reported worse health status compared with those living alone (Wang et al., 2013, Weissman and Russell, 2018). Such findings may be because living alone does not necessarily equate to 'ageing alone'. A previous study using the fourth wave of the SHARE examined the heterogeneity of support networks for older people living alone and reported that the majority of them were in

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[18]The cross-tabulations of gender and illiteracy based on the analytical sample shown in Table 8.1 suggest that 47.1% of female respondents cannot read write, while 14% of male respondent cannot read or write.

relatively good health compared with those living with others (Djundeva et al., 2019)

The findings of this study related to need factors corroborate previous evidence stressing the vital role of need factors in predicting health and social care needs (Willis et al., 2007, Hu et al., 2020a, Hajek et al., 2021, Che and Cheung, 2022), and indicating that older people with more health problems have a greater likelihood of needing social care. Specifically, the results outlined in Section 6.4 suggest that older people with cognition-related and chronic diseases are more likely to report needing help with ADLs and IADLs than those with no such health conditions. This is in line with previous findings denoting the vital link between chronic diseases and functional disabilities (Lindbergh et al., 2016, Bleijenberg et al., 2017).

9.3.2 Research Questions 1 a&b a) What is the extent of older people's unmet needs? b) How does the extent of older people's unmet needs vary by their demographic and socioeconomic characteristics?

What is the extent of older people's unmet needs?

This section directs attention to the key findings regarding the contemporary unmet needs based on the results in Chapter 7. As discussed in Section 2.4, informal care alone fails to meet the increasing social care needs amongst older people (Yang and Tan, 2021). Formal care in China, especially home- and community-based care, is underdeveloped, reflecting the uneven distribution of resources between rural and urban areas (Zhou and Walker, 2016), and the voluntary sector is still in its infancy. Unmet needs in this study were conceptualised as the social care provision for older people falling short of their needs for daily assistance (Zhu and Walker, 2018, Vlachantoni, 2019). Relevant findings of this thesis contribute to deepening the current understanding of the extent of unmet needs in contemporary China by examining the prevalence rates of unmet needs for ADLs and IADLs, as well

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as each task of ADLs and IADLs

The analytical sample employed to address unmet needs for ADLs was composed of individuals aged 60 years and over who reported needing help with at least one ADL in Wave 4 of the CHARLS. Similarly, the sample used to investigate unmet needs for IADLs comprised individuals aged 60 years and over who reported needing help with at least one IADL. The results presented in Section 7.1 suggest that the prevalence of unmet needs for ADLs amongst the analytical sample was nearly 30%. This proportion is lower than that reported by Zeng and colleagues (Zeng et al., 2020), who found that around half of older people aged 65 years and over reported unmet needs for ADLs using data from the 2014 CLHLS (Zeng et al., 2020). The smaller proportion of older Chinese people reporting unmet needs for ADLs in this study is consistent with the declining trend in the prevalence rate of unmet needs for ADLs reported by Peng and colleagues (Peng et al., 2015). Such findings may indicate improved access to social care services, which is in line with the discussion regarding the expansion of the formal care sector over the last decade in Section 2.4.2 (Shi and Hu, 2020). The prevalence of reporting unmet needs was the highest for using the toilet (18.8%) amongst all four ADL tasks assessed in this study, which also included bathing (8.5%), dressing (3.5%), getting in and out of bed (3.5%), and eating (1.5%). This is in line with a previous study exploring unmet needs using data from 303 individuals aged 60 and over recruited from 15 communities in Nanjing, which is the capital city of Jiangsu province (Chen et al., 2018b). In their study, using the toilet was the daily task with the highest prevalence of unmet needs amongst older community-dwelling people in Nanjing (Chen et al., 2018b). Moreover, using data from the 2015 National Health and Ageing Trends Study, others have reported that the prevalence of not receiving any help with using the toilet was higher than for other daily activities (Henning-Smith et al., 2019, Jenkins Morales and Robert, 2022). Such findings indicate that daily support for older people using the toilet to be strengthened.

The prevalence rate of unmet needs for IADLs amongst individuals aged 60 years and over was 31.9% (see Table 7.6). This rate is close to the results of Hu and Wang's (2019) study, which found that about 30% of older Chinese people reported unmet needs for ADLs or IADLs based on data from the 2013 wave of the CHARLS (Hu and Wang, 2019). Particularly, the prevalence rate of reporting unmet needs in terms of doing housework (10.5%), making phone calls (10.1%), and managing money (9.1%) was higher than cooking (5.7%), shopping for groceries (3.4%), and taking medications (2.4%). This coincides with a previous study that found housework to be the activity for which most community-dwelling older people in New Zealand aged 75 years and over reported unmet needs for (Wilkinson‑Meyers et al., 2014).

How does the extent of older people's unmet needs vary by the person's demographic and socioeconomic characteristics?

The results in Sections 7.2.3 and 7.3.3 suggest that the conceptual framework illustrated in Figure 4.1 in Section 4.7 is reliable for comprehensively exploring the predictors of unmet needs for ADLs and IADLs. The results based on the logistical regression models were generally in line with the hypotheses (see Tables 7.5, 7.10, and 7.11). Older people living alone were more likely to report unmet needs for ADLs and IADLs than those living with others. This is in line with previous studies indicating that living alone is a significant risk factor for reporting unmet needs in later life. Older people living with others and reporting functional disabilities were more likely to receive timely and adequate daily assistance compared to those living alone (Peng et al., 2015, Cao et al., 2023). One surprising finding here is that older people with at least two living children were more likely to report unmet needs for ADLs and IADLs compared to those having no children or one living child. This is the opposite of empirical evidence based on data from the CLHLS suggesting that having more living children is significantly associated with a lower risk of reporting unmet needs (Peng et al., 2015, Cao et al., 2023). A possible explanation for this inconsistency is the different measures of the number of living children

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used in this current study and others' work. In this study, the number of living children was dichotomised into two categories: no children or one living child and at least two living children. By comparison, this factor was treated as a continuous variable by Peng and colleagues (Peng et al., 2015) , and it was classified into three categories (less than two living children, three or four living children, and at least five living children) in the work of Cao and colleagues' work (Cao et al., 2023). As discussed in Section 2.3.1, the geographic separations of families driven by fast-paced urbanisation and modernisation have led to a low probability of receiving informal instrumental support from adult children (Phillips and Feng, 2015).

Findings related to need factors and unmet needs show that older people with memory-related diseases and at least one IADL limitation were less likely to report unmet needs for ADLs than those with no memory-related issues or IADL limitations. This is consistent with the association between self-reported health and unmet needs in Zhu and Österle's study (Zhu and Österle, 2017). They found that amongst older Chinese people needing help with at least two ADLs, individuals with fair or poor self-reported health were less likely to report unmet needs compared to those with better self-reported health (Zhu and Österle, 2017). This is perhaps because older people with lower cognitive performance and more functional disabilities are more likely to receive help compared with those who are healthier (Hu and Ma, 2018). Thus far, the key findings that addressed Research Questions 1a & b have been demonstrated and compared with the findings of other studies. The following sections proceed with elaborating findings addressing the second set of research questions and the long-term impacts of early-life adversities on social care needs and unmet needs in later life.

9.3.3 Research Questions 2 a&b a) How do older people's social care needs and unmet needs change over time? b) What are the underlying factors associated with the different dynamic patterns of these needs?

The second set of research questions explored the longitudinal patterns in

social care needs and unmet needs for ADLs and IADLs, as well as their predictors. This section discusses the findings based on the results presented in Chapter 8 that addressed Research Questions 2 a & b, along with a critical engagement with previous studies.

How do older people's social care needs and unmet needs change over time?

The conceptual framework adopted in this study (presented in Figure 4.2) for analysing the dynamic nature of social care needs and unmet needs tracked their every possible change from Time Point 1 to 2 in later life (Vlachantoni et al., 2022). As discussed in Section 4.7 and reiterated in Section 8.2.1, five dynamic patterns were explored in this study, including no longer having social care needs, repeated met needs, newly arisen unmet needs, newly arisen met needs, and repeated unmet needs for ADLs and IADLs. No longer having social care needs captured the transition from needing help with daily tasks at Time Point 1 to not needing any help at Time Point 2, suggesting that reporting functional disabilities and needing help with daily tasks in later life is a temporary phase (Bircher, 2005, Gill et al., 2006). Older people reporting repeatedly met social care needs across the two time points were those with social care needs who received daily assistance with their tasks at Time Points 1 and 2. Those reporting social care needs and receiving sufficient daily assistance at Time Point 1 but not at Time Point 2 were classified as having newly arisen unmet needs, highlighting the discontinuity of adequate care provision over time. As for newly arisen met needs and repeated unmet needs, these two patterns suggest changes in the unmet needs of older Chinese people. Newly arisen met needs refer to the situation where older people reported unmet needs at Time Point 1 but subsequently received adequate care, leading to reporting met needs at Time Point 2. Repeated unmet needs referred to the dynamic pattern denoting that older people reported unmet needs at both Time Points 1 and 2 (Vlachantoni et al., 2022).

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The results discussed in Sections 8.2.1 and 8.3.1 indicate the detailed distribution of older people over five dynamic patterns of social care needs and unmet needs for ADLs and IADLs across Waves 3 and 4. Amongst older people reporting social care needs in Wave 3 of the CHARLS, around half no longer needed help in Wave 4. This is in line with previous research reporting the declining trend in the incidence of functional disabilities related to ADLs and IADLs observed over time (Feng et al., 2013, Liang et al., 2015, Liang et al., 2017). In Wave 4, around 25% reported repeated met needs for ADLs and IADLs, which is close to the proportion of older English people reporting repeated met needs in terms of bathing or dressing identified by (Vlachantoni et al., 2022). Less than 3% reported newly arising unmet needs for ADLs, and the proportion of those reporting such a dynamic pattern for IADLs was 10%. About 10% of older people reported newly arisen met needs for ADLs or IADLs. This number is in line with the study conducted by Vlachantoni and colleagues' (2022), which found that 10.8% of older people living in England reported delayed met needs for bathing or dressing in Wave 9 of the ELSA (Vlachantoni et al., 2022). About 7% of older people reported repeated unmet needs for ADLs and IADLs in both Waves 3 and 4. The group of older people reporting repeated unmet needs requires special attention, for they face a greater likelihood of developing health problems, as noted in several previous studies (Zhen et al., 2015, Hu and Wang, 2019). In summary, amongst older people reporting social care needs across both waves, only around half received adequate care at these two points in time, reporting no unmet needs for ADLs and IADLs.[19] The considerable proportion of older people not receiving adequate social care provision across Waves 3 and 4 of the CHARLS is in line with discussions in Section 2.4, which pointed out the challenges regarding the sustainability of social care provision for older Chinese people (Zhu and Walker, 2018).

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[19] This proportion is the result of dividing the number of older people reporting repeated unmet needs into the number of older people reporting social care needs across two waves based on the results in Tables 8.1 and 8.6. 92/(384-218) ≈ 55.4%; 364/(1,258-554) ≈ 51.7%.

The adverse effects of unmet needs on older people's quality of life, health status, and mortality risk have been underscored in previous studies (Zhen et al., 2015, Hu and Wang, 2019). As shown in Tables 8.1 and 8.6, about 7% of older people reported repeated unmet needs for ADLs and IADLs in Waves 3 and 4 of the CHARLS. This proportion is lower than that identified amongst older English people (Vlachantoni et al., 2022). Employing data from Waves 8 and 9 of the ELSA, Vlachantoni et al. (2022) found that nearly 30% of older English people reported repeated unmet needs for bathing or dressing across the two waves of the survey. The differences in the prevalence of reporting repeated unmet needs may be explained by the disparities in the proportion of married older people in the sample used in this study and the one used by Vlachantoni and colleagues. Marital status is an important indicator of receiving informal care in older age (Vlachantoni et al., 2015, Hu and Ma, 2018). Around 20% of the analytical sample for this part of the study were unmarried (see Tables 8.1 and 8.6), while more than 40% of the analytical sample from the ELSA were unmarried (Vlachantoni et al., 2022). Future studies can utilise the data from the HRS, SHARE, or Korean Longitudinal Study of Aging (KLoSA) to explore the dynamic social care needs and unmet needs in different countries or regions across the world.

What are the underlying factors associated with the different dynamic patterns of these needs?

This section discusses the statistically significant predictors of reporting different dynamic patterns of social care needs and unmet needs based on the results in Sections 8.2.3 and 8.3.3. The underlying predictors conceptualised in Figure 4.1 were examined for the dynamic social care needs and unmet needs for ADLs and IADLs, respectively. The results based on multivariate analyses show that predisposing, enabling, need, and early-life factors were significantly associated with the dynamics of social care needs and unmet needs. At the same time, these results confirm the validity of applying the conceptual framework displayed in Figure 4.1. The following

discussions of the findings are arranged in the sequence of no longer having social care needs, repeated met needs, newly arisen unmet needs, newly arisen met needs, and repeated unmet needs for ADLs and IADLs. The significant predictors related to early-life adversities are addressed separately in the following section.

Predisposing and enabling factors were significant predictors for no longer needing help with IADLs from Wave 3 to 4 of the CHARLS. In contrast, need factors were significantly associated with no longer needing help with ADLs and IADLs. Age, gender, illiteracy, smoking habits, and hukou status were statistically significant determinants for no longer needing help with IADLs across the two waves. Older people aged 80 years and over faced a lower likelihood of no longer reporting social care needs for IADLs compared with those aged between 60 and 69 years. This finding aligns with empirical evidence showing that ageing is a process accompanied by the inevitable decline in physical and mental functions, corresponding with the increasing possibility of needing assistance with daily activities (World Health Organization, 2015). Older women were more likely to report no longer needing help with IADLs than older men across the two waves. On the other hand, this finding is in contradiction with an earlier study examined the trends in the prevalence of disabilities regarding IADLs and found that older women were less likely to report disabilities related to IADLs than their male counterparts (Heise et al., 2019, Gates, 2019). On the other hand, this finding is in line with an earlier study examining the trend of the prevalence of disabilities regarding IADLs, which suggested that older women were less likely to report disabilities related to IADLs compared with their male counterparts (Liang et al., 2017). Moreover, a further investigation of the associations between gender and no longer needing help with specific IADL tasks across Waves 3 and 4 was conducted in order to gain a better understanding of the role of gender in predicting the decline in social care needs over time (see Appendix E.5). Relevant results in Appendix E.5 show that the association between gender and no longer needing help with IADLs in

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Wave 4 was only significant for cooking. The plausible explanation here is the gendered segregation of housework (Luo and Chui, 2018). As discussed in Section 9.3.1, compared to men, women tend to do the majority of household labour, especially for tasks that are high in frequency and more time-consuming, which may explain the findings that older women were less likely to need help with cooking and doing housework (see Table 6.9), as well as no longer needing help with these tasks over time compared with older men.

Older people with no formal education and who were illiterate were less likely to report no longer needing help with IADLs compared to their more educated counterparts. This is consistent with earlier findings that older people with lower educational attainment face higher risks of developing physical limitations and other adverse health conditions (Bleijenberg et al., 2017, Arpino and Solé-Auró, 2019, Brigola et al., 2019). Not receiving a formal education is still common amongst the older Chinese population (see Tables 6.1, 7.1, 7.6, 8.1, and 8.6), and it is a key risk factor for reporting cognitive and functional impairments. Hence, critical attention should be paid to this group of individuals since they are not only more likely to develop functional disabilities (Brigola et al., 2019) but also tend to need more help with IADLs in later life (see Tables 8.10, 8.11, and 8.12). Older people with rural hukou were less likely to report no longer having social care needs for IADLs than those with urban hukou. This is in line with the discussions in Sections 4.3 and 9.3.1, suggesting that hukou status in the Chinese context is related to the imbalanced distribution of resources regarding health and social care (Anderson et al., 2015, Zhu and Österle, 2017, Song and Smith, 2019). As for the associations between need factors and no longer needing help with ADLs and IADLs, older people reporting no chronic conditions and functional limitations regarding ADLs and IADLs were more likely to report no longer needing help with ADLs and IADLs by the second time point compared to those with more chronic diseases and functional limitations (see Tables 8.5, 8.10, 8.11, and 8.12). This aligns with existing literature suggesting that the prevalence of ADL limitations is higher amongst older people with chronic

diseases than those with no such health conditions (Fong, 2019).

Findings related to repeated met needs for ADLs and IADLs show that need factors play a determining role in predicting older people's repeated met needs for ADLs and IADLs (see Tables 8.5, 8.10, 8.11, and 8.12). Overall, older people with more limitations related to ADLs and IADLs were more likely to receive adequate support across the two waves than those with no such limitations. Related findings are consistent with previous research highlighting that physical limitations are key determinants of receiving social care for older people. Older people with functional disabilities regarding ADLs and IADLs are more likely to receive social care than those with no such disabilities (Vlachantoni et al., 2015, Hu and Ma, 2018). It is worth noting that people aged 80 years and over were more likely to report repeated met needs for IADLs than those aged between 60 and 69 years (see Table 8.10). One plausible explanation is that individuals aged 80 years and above tend to report more functional disabilities than those who are relatively younger (Connolly et al., 2017) and, therefore, face a greater likelihood of receiving social care (Hu and Ma, 2018).

Due to only 11 respondents reporting new unmet needs for ADLs (see Table 8.1), only the examination of the underlying predictors for newly arisen unmet needs for IADLs was carried out (see Tables 8.10, 8.11, and 8.12). The results presented in Table 8.10 show that living arrangements and changes in ADL and IADL limitations across Waves 3 and 4 were statistically significant predictors of reporting newly arisen unmet needs for IADLs. Older people living alone were less likely to report newly arisen unmet needs than those living with others. As discussed in Sections 4.2.2 and 9.31, older people living alone tend to report better health status than those living with others (Sereny, 2011, Wang et al., 2013, Weissman and Russell, 2018). Older people with a deteriorated status in performing ADLs and IADLs across the two waves were more likely to report newly arisen unmet needs for IADLs than those with the same or improved physical status. This is probably due to declining physical

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status being a key indicator of receiving help in daily life (Hu and Ma, 2018). The results in Table 8.11 show that older women from ethnic minority backgrounds were less likely to report newly arisen unmet needs for IADLs compared with their Han Chinese counterparts. As noted previously in section 8.2.2.1, older people from ethnic minority communities tend to live with extended families since they have historically been less impacted by the One-Child policy compared with their Han Chinese counterparts (Chen et al., 2021a). Additionally, there has generally been a lower prevalence of out-migration of adult children amongst ethnic minority families in China because they tend to reside in more remote or rural areas compared with Han Chinese families, and these geographic disadvantages often set more barriers regarding the out-migration of the younger generation (Chen et al., 2021a).

Marital status was an important indicator of newly arisen unmet needs for IADLs amongst older men. Older men who were unmarried faced a higher risk of reporting newly arisen unmet needs for IADLs compared with those who were married or had a partner. This may be explained by the importance of informal care provided by one's spouse in later life (Hu and Ma, 2018, Jain and Sheehan, 2023). Meanwhile, older people experiencing deteriorating physical functions regarding ADLs and IADLs over time were more likely to report newly arisen unmet needs for IADLs than those not experiencing such deterioration. This is perhaps due to older people with declining ADL and IADL functions requiring more daily assistance at Wave 4 compared with Wave 3, resulting in a larger gap between social care needs and provision (Vlachantoni et al., 2011).

Ethnicity, illiteracy, ADL limitations, daily consumption of alcohol, and changes in ADL and IADL limitations across the two waves were found to be important determinants of reporting newly arisen unmet needs for ADLs and IADLs. Older people from ethnic minority communities were more likely to report newly arisen met needs compared to their Han Chinese counterparts. Interestingly, older people who were illiterate were more likely to report newly

arisen met needs for IADLs than those who had a formal education and were capable of reading and writing. This contradicts previous findings that people with higher educational attainments face lower risks of reporting unmet needs for ADLs compared with those not receiving any formal education (Peng et al., 2015). One possible explanation here is that older people who are illiterate are more likely to report more limitations related to physical status compared to those who have a higher educational level, and these functional limitations are the key determinants of receiving social care in later life (Hu and Ma, 2018, Brigola et al., 2019). As for need factors, older people with more physical limitations regarding ADLs and IADLs and worse physical status were more likely to report newly arisen met needs compared with those reporting no limitations or maintaining the same or improved status regarding ADLs and IADLs. This is probably because older people with greater physical limitations are more likely to receive social care than those reporting no physical limitations (Vlachantoni et al., 2015, Hu and Ma, 2018).

Marital status, living arrangements, memory-related diseases, ADL limitations, and changes in IADL limitations from Wave 3 to 4 were important predictors of reporting repeated unmet needs for ADLs and IADLs across the two waves. As discussed in Sections 4.3 and 9.3.1, marital status is an essential indicator of individuals receiving daily support in later life. Older people who were unmarried and had no partner were more likely to report repeated unmet needs for ADLs and IADLs compared with those who were married or had a partner. This finding is in line with existing literature suggesting that marital status and living arrangements were significant predictors of receiving informal care in later life (Jain and Sheehan, 2023). Additionally, older men who lived alone were more likely to report repeated unmet needs for IADLs than those living with others, in line with earlier findings that one's living arrangements are key risk factors for reporting unmet needs (Peng et al., 2015, Gu and Vlosky, 2008, Cao et al., 2023). Furthermore, older people with more ADL limitations or experiencing declining IADL limitations were more likely to report repeated unmet needs for IADLs over time. This may be

explained by the fact that increased physical limitations indicate a higher level of social care needs, leading to a widening gap between social care needs and provision over time.

9.3.4 Understanding the far-reaching effects of early life adversities on social care needs and unmet needs in later life

Examining the far-reaching impacts of early-life adversities on social care needs and unmet needs has been another central focus of this thesis. This study found a significant association between experiences of hunger prior to the age of 17 and reporting needs, unmet needs, no longer having social care needs, and repeated met and unmet needs amongst older Chinese people. Reporting experiences of hunger prior to the age of 17 was significantly associated with a lower likelihood of needing help with bathing and cooking (see Tables 6.6 and 6.9). Amongst the older male and rural subsamples, such experiences were strong predictors of needing help with a higher number of IADL tasks in later life (see Table 6.10). The longitudinal results in Table 8.5 show that older people who experienced hunger for three episodes before the age of 17 were more likely to no longer report social care needs for ADLs across the two waves compared to those having had no such experience. These findings are in conflict with previous studies examining 'the long arm of childhood', which have suggested that individuals who report more negative experiences in early life are more likely to report worse health later on (Hayward and Gorman, 2004, Case et al., 2005, Arpino and Solé-Auró, 2019, Lu and Shelley, 2019, Hu et al., 2020b, Deng and Lindeboom, 2022). These findings also clash with the cumulative advantages and disadvantages theory, which posits that individuals who are socioeconomically disadvantaged early in life are prone to experience accumulated disadvantages over the life course (Crystal and Shea, 1990, Dannefer, 2003).

The possible explanation for such inconsistencies is twofold. First, the mortality selection hypothesis may help understand the seemingly positive effect of the experiences of hunger prior to the age of 17 on social care needs

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in later life. Mortality selection can result in excess deaths amongst individuals with the poorest health status, leading to survivors of challenging circumstances showing better health status than individuals unaffected by such adversities (Fox et al., 1982, Howe and Robinson, 2018). For example, using data from the 2008 and 2011 wave of the CLHLS, Shen and Zeng (2014) used whether respondents were born in rural or urban areas, father's education and occupation, and the utilisation of medical help in early years to measure childhood status, reporting the negative and direct effect of positive childhood status on mortality risks in later life. Therefore, one plausible explanation is that individuals who have survived early-life adversities to an advanced age tend to report better health than their peers with no such adverse experiences, leading to a lower risk of developing functional disabilities and needing help with daily activities.

Secondly, the cumulative inequality (CI) theory is helpful for understanding the negative associations between experiences of hunger before the age of 17 and reporting social care needs in later life (Ferraro and Shippee, 2009, Schafer et al., 2009). CI theory proposes five axioms in order to thoroughly examine and explain the influence of life-course inequalities on life trajectories (see Section 3.4.2). It also addresses how individuals' trajectories can be shaped by resources, human agency, self-perceptions of life trajectories, and comparisons of one's life with others (Ferraro and Shippee, 2009).

Specifically, the third axiom is highly relevant to this discussion regarding why older people with experiences of hunger before the age of 17 were less likely to report social care needs than those with no such experiences. The third axiom points out the significant effects of accessible resources on shaping life trajectories. Psychosocial resources, including individuals' potential, skills, and sense of self-control related to coping with stressful life events (Taylor, 2011, Taylor and Broffman, 2011) are significant in terms of weakening the harmful influence of adverse experiences on one's health (Ferraro and Shippee, 2009, Li and Luo, 2023). Existing findings have found that older people who have

experienced more adversities over their life course are more likely to develop psychological resilience (Flores and Kalwij, 2014). Evidence from the Chinese context suggests that older Chinese people with a higher level of resilience are more likely to report fewer depressive symptoms compared with those with a lower level of resilience (Lim et al., 2015). Therefore, it is argued in this thesis that older people who have experienced more early-life adversities tend to develop a higher level of psychological resilience compared to those unaffected by such adversities, thereby buffering the long-term harmful influence of early-life adversities on health in later life. Furthermore, the fifth axiom highlights premature mortality as the negative outcome of cumulative inequalities (Ferraro and Shippee, 2009). This is in line with the mortality selection effect, predicting the converging inequalities regarding health amongst older people (Markides and Machalek, 2020) .

The results presented In Sections 7.2.3, 7.3.3, and 8.3.3 indicate that older people who experienced hunger prior to the age of 17 were more likely to report unmet needs for ADLs and IADLs, as well as repeated unmet needs for IADLs, while they faced a lower likelihood of reporting repeated met needs for ADLs compared to older people without such adverse experiences. These findings are in line with Hu and Wei (2022) study, which found that older people with more childhood adversities were more likely to report unmet needs for ADLs and IADLs (Hu and Wei, 2022). The comparative advantages and disadvantages theory posits that individuals who are at a disadvantaged status early in life are more likely to experience accumulative disadvantages over the life course and be economically disadvantaged in later life, suggesting a lower likelihood of obtaining an advanced education level, decent job opportunities, and better health (Crystal and Shea, 1990). Individuals with more adverse childhood experiences are more likely to report disadvantaged socioeconomic status and have fewer resources and support in later life (Ferraro et al., 2016, Crystal et al., 2017). A previous study focusing on the Chinese context has suggested that older people with lower socioeconomic statuses are less likely to receive sufficient social care (Wang

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et al., 2021a), leading to higher risks of reporting unmet needs for social care (Hu and Wei, 2022).

9.4 Policy Implications

The policy developments shaping the social care system in China were previously reviewed in Section 2.3.2, which highlighted the limitations in current policies influencing the social care provision to older people. The key findings discussed above may prove invaluable to policymakers and other stakeholders in terms of enhancing the social care system, especially for the sustainability of care provision and delivery of tailored care services for older people.

9.4.1 Developing a user-oriented social care system providing tailored services for older people

This study found not only a sizeable proportion of older Chinese people reporting social care needs and unmet needs for ADLs and IADLs, but it also identified the exact tasks with which older people require assistance. One important policy closely related to social care provision for older people is the Long-Term Care Insurance (LTCI) (see Section 2.3.2). As of the end of 2022, a total of 1.95 million people had benefited from the LTCI insurance.[20] Despite this seemingly large number of beneficiaries, recent evidence suggests that the social care provided by the state only covers a small proportion of older people living in urban China (Hu et al., 2020a). Therefore, on the basis of existing knowledge and the findings of this study regarding the extent of social care needs and unmet needs, the coverage of the LTCI must be further expanded in order to benefit more older people.

Additionally, findings related to older people reporting social care needs and unmet needs for specific ADL and IADL tasks have important policy implications towards a more balanced distribution of social resources. For

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[20] Data resource: http://www.nhc.gov.cn/wjw/tia/202309/44f5ca80881d4337ad51a2e22b403f15.shtml (Chinese version).

example, a significantly higher proportion of older people with rural hukou reported needing help with shopping for groceries, making phone calls, taking medications, and managing money (See Table 6.3). It has been suggested in previous studies that older people with urban hukou have more access to social care services than their counterparts with rural hukou, while older people with rural hukou face higher risks of reporting social care needs and unmet needs (Zhu and Österle, 2017, Hu and Wang, 2019, Zeng et al., 2020). Therefore, it is argued that more social care resources should be allocated to older people with rural hukou.

The effective delivery of social "are 'ervices to an older individual requiring help with daily activities cannot be achieved without carefully evaluating their physical functions (Zhu and Walker, 2018). Findings regarding specific ADLs and IADLs are also useful for delivering tailored social care for people based on a careful assessment of their function status. Amongst older Chinese people who have enrolled in the LTCI, their functional status is accessed first as a basis for whether they are eligible to receive formal care services provided by the state (Lei et al., 2022). For example, in Shanghai, the evaluation of older people's functional status includes a comprehensive assessment of physical abilities related to performing ADLs and IADLs, as well as mental health and cognitive status. The result of the evaluation is a unified score representing different levels of functional impairment. The total score is divided into six levels, with higher levels indicating more severe functional impairments. Specifically, older people evaluated at level two or three are eligible to receive door-to-door services three times a week, with each time lasting one hour.[21] Using the overall score is an effective way of evaluating older people's functional status to decide whether an older individual is eligible for receiving LTCI benefits. However, such an assessment method overlooks the complexities and diversities of functional disabilities in

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[21] The general guidance of the LTCI in Shanghai can be found:
https://ybj.sh.gov.cn/qtwj/20210108/5788843716bb45a3ba89fa025cf60eb5.html (Chinese version).

later life by assigning the same value to each task of ADLs and IADLs.[22] As discussed in Sections 4.2.1 and 5.5, ADLs relate to activities employed to assess one's fundamental ability related to self-care, while IADLs are more relevant to instrumental and less basic activities concerning one's life in the community (Roehrig et al., 2007). Thus, it is suggested that the score assigned for each task of ADLs and IADLs should be adjusted according to whether such an activity needs to be conducted daily and the potential impacts of not receiving adequate assistance on an individual's well-being.

9.4.2 Making flexible arrangements for older Chinese people considering the dynamics of needs and unmet needs

The dynamic patterns of social care needs and unmet needs of older Chinese people warrant critical policy attention. The findings in Chapter 7 emphasise that social care needs and unmet needs in older age are not static. It is therefore recommended that policymakers pay attention to such dynamics and establish a reaction mechanism in order to make corresponding adjustments to social care services for older people based on any changes in their social care needs and unmet needs. Specifically, the implications of the longitudinal findings for policymakers and other stakeholders are twofold. First, it is essential to enhance the role which rehabilitation plays in meeting increasing social care needs. This study found that around half of older people reporting social care needs in Wave 3 no longer needed help in Wave 4 (see Tables 8.1 and 8.6). The sizeable proportion of older people no longer reporting social care needs over time points out that meeting the challenge of increasing needs might benefit from placing rehabilitation at the heart of policy responses. One of the principal aims of rehabilitation is to regain functional capacities, enhance daily life experiences, and mitigate the financial burden of social care on the healthcare system (Stucki et al., 2018). Previous findings indicate that rehabilitation offers effective interventions for those with physical

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[22] The detailed criteria of accessing older Chinese people's eligibility of LTCI beneficials can be found: https://www.gov.cn/zhengce/zhengceku/2021-08/06/5629937/files/7c636db0008244b3a0987325b6c5dd9d.pdf (Chinese version).

limitations and helps older people to stay in their homes (World Health Organization, 2017, Kitzman et al., 2021). In other words, older people with functional disabilities who need social care have the chance to restore their independence through using rehabilitation services (Intiso et al., 2012). Therefore, improving rehabilitation services for older people is useful for meeting the challenges presented by the ageing population from the perspective of strengthening and regaining independence. The lessons from the implementation of LTCI in Japan are illuminating for improving the social care system in China to fit the dynamic nature of social care needs and unmet needs in later life. Long-Term Care Insurance in Japan was implemented in 2000 in order to alleviate the financial pressures of the increasing medical care expenditure brought on by the nation's rapidly ageing population (Iwagami and Tamiya, 2019). In particular, older people who are not qualified to receive long-term care services can gain support from the long-term care prevention programme (Curry et al., 2018) in order to lower the risk of developing functional disabilities and promote healthy longevity (Kabayama et al., 2014).

The second implication touches upon the group of older people reporting repeated unmet needs over time. Findings included in Sections 8.2.3 and 8.3.3 offer important implications for identifying the group of older people facing higher risks of experiencing repeated unmet needs over time. Older people repeatedly experiencing unmet needs have difficulties in accessing adequate informal or formal care and face a higher risk of reporting health problems related to not receiving sufficient daily assistance (Choi and McDougall, 2009, Zhen et al., 2015). The findings of this study suggest that the risk of experiencing repeated unmet needs is especially high for older Chinese who are unmarried, live alone, and have reported diminishing physical functions over time. Such findings are useful for policymakers to offer targeted social support for these individuals and remove the barriers hindering them from accessing social care services.

9.4.3 Improving the social security system to alleviate the far-reaching impacts of early-life adversities

The key findings of this thesis suggest a significant link between early-life adversities and reporting unmet needs, especially repeated unmet needs. Amongst older Chinese people requiring daily assistance for IADLs, those with experiences of hunger prior to the age of 17 were more likely to report unmet needs for IADLs across two time points than those with no such experiences. Previous evidence from different contexts has demonstrated that a developed social security system can blunt the lasting impacts of childhood adversities on health and socioeconomic status in adulthood and later life (Lu and Shelley, 2019, Andersson et al., 2023). Using data from the 2013 HRS, CHARLS, the Mexican Health and Ageing Study (MHAS), and ELSA, Lu and Shelley (2019) reported cumulative gaps in individuals' functional ability regarding performing daily activities in China and Mexico but not in England and the United States. Andersson et al. (2023) utilised data from the 2014 SHARE, 2011 International Social Survey Programme, the Global Burden of Diseases study, and the 2008 European Social Survey to examine the association between childhood conditions and adulthood diseases. They found that this association weakened in countries with a more developed healthcare system (Andersson et al., 2023). Although there have been improvements in pension and health insurance in China (Zhu and Walker, 2019), the social security system in China remains relatively underdeveloped, featuring significant disparities between rural and urban areas (Ying et al., 2020, Zhang et al., 2020, Cai and Yue, 2020, Zhang et al., 2017). Therefore, enhancing social protections for older people with rural hukou is a vital task for the Chinese government to alleviate the long-term influence of cumulative inequalities.

9.5 Limitations of this study

Notwithstanding this thesis offering significant implications for policymakers and other stakeholders, a number of limitations must be taken into account

when interpreting the findings. Regarding the research design, predictors related to individual-level characteristics were emphasised and examined in this study, while contextual factors were not considered. While the findings of this thesis contribute to a more comprehensive understanding of individuals' social care needs and unmet needs and their dynamic patterns in older age, it is also necessary to examine the role of contextual factors when relevant data is available. As discussed in Section 9.4.3, factors at the national level accessing the quality of health or social care system can be examined to explore their role in blocking the enduring influence of childhood adversities on adulthood and later-life status. Thus, future studies are encouraged to explore the role of contextual factors in predicting social care needs, unmet needs, and their changes over time.

Additional limitations arose due to the use of secondary data in the analysis presented in this thesis. First, the operationalisation of the dynamic social care needs and unmet needs was confined by the time interval between available follow-up waves of the CHARLS. Specifically, the measure of the dynamic social care needs and unmet needs in this study was based on the observed changes in these aspects between Waves 3 (2015) and 4 (2018), which were conducted before the COVID-19 pandemic. On the one hand, since the COVID-19 pandemic entailed drastic global changes (Vlachantoni et al., 2023), it can be anticipated that the findings of this study might not fit the post-pandemic context. Future studies could employ the most recent available wave (2020) of the CHARLS, released on the 16th November 2023, in order to examine social care needs and unmet needs during the pandemic and compare the updated results with existing evidence.

Second, regular physical activities were examined as an important part of lifestyle characteristics in this study. However, this independent variable was not included in the longitudinal analysis addressing the dynamic social care needs and unmet needs because only a random half of respondents were asked to provide their information on needs and unmet needs in Wave 3 of

the CHARLS. As a result, the association between regular physical activities and the dynamics of social care needs and unmet needs remains unknown.

Another limitation brought about by the secondary analysis was that the measures of social care needs were based on respondents' self-reported limitations regarding ADLs and IADLs, and the experiences of hunger in early life were measured using older people's memories. Thus, there may be a degree of recall bias in these variables (Coughlin, 1990, Yan et al., 2019), which, in turn, may have affected the association between childhood adversities and social care needs and unmet needs in later life. This limitation might be addressed by conducting pilot surveys using different measures for accessing functional limitations and encouraging participants to recall more early-life details in order to improve the quality of data (Fadnes et al., 2009).

Finally, the analysis of this study was limited by the sample size. As discussed in Section 5.8, the analysis of the dynamics of social care needs and unmet needs was planned to be conducted for both ADLs and IADLs. However, only 11 respondents identified as having newly arisen unmet needs for ADLs. Moreover, as discussed in Sections 4.2 and 4.3, disparities regarding social care needs and unmet needs of gender and hukou status have been underscored in previous studies (Zhu and Österle, 2017, Teerawichitchainan and Knodel, 2018). Therefore, the regression models constructed to investigate the predictors of the five dynamic patterns of social care needs and unmet needs were planned for the female/male and rural/urban subsamples. However, this analysis was not performed due to less than ten older male respondents reporting newly arisen unmet needs for ADLs (N=4) or repeated unmet needs for ADLs (N=9), and less than five older respondents with urban hukou reporting newly arisen unmet needs for ADLs (N=3), newly arisen met needs for ADLs (N=5), and repeated unmet needs for ADLs (N=9). This limitation could be addressed in future research by using the multiple imputation method in order to expand the sample size by addressing the missing data (Enders, 2017).

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9.6 Original contributions to the field

In spite of the limitations discussed above, this thesis made several important theoretical and empirical contributions to the field. The theoretical framework employed in this study expanded upon Andersen's behaviour model by adding a temporal dimension (see Sections 3.3 and 3.4.3; see also Figures 3.4 and 4.1), aiming at comprehensively understanding the predictors of social care needs and unmet needs from the life-course perspective. As addressed in Section 3.3, the Andersen behaviour model proposes three significant aspects of factors influencing the behaviour of utilising medical help, which include the predisposing, enabling, and need factors (Andersen, 1995, Willis et al., 2007). This study not only investigated the predisposing, enabling, and need factors related to older people's contemporary status but also the far-reaching influence of early-life adversities, thereby enhancing the Andersen behaviour model by infusing it with a life-course perspective. Moreover, findings addressing the first and second sets of research questions both support the validity of the expanded version of the Andersen behaviour model, which was integrated with the life-course perspective in order to better understand the risk factors of social care needs and unmet needs in later life.

In addition, this thesis contributes empirical evidence to ongoing discussions regarding the social care needs of older people in China and expands the current understanding in three aspects. First, this thesis explored the predictors of contemporary social care needs and unmet needs of older Chinese people in extensive detail. In particular, this thesis employed a series of logistic regression models in order to examine the predictors of needing help with ADLs, IADLs, and each task of ADLs and IADLs. For example, while gender disparities in social care needs have been highlighted in previous studies (Connolly et al., 2017, Yang, 2020a), this thesis further examined the role of gender in predicting whether an older individual needs help with specific ADL and IADL tasks and added new empirical evidence with the gender disparity in predicting needs regarding different tasks of IADLs (See Table 6.9). Second, this thesis is the first study examining the dynamic

patterns in social care needs and unmet needs for ADLs and IADLs in the context of ageing China. The conceptual framework capturing the changes or transitions in social care needs or unmet needs was constructed by Vlachantoni and colleagues (Vlachantoni et al., 2022) and tested in the English context. Built on such existing research examining dynamic unmet needs for bathing and dressing (Vlachantoni et al., 2022), this study applies this framework to examine the dynamics of social care needs and unmet needs for ADLs and IADLs, respectively. Finally, this study found the statistically significant association between experiences of hunger prior to the age of 17 and needs, unmet needs, and the dynamics of such needs in later life.

9.7 Implications for future studies

In addition to offering implications for policymakers and other stakeholders in terms of enhancing social care for older Chinese people, this study also proposes a few directions that future research could potentially explore.

First, future researchers are encouraged to employ a mixed-methods approach to investigate the dynamic social care needs and unmet needs in later life. This current study solely adopted a quantitative approach to test such dynamic changes in later life. Evidence from both qualitative and quantitative perspectives could provide a panoramic view based on more complete information on individuals' needs and unmet needs in later life (Shorten and Smith, 2017). Additionally, the statistical results could be more meaningful with the help of vivid descriptions from participants (Migiro and Magangi, 2011). Furthermore, rich data from personal reflections on living with social care needs or unmet needs, as well as participants' interpretations of the impacts of early-life adversities on their life trajectories, could be helpful for better informing policies and theories.

Second, as addressed above, one limitation to the use of secondary data analyses in this study was the fixed interval between follow-up waves of the

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CHARLS, resulting in the changes in social care needs and unmet needs examined only between two years. This conceptual framework could be further tested using primary data to understand possible changes in social care needs and unmet needs within a shorter, fixed timeframe. Moreover, as this framework was initially developed by Vlachantoni and colleagues aiming to examine unmet needs for social care from a dynamic perspective (Vlachantoni et al., 2022), future studies could apply this framework to explore the subsequent changes of a given healthcare need. Findings for such changes in social and health care needs could prove invaluable for developing and improving the integrated care system, which is in line with the core idea of the policy on promoting the development of health and old-age care in China (State Council, 2022).

Third, the consequences of experiencing repeated unmet needs on mental and physical health status should be further examined. Existing evidence suggests that older people with unmet needs are more likely to report depressive symptoms (Hu and Wang, 2019) or face higher risks of mortality compared with those with no unmet needs (Zhen et al., 2015). Therefore, future research could investigate the ways in which repeated unmet needs affect health or well-being in later life. Researchers could use data from the HRS, ELSA, SHARE or CHARLS in order to examine the consequences of experiencing unmet needs for ADLs and IADLs on health status in later life. Relevant findings yielded from different contexts together can contribute to coping with the challenges of ageing populations across the globe.

Further examination of mediators and moderators will be helpful of understanding the mechanism behind early life adversities and social care needs/ unmet needs in later life. A mediator is the variable helping to understand the 'how' and 'why' of the significant association between an independent variable and an outcome variable (Bennett, 2000). As discussed in Section 9.3.4, resilience was purposed to understand why older Chinese people with experience of hunger prior to the age of 17 were less likely to

need help with bathing than those with no such experience. The Chinese version of the Connor Davidson Resilience Scale has been used to measure individuals' resilience(Yu and Zhang, 2007, Ran et al., 2020). However, some items on this scale cannot be assessed using data from CHARLS, such as "Can deal with whatever come"" and "Not easily discouraged by failure (Connor and Davidson, 2003). Future studies are recommended to conduct qualitative research, collect primary data, or employ data from the CLHLS in order to examine the role of resilience in linking experiences of hunger in early life and social care needs in later life.

Additionally, previous studies have shown that individuals reporting adverse early-life life experience are more likely to develop metabolic syndrome and obesity in adulthood and older age. These chronic conditions might play the role of mediators influencing the relationships between adverse early-life experience and social care needs in later life.

Finally, it is recommended that individuals' health and socioeconomic statuses in adulthood can be examined as mediators in terms of the link between early-life experiences and social care needs or unmet needs in older age. Existing studies focusing on cumulative advantages and disadvantages over the life course have examined that the status in adulthood functions as the important mediators between childhood and later life (Bifulco et al., 2006, Wrulich et al., 2013, Lietzén et al., 2021). Examining how the mediating role of health and socioeconomic status in adulthood influences the far-reaching consequences of childhood adversities on later life is valuable for comprehending the mechanisms through which cumulative advantages or disadvantages manifest over the course of one's life (Bifulco et al., 2006).

Moderators, on the other hand, influence the strength or direction of the association between an independent variable and an outcome variable (Bennett, 2000). Future studies could investigate the role of gender and hukou status in moderating the long-term impacts of early-life adversities and later-life independence. For example, compared to men, women often face unequal

access to education, sex discrimination in the labour market, and undervalued contributions to caregiving and household work (Hu and Wei, 2022). Therefore, women may have fewer resources to cope with the adverse impacts of life shocks on physical and mental health. As a result, the relationship between early-life adverse experience and social care needs might be stronger amongst women compared to men.

9.8 Conclusions

To bring this thesis to a conclusion, the key findings of this study provide comprehensive, up-to-date insights into the social care needs and unmet needs of the older Chinese population in two aspects. First, while previous studies have focused on examining social care needs and unmet needs using cross-sectional analyses and without employing a temporal dimension(Zhu, 2015, Fu et al., 2017, Zeng et al., 2020, Yang and Tan, 2021), this thesis specifically focused on the dynamic patterns capturing the possible changes in social care needs and unmet needs for ADLs and IADLs over time. Second, the relationship between early-life adverse experiences and social care needs and unmet needs in later life has been a critically overlooked avenue of research (Hu, 2021). In order to address this gap, this study explored the underlying predictors of social care needs, unmet needs, and their dynamic dimensions through the lens of the life-course perspective. The findings of this study provide clear and actionable evidence for policymakers and other stakeholders to improve social care for older Chinese people and work towards buffering the far-reaching influences of early-life adversities on older age.

Appendix A

Table A.1 The constructions and questions of social care needs based on data from the 2018 CHARLS

Outcome variables			Wave	Type	Code	Questions from the 2018 CHARLS questionnaire
Social care needs for ADLs	Needing help with	dressing	4	binary	db010	DB010 Because of health and memory problems, do you have any difficulty with dressing? Dressing includes taking clothes out from a closet, putting them on, buttoning up, and fastening a belt. 1. No, I don't have any difficulty Skip to DB011 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		bathing	4	binary	db011	DB011 Because of health and memory problems, do you have any difficulty with bathing or showering? 1. No, I don't have any difficulty → Skip to DB012 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		eating	4	binary	db012	DB012 Because of health and memory problems, do you have any difficulty with eating, such as cutting up your food? (Definition: By eating, we mean eating food by oneself when it is ready) 1. No, I don't have any difficulty → Skip to DB013 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
	Needing help with	getting in or out of bed	4	binary	db013	DB013 Do you have any difficulty with getting into or out of bed? 1. No, I don't have any difficulty → Skip to DB014 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		using the toilet	4	binary	db014	DB014 Because of health and memory problems, do you have any difficulties with using the toilet, including getting up and down? 1. No, I don't have any difficulty→ Skip to DB015 2. I have difficulty but can still do it

					3. Yes, I have difficulty and need help 4. I can not do it
Social care needs for ADLs		controlling urination and defecation	4	binary	db015	DB015 Because of health and memory problems, do you have any difficulties with controlling urination and defecation? If you use a catheter (conduit) or a pouch by yourself, then you are not considered to have difficulties. 1. No, I don't have any difficulty 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
	Needing help with at least one ADL		4	binary		As long as respondents report needing help (option 3 or 4) with one of above six ADL tasks, they will be identified as needing help with at least one ADL and report social care needs for ADLs
	The number of ADL tasks with which respondents needing help		4	count		The total number of ADL tasks with which respondents report needing help
Social care needs for IADLs	Needing help with	doing housework	4	binary	db016	DB016 Because of health and memory problems, do you have any difficulties with doing household chores? (Definition: By doing household chores, we mean house cleaning, doing dishes, making the bed, and arranging the house) [IWER: If R cannot mop the floor, but can scrub, or R cannot fold heavy bedding, but is able to do light ones, then mark (3). 1. No, I don't have any difficulty → skip to DB017 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
	Needing help with	cooking	4	binary	db017	DB017 Because of health and memory problems, do you have any difficulties with preparing hot meals? (Definition: By preparing hot meals, we mean preparing ingredients, cooking, and serving food) [IWER: If another person prepares ingredients or if R can cook rice, but is not able to prepare side dishes, then mark (3), 1. No, I don't have any difficulty → skip to 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		shopping for groceries	4	binary	db018	DB018 Because of health and memory problems, do you have any difficulties with shopping for groceries? By shopping, we mean deciding what to buy and paying for it.

						1. No, I don't have any difficulty → skip to DB035 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		making phone calls	4	binary	db035	DB035 Because of health and memory problems, do you have any difficulties with making phone calls? 1. No, I don't have any difficulty → skip to DB020 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it 5. Not relevant to me (no phone) → skip to DB020
social care needs for IADLs	Needing help with	taking medications	4	binary	db020	DB020 Because of health and memory problems, do you have any difficulties with taking medications? By taking medications, we mean taking the right portion of medication right on time. 1. No, I don't have any difficulty→ skip to DB019 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
		managing money	4	binary	db019	DB019 Because of health and memory problems, do you have any difficulties with managing your money, such as paying your bills, keeping track of expenses, or managing assets? 1. No, I don't have any difficulty → skip DB019_W2 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it
	needing help with at least one IADL		4	binary		As long as respondents report needing help (option 3 or 4) with one of above six IADL tasks, they will be identified as needing help with at least one IADL and report social care needs for ADLs
	the number of IADL tasks with which older respondents report needing help		4	count		The total number of IADL tasks with which respondents report needing help

Sources: Author's work based the 2018 CHARLS questionnaire.

Table A.2 The constructions and questions of unmet needs based on data from the 2018 CHARLS

Outcome variables			Wave	Type	Code	Questions from the 2018 CHARLS questionnaire
Unmet needs for ADLs	Unmet needs for	Dressing	4	binary	db010 db010_w2	DB010 Because of health and memory problems, do you have any difficulty with dressing? Dressing includes taking clothes out from a closet, putting them on, buttoning up, and fastening a belt. 1. No, I don't have any difficulty→ Skip to 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB010_W2 Does anyone ever help you dress? 1. Yes 2. No
		bathing	4	binary	db011 db011_w2	DB011 Because of health and memory problems, do you have any difficulty with bathing or showering? 1. No, I don't have any difficulty→ Skip to DB012 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB011_W2 Does anyone ever help you bathe? 1. Yes 2. No
		eating	4	binary	db012 db012_w2	DB012 Because of health and memory problems, do you have any difficulty with eating, such as cutting up your food? (Definition: By eating, we mean eating food by oneself when it is ready) 1. No, I don't have any difficulty→ Skip to DB013 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB012_W2 Does anyone ever help you eat? 1. Yes

						2. No
Unmet needs for ADLs	Unmet needs for	getting in or out of bed	4	binary	db013 db013_w2	DB013 Do you have any difficulty with getting into or out of bed? 1. No, I don't have any difficulty → Skip to DB014 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB013_W2 Does anyone ever help you get in or out of bed? 1. Yes 2. No
	Unmet needs for	using the toilet	4	binary	db014 db014_w2	DB014 Because of health and memory problems, do you have any difficulties with using the toilet, including getting up and down? 1. No, I don't have any difficulty → Skip to DB015 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB014_W2 Does anyone ever help you use the toilet? 1. Yes 2. No
	Unmet needs for ADLs		4	binary		As long as respondents report not receiving any assistance with the task with which of ADLs they report needing help, they will be identified as having unmet needs for ADLs.
	the number of unmet needs for ADLs		4	count		The total number of ADL tasks for which respondents report unmet needs for
Unmet needs for IADLs	unmet needs for	doing housework	4	binary	db016 db016_w2	DB016 Because of health and memory problems, do you have any difficulties with doing household chores? (Definition: By doing household chores, we mean house cleaning, doing dishes, making the bed, and arranging the house) [IWER: If R cannot mop the floor, but can scrub, or R cannot fold heavy bedding, but is able to do light ones, then mark (3). 1. No, I don't have any difficulty → skip to DB017 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it

Unmet needs for IADLs	unmet needs for					DB016_W2 Does anyone help you do household chores? 1. Yes 2. No
		cooking	4	binary	db017 db017_w2	DB017 Because of health and memory problems, do you have any difficulties with preparing hot meals? (Definition: By preparing hot meals, we mean preparing ingredients, cooking,and serving food) [IWER: If another person prepares ingredients or if R can cook rice, but is not able to prepare side dishes, then mark (3). 1. No, I don't have any difficulty → skip to DB018 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB017_W2 Does anyone help you prepare hot meals? 1. Yes 2. No
		shopping for groceries	4	binary	db018 db018_w2	DB018 Because of health and memory problems, do you have any difficulties with shopping for groceries? By shopping, we mean deciding what to buy and paying for it. 1. No, I don't have any difficulty → skip to DB035 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB018_W2 Does anyone help you shop for groceries? 1. Yes 2. No
		making phone calls	4	binary	db035 db035_w2	DB035 Because of health and memory problems, do you have any difficulties with making phone calls? 1. No, I don't have any difficulty → skip to DB020 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it 5. Not relevant to me (no phone) → skip to DB020

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Unmet needs for IADLs	unmet needs for	taking medications	4	binary	db020 db020_w2	DB020 Because of health and memory problems, do you have any difficulties with taking medications? By taking medications, we mean taking the right portion of medication right on time. 1. No, I don't have any difficulty → skip to DB019 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB020_W2 Does anyone help you take medications? 1. Yes 2. No
						DB035_W2 Does anyone help you make telephone calls? 1. Yes 2. No
		managing money	4	binary	db019 db019_w2	DB019 Because of health and memory problems, do you have any difficulties with managing your money, such as paying your bills, keeping track of expenses, or managing assets? 1. No, I don't have any difficulty→ skip DB019_W2 2. I have difficulty but can still do it 3. Yes, I have difficulty and need help 4. I can not do it DB019_W2 Does anyone help you manage your money? 1. Yes 2. No
	unmet needs for IADLs		4	binary		As long as respondents report not receiving any assistance with the task with which of ADLs they report needing help, they will be identified as having unmet needs for ADLs.
	the nunmber of unmet needs for IADLs		4	count		The total number of ADL tasks for which respondents report unmet needs for

Sources: Author's work based the 2018 CHARLS questionnaire.

Table A.3 The construction of dynamic social care needs and unmet needs based on the 2015 and 2018 CHARLS

Outcome variables		Type	Details	Code	Dataset
Dynamic social care needs and unmet needs for ADLs	No longer having social care needs for ADLs	binary	Needing help with at least one task of ADLs in Wave 3 and no longer needing any help with any ADLs in Wave 4	Wave 3 (db010 db011 db012 db013 db014 db015) Wave 4 (db010 db011 db012 db013 db014 db015)	Waves 3, 4 and the harmonised CHARLS
	Repeated met needs for ADLs	binary	Needing help with at least one ADLs at Waves 3 and 4. Receiving support for each task of ADL with which respondents report needing help at Waves 3 and 4 (targeted help) and no unmet needs for ADLs at Waves 3 and 4.	Wave 3 (db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2) Wave 4 ((db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2)	Waves 3, 4 and the harmonised CHARLS
	Newly arisen unmet needs for ADLs	binary	Needing help with at least one ADLs at Waves 3 and 4. Receiving targeted help at Wave 3 and reporting unmet needs at Wave 4.	Wave 3 (db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2) Wave 4 ((db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2)	Waves 3, 4 and the harmonised CHARLS
	Newly arisen met needs for ADLs	binary	Needing help with at least one ADLs at Waves 3 and 4. Reporting unmet needs for ADLs at	Wave 3 (db010 db010_w2 db011 db011_w2	Waves 3, 4 and the harmonised CHARLS

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			Wave 3 and receiving targeted help at Wave 4	db012 db012_w2 db013 db013_w2 db014 db014_w2) Wave 4 ((db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2)	
	Repeated unmet needs for ADLs	binary	Needing help with at least one ADLs at Waves 3 and 4. Reporting unmet needs for ADLs at both Waves 3 and 4	Wave 3 (db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2) Wave 4 ((db010 db010_w2 db011 db011_w2 db012 db012_w2 db013 db013_w2 db014 db014_w2)	Waves 3, 4 and the harmonised CHARLS
Dynamic social care needs and unmet needs for IADLs	No longer having social care needs for IADLs	binary	Needing help with at least one task of IADLs in Wave 3 and no longer needing any help with any IADLs in Wave 4	W3 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2) W4 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2)	Waves 3, 4 and the harmonised CHARLS
	Repeated met needs for IADLs	binary	Needing help with at least one IADLs at Waves 3 and 4. Receiving support for each task of IADL with which respondents	W3 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2	Waves 3, 4 and the harmonised CHARLS

			report needing help at Waves 3 and 4 (targeted help) and no unmet needs for IADLs at Waves 3 and 4.	db020 db020_w2 db035 db035_w2) W4 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2)	
Newly arisen unmet needs for IADLs	binary		Needing help with at least one IADLs at Waves 3 and 4. Receiving targeted help at Wave 3 and reporting unmet needs at Wave 4.	W3 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2) W4 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2)	Waves 3, 4 and the harmonised CHARLS
Newly arisen met needs for IADLs	binary		Needing help with at least one IADLs at Waves 3 and 4. Reporting unmet needs for IADLs at Wave 3 and receiving targeted help at Wave 4	W3 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2) W4 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2 db035 db035_w2)	Waves 3, 4 and the harmonised CHARLS
Repeated unmet needs for IADLs	binary		Needing help with at least one IADLs at Waves 3 and 4. Reporting unmet needs for IADLs at both Waves 3 and 4	W3 (db016 db016_w2 db017 db017_w2 db018 db018_w2 db019 db019_w2 db020 db020_w2	Waves 3, 4 and the harmonised CHARLS

| | | | | db035 db035_w2)
W4 (db016 db016_w2
db017 db017_w2
db018 db018_w2
db019 db019_w2
db020 db020_w2
db035 db035_w2) | |

Sources: Author's work based the 2015 and 2018 CHARLS dataset.

Appendix B

Table B.1 The composition of independent variables used in analysis of the first set of research questions

Independent variables		Type	Category Details	Code	Dataset
Predisposing factors					
Age	age groups	categorical	60-69/70-79/80+	r4agey	The harmonised CHARLS
Gender		binary	male/ female	ragender	The harmonised CHARLS
Ethnicity		binary	Han/ other	bg001_w4	Wave 4 of the CHARLS
Marital status	marital status	categorical	married (partnered)/ widowed/ separated divorced and never married	r4mstat	The harmonised CHARLS
	whether being married or not	binary	married (partnered)/ unmarried	r4mstat	The harmonised CHARLS
Education	Whether respondents having finished primary school	categorical	yes/no	raeducl	The harmonised CHARLS
	whether being illiterate	binary	yes/no	raeduc_c	The harmonised CHARLS
Smoking	smoking frequency	categorical	never smoking/ former smoking/ currently smoking	r4smokev r4smoken	The harmonised CHARLS
Drinking	daily alcohol consumption	categorical	None/Less than once per day/ Once per day/ Twice per day /More than twice per day	r4drinkr_c	The harmonised CHARLS
	whether drinking or not	binary	none/ have some alcohol drinks	r4drinkr_c	The harmonised CHARLS
Physical activities	whether doing physical activities regularly	binary	yes/no	r4ltact_c r4mdact_c r4vgact_c	The harmonised CHARLS
Enabling factors					
Hukou status		binary	urban/ rural	r4rural2	The harmonised CHARLS

Residential areas		binary	urban/ rural	h4rural	The harmonised CHARLS
Living arrangements		binary	living alone/ living with others	h4hhres	The harmonised CHARLS
The number of living children		categorical	none / one/ at least two	h4child	The harmonised CHARLS
Earned income		Continuous	ln (income+1)	r4itearn	The harmonised CHARLS
Healthcare insurance	different types of healthcare	categorical	none/ public/ other/ mixed types of insurances	r4higov r4hipriv r4hiothp	The harmonised CHARLS
	whether being covered by healthcare insurance	binary	yes/no	r4higov r4hipriv r4hiothp	The harmonised CHARLS
Need factors					
Cognition impairment	whether being diagnosed with a memory-related problem	binary	yes/no	r4memrye	The harmonised CHARLS
Chronic diseases	co-morbidity	binary	yes/no	r4hibpe r4diabe r4cancre r4lunge r4hearte r4stroke r4psyche r4arthre r4dyslipe r4livere r4kidneye r4digeste r4asthmae	The harmonised CHARLS
	The number of chronic diseases	categorical	none/ one or two/ at least three	r4hibpe r4diabe r4cancre r4lunge r4hearte r4stroke r4psyche r4arthre r4dyslipe r4livere r4kidneye r4digeste r4asthmae	The harmonised CHARLS
ADLs limitations	number of limitations	categorical	none/ one or two/ at least three	r4adlab_c	The harmonised CHARLS
	whether having limitations	binary	yes/no	r4adlab_c	The harmonised CHARLS
IADLs limitations	number of limitations	categorical	none/ one or two/ at least three	r4moneya r4medsa r4shopa r4mealsa r4housewka r4phonea	The harmonised CHARLS

	whether having limitations	binary	yes/no	r4moneya r4medsa r4shopa r4mealsa r4housewka r4phonea	The harmonised CHARLS
	Impacts from early life				
Whether having experienced hunger prior to the age of 17		binary	yes/no	c3_a	The Life History Survey in 2014
The number of episodes whether an older adult experienced prior to the age of 17		categorical	0/ 1/ 2 /3	c3_bs1 c3_bs2 c3_bs3	The Life History Survey in 2014

Sources: Author's work based the 2014 Life History Survey, the 2018 and the harmonised CHARLSs dataset.

Table B.2 The composition of independent variables used in analysis of the second set of research questions

Independent variables		Type	Details	Original indicator	Dataset
Predisposing factors					
Age	age groups in wave 3	categorical	60-69/70-79/80+	r3agey	The harmonised CHARLS
Gender		binary	male/ female	ragender	The harmonised CHARLS
Ethnicity		binary	Han/ other	bg001_w4	The follow-up survey in 2018
Marital status	marital status in wave 3	categorical	married (partnered)/ widowed/ separated divorced and never married	r3mstat	The harmonised CHARLS
	marital status in wave 3	binary	married (partnered)/ unmarried	r3mstat	The harmonised CHARLS
Education	Whether respondents having finished primary school	binary	yes/no	raeducl	The harmonised CHARLS
	whether being illiterate	binary	yes/no	raeduc_c	The harmonised CHARLS
Smoking		categorical	never smoking/ former smoking/ currently smoking	r3smokev r3moken	The harmonised CHARLS
Whether having some alcoholic drinks daily		binary	none/ have some alcohol drinks	r3drinkr_c	The harmonised CHARLS
Enabling factors					
Hukou		binary	urban/ rural	r3rural2	The harmonised CHARLS
Residential areas		binary	urban/ rural	h3rural	The harmonised CHARLS
Living arrangements		binary	living alone/ living with others	h3hhres	The harmonised

					CHARLS	
Number of living children		binary	none or one /at least two	h3child	The CHARLS	harmonised
Earned income		continuous	ln (income+1)	r3itearn	The CHARLS	harmonised
Healthcare	whether being covered by healthcare insurance	binary	yes/no	r3higov r3hipriv r3hiothp	The CHARLS	harmonised
Need factors						
Chronic diseases	number of chronic diseases	Categorical	no/ one or two/ at least three	r3hibpe r3diabe r3cancre r3lunge r3hearte r3stroke r3psyche r3arthre r3dyslipe r3livere r3kidneye r3digeste r3asthmae	The CHARLS	harmonised
Cognition	whether being diagnosed with a memory-related problem un wave 3	binary	yes/no	r3memrye	The CHARLS	harmonised
ADLs limitations	number of limitations	categorical	no/one or two/ more than three	r3adlab_c	The CHARLS	harmonised
	whether having limitations	binary	yes/no	r3adlab_c	The CHARLS	harmonised
	Changes in limitations		same status/ improved status/ deteriorated status	r3adlab_c r4adlab_c	The CHARLS	harmonised
IADLs limitations	number of limitations	categorical	no/one or two/ more than three	r3moneya r3medsa r3shopa r3mealsa r3housewka r3phonea	The CHARLS	harmonised

				r3moneya r3medsa	
whether having limitations	binary	yes/no	r3shopa r3mealsa r3housewka r3phonea	The harmonised CHARLS
Changes in limitations		same status/ improved status/ deteriorated status	r3moneya r3medsa r3shopa r3mealsa r3housewka r3phonea r4moneya r4medsa r4shopa r4mealsa r4housewka r4phonea	The harmonised CHARLS
Impacts from early life				
Whether having experienced hunger prior the age of 17	binary	yes/no	c3_a	The life history survey in 2014
Number of episodes reported having experienced hunger prior the age of 17	categorical	0/ 1/ 2 /3	c3_bs1 c3_bs2 c3_bs3	The life history survey in 2014

Sources: Author's work based the 2014 Life History Survey, the 2015, 2018 and the harmonised CHARLSs dataset

Appendix C

Table C.1 Predictors of needing help with at least one ADL using logistic regression models (N=8,527)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.178	1.404**	0.943	1.19	1.113
80+	1.905***	2.333***	1.577*	1.752***	2.551**
Gender					
male (ref)					
female	0.92			0.945	0.919
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.475**	1.313	1.837**	1.427*	1.795
Marital status					
not married (ref)					
married	0.764*	0.728*	0.843	0.732*	1.016
Illiterate					
no (ref)					
yes	0.815*	0.778*	0.908	0.793*	0.958
Smoking					
having never smoked (ref)					
former smokers	1.587***	1.309	2.013***	1.611**	1.445
currently smoking	0.874	0.709	1.049	0.857	1.004
Daily alcoholic drink consumptions					
no (ref)					
yes	0.812	0.629*	0.926	0.780*	0.982
Weekly physical activities					
no (ref)					
yes	0.334***	0.395***	0.269***	0.347***	0.264***
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.067	1.243	0.914		
Living arrangements					
living alone (ref)					
living with others	1.215	1.13	1.499	1.264	1.024
The number of living children					
no or one living child (ref)					
at least two living children	1.034	0.971	1.066	0.821	1.639
Earned income	0.947*	0.904*	0.968	0.933*	0.995
Health insurance					
none (ref)					
public or other type of health insurance	0.834	0.871	0.762	0.84	0.829
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	2.067***	2.113***	2.064***	2.227***	1.598
Number of chronic diseases					
none (ref)					
one or two chronic diseases	2.007**	2.703**	1.582	1.707*	9.137*
at least three chronic diseases	3.124***	4.502***	2.341**	2.743***	12.19*

Number of IADL limitations					
none (ref)					
at least one IADL limitation	11.60***	7.392***	20.17***	10.64***	15.47***
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	1.024	0.966	1.114	1.005	1.148
N	8527	4299	4228	6560	1967

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④Binary experience of hunger is employed.

Table C.2Predictors of needing help with each ADL using logistic regression models (N=8,527)

	Eating	Dressing	Bathing	Using the toilet	Controlling urination and defecation	Getting in or out of bed
	(1)	(2)	(3)	(4)	(5)	(6)
Predisposing factors						
Age						
60–69 (ref)						
70–79	1.287	1.082	1.098	1.192	1.442	0.938
80+	2.682**	1.498	2.028***	1.866**	2.321**	1.552
Gender						
male (ref)						
female	0.584	0.567**	0.751	0.765	0.73	0.715
Ethnicity						
Han ethnicity (ref)						
ethnic minorities	1.727	1.252	1.494*	1.38	1.318	1.872*
Marital status						
not married (ref)						
married	0.747	0.88	0.651**	0.988	0.714	0.561*
Illiterate						
no (ref)						
yes	1.087	0.869	0.808	0.896	0.857	1.084
Smoking						
having never smoked (ref)						
former smokers	1.942*	1.212	1.604**	1.373	1.546	1.421
currently smoking	0.632	0.637	0.78	0.704	0.966	0.476*
Daily alcoholic drinks consumption						
no (ref)						
yes	0.787	0.984	0.716*	0.663*	0.877	0.932
Weekly physical activities						
no (ref)						
yes	0.138***	0.243***	0.265***	0.241***	0.243***	0.162***
Enabling factors						
Hukou Status						
urban hukou (ref)						
rural hukou	1.346	0.974	1.058	1.05	1.466	1.019
Living arrangements						
living alone (ref)						
living with others	1.459	1.446	1.693**	0.871	1.492	1.668
The number of living children						
no or one living child (ref)						
at least two living children	0.516	0.843	0.831	1.009	1.006	0.826
Earned income	0.976	0.903	0.925*	0.955	0.946	0.782*
Health insurance						
none (ref)						
public or other type of health insurance	0.873	0.997	0.799	0.832	0.842	0.818
Need factors						
Diagnosed with a memory-related disease						
none (ref)						
a memory-related disease	4.391***	2.723***	2.310***	1.966***	3.041***	3.068***
Number of chronic diseases						
none (ref)						
one or two chronic diseases	2.612	1.911	1.798*	1.634	1.522	2.044

at least three chronic diseases	2.508	2.202*	2.435***	2.457**	2.19	2.832*
Number of IADL limitations						
none (ref)						
at least one IADL limitation	35.38***	28.09***	21.04***	8.502***	11.71***	30.06***
Early-life factors						
Having experienced hunger prior to the age of 17						
no (ref)						
yes	0.783	0.952	0.814	1.151	1.077	0.81
N	8527	8527	8527	8527	8527	8527

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④ Binary experience of hunger is employed.

Table C.3 Predictors of the number of ADL tasks reported needing help with (ranging from 1-6) using Poisson regression models (N=752)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.033	1.045	1.019	1.044	0.926
80+	1.129	1.263	1.018	1.109	1.153
Gender					
male (ref)					
female	0.823*			0.824*	0.771
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	0.823*			0.824*	0.771
Marital status					
not married (ref)					
married	0.966	1.038	0.904	0.916	1.378
Illiterate					
no (ref)					
yes	1.049	1.029	1.072	1.061	0.956
Smoking					
having never smoked (ref)					
former smokers	0.996	1.014	0.999	1.014	0.825
currently smoking	0.855	0.811	0.865	0.886	0.647
Daily alcoholic drink consumptions					
no (ref)					
yes	0.951	1.009	0.928	0.994	0.765
Weekly physical activities					
no (ref)					
yes	0.633***	0.628***	0.641***	0.639***	0.578***
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.038	0.994	1.065		
Living arrangements					
living alone (ref)					
living with others	1.049	0.996	1.148	1.125	0.716
The number of living children					
no or one living child (ref)					
at least two living children	0.921	0.925	0.931	0.86	1.21
Earned income	0.968	0.957	0.968	0.973	0.938
Health insurance					
none (ref)					
public or other type of health insurance	0.978	0.944	1.091	0.965	1.199
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	1.326***	1.251*	1.401***	1.383***	1.094
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.088	1.396	0.986	1.052	2.411
at least three chronic diseases	1.034	1.341	0.908	1.038	1.785
Number of IADL limitations					
none (ref)					
at least one IADL limitation	1.505***	1.475**	1.541*	1.479**	1.753*
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	0.953	0.97	0.929	0.984	0.904

N		752	419	333	606	146

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④ Binary experience of hunger is employed.

Table C.4 The predictors of reporting needing help with at least one IADL using logistic regression models (N=8,527)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.535***	1.642***	1.392**	1.482***	1.867***
80+	2.250***	2.203***	2.308***	2.247***	2.328***
Gender					
male (ref)					
female	1.112			1.113	1.137
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.044	1.075	0.99	1.008	1.174
Marital status					
not married (ref)					
married	0.779**	0.713**	0.998	0.713**	1.274
Illiterate					
no (ref)					
yes	2.285***	2.179***	2.463***	2.248***	2.481***
Smoking					
having never smoked (ref)					
former smokers	1.06	1.349	1.073	1.013	1.269
currently smoking	1.176	0.794	1.405**	1.142	1.38
Daily alcoholic drink consumptions					
no (ref)					
yes	0.673***	0.824	0.586***	0.701***	0.545***
Weekly physical activities					
no (ref)					
yes	0.468***	0.501***	0.421***	0.523***	0.260***
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.781***	1.958***	1.621***		
Living arrangements					
living alone (ref)					
living with others	1.848***	1.972***	1.538	1.961***	1.266
The number of living children					
no or one living child (ref)					
at least two living children	1.101	1.161	1.013	1.15	0.918
Earned income	0.936***	0.948**	0.929***	0.923***	1.006
Health insurance					
none (ref)					
public or other type of health insurance	0.986	1.175	0.725	0.979	0.682
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	2.610***	2.418***	2.783***	2.244***	3.840***
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.266*	1.191	1.387*	1.219	1.912
at least three chronic diseases	1.731***	1.696***	1.816***	1.683***	2.539**
Number of ADL limitations					
none (ref)					
at least one ADL limitation	5.178***	4.017***	7.414***	4.734***	7.975***
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	0.998	0.951	1.062	1.052	0.849

| N | 8527 | 4299 | 4228 | 6560 | 1967 |

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④ Binary experience of hunger is employed.

Table C.5 Predictors of reporting needing help with each IADL using logistical regression models (N=8,527)

	Cooking (1)	Doing housework (2)	Taking medicine (3)	Managing money (4)	Shopping for groceries (5)	Making phone calls (6)
Predisposing factors						
Age						
60–69 (ref)						
70–79	1.507***	1.327**	1.227	0.982	1.597***	1.875***
80+	3.332***	2.613***	2.158***	1.717***	3.389***	2.211***
Gender						
male (ref)						
female	0.589***	0.714**	0.741	1.093	1.3	1.119
Ethnicity						
Han ethnicity (ref)						
ethnic minorities	0.589***	0.714**	0.741	1.093	1.3	1.119
Marital status						
not married (ref)						
married	0.618***	0.623***	1.086	1.029	0.886	0.891
Illiterate						
no (ref)						
yes	1.004	0.944	2.254***	1.942***	1.553***	3.313***
Smoking						
having never smoked (ref)						
former smokers	1.330*	1.319*	1.013	1.067	1.175	0.856
currently smoking	1.231	1.07	0.596*	1.101	0.971	1.029
Daily alcoholic drinks consumption						
no (ref)						
yes	0.590***	0.535***	0.581**	0.599***	0.480***	0.811*
Weekly physical activities						
no (ref)						
yes	0.270***	0.261***	0.429***	0.500***	0.271***	0.672***
Enabling factors						
Hukou Status						
urban hukou (ref)						
rural hukou	1.143	1.078	1.181	1.474***	1.429**	2.481***
Living arrangements						
living alone (ref)						
living with others	4.236***	2.351***	1.746*	2.127***	2.107***	1.563**
The number of living children						
no or one living child (ref)						
at least two living children	0.887	0.9	0.985	1.051	0.933	1.116
Earned income	0.927**	0.886***	0.984	0.918***	0.902***	0.951**
Health insurance						
none (ref)						
public or other type of health insurance	0.966	1.298	1.087	1.179	0.905	1.256
Need factors						
Diagnosed with a memory-related disease						
none (ref)						
a memory-related disease	2.553***	2.342***	4.055***	2.882***	2.836***	3.181***
Number of chronic diseases						
none (ref)						
one or two chronic diseases	1.612*	2.066***	1.585	1.168	1.187	1.310*
at least three chronic diseases	2.258***	3.211***	1.970*	1.588**	1.615*	1.263
Number of ADL limitations						
none (ref)						
at least one ADL limitation	8.328***	8.405***	5.424***	4.109***	6.436***	2.548***
Early-life factors						

Having experienced hunger prior to the age of 17						
no (ref)						
yes	0.819	0.908	0.849	1.155	0.914	0.896
N	8527	8527	8527	8527	8527	8527

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④Binary experience of hunger is employed.

Table C.6 Predictors of the number of IADL tasks reported needing help with (ranging from 1-6) using Poisson regression models (N=2,161)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	1.074*	1.098*	1.036	1.065	1.135
80+	1.312***	1.417***	1.205**	1.300***	1.395**
Gender					
male (ref)					
female	0.948			0.932	1.046
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	0.997	0.988	1.004	1.023	0.857
Marital status					
not married (ref)					
married	0.986	1.015	0.946	0.993	0.972
Illiterate					
no (ref)					
yes	1.029	0.994	1.102	1.026	1.041
Smoking					
having never smoked (ref)					
former smokers	1.064	1.059	1.011	1.067	1.039
currently smoking	0.97	1.053	0.902	0.964	0.989
Daily alcoholic drinks consumption					
no (ref)					
yes	0.863***	0.853*	0.858**	0.861***	0.903
Weekly physical activities					
no (ref)					
yes	0.771***	0.773***	0.783***	0.766***	0.780**
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.978	0.95	1.01		
Living arrangements					
living alone (ref)					
living with others	1.317***	1.298***	1.366**	1.311***	1.346*
The number of living children					
no or one living child (ref)					
at least two living children	0.929	0.906	0.967	0.881	1.055
Earned income	0.984	0.977	0.989	0.985	0.978
Health insurance					
none (ref)					
public or other type of health insurance	1.071	1.055	1.115	1.09	1.071
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	1.284***	1.321***	1.245***	1.311***	1.217*
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.099	1.139	1.061	1.081	1.354
at least three chronic diseases	1.137	1.235*	1.02	1.134	1.279
Number of ADL limitations					
none (ref)					
one or two ADLs limitations	1.257***	1.183***	1.385***	1.246***	1.321**
at least three ADLs limitations	1.722***	1.600***	1.938***	1.712***	1.779***
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					

yes	0.952	0.97	0.921	0.934	1.015
N	2161	1320	841	1848	313

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1).④ Binary experience of hunger is employed.

Appendix D

Table D.1 Predictors of unmet needs for ADLs using logistic regression models (N=752)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.958	0.901	1.11	0.91	1.47
80+	0.872	0.825	0.953	0.822	1.114
Gender					
male (ref)					
female	0.987			1.054	0.965
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.183	1.119	1.142	1.341	0.621
Marital status					
not married (ref)					
married	1.269	1.592	0.85	1.276	1.789
Illiterate					
no (ref)					
yes	0.933	0.989	0.676	0.897	1.051
Smoking					
having never smoked (ref)					
former smokers	0.872	0.983	1.18	0.886	1.13
currently smoking	1.248	0.843	1.854	1.159	2.201
Daily alcoholic drinks consumption					
no (ref)					
yes	0.654	0.632	0.661	0.728	0.453
whether having exercise every week					
no (ref)					
yes	1.307	1.096	1.281		
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.307	1.096	1.281		
Living arrangements					
living with others (ref)					
living alone	0.306***	0.371**	0.260*	0.291***	0.334
The number of living children					
no or one living child (ref)					
at least two living children	1.039	4.106*	0.585	0.831	2.086
Earned income	1.019	1.049	1.008	1.046	0.937
Health insurance					
none (ref)					
public or other type of health insurance	0.848	0.71	1.318	1.014	0.221
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.506*	0.292**	0.742	0.535*	0.433
Number of chronic diseases					
none or one chronic disease (ref)					
at least two chronic diseases	0.83	0.928	0.737	0.876	0.524
Number of IADL limitations					
none (ref)					
at least one IADLs limitations	0.584*	0.591	0.618	0.732	0.250*
Early-life factors					

Having experienced hunger prior to the age of 17					
no (ref)					
yes	1.389	1.883[*]	0.969	1.548	1.026
N	752	419	333	606	146

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Earned income is computed as log(income+1). ④Binary experience of hunger is employed here.

Table D.2 Predictors of reporting unmet needs for IADLs using logistic regression models (N=2,161)

	Whole (1)	Female (2)	Male (3)	Rural (4)	Urban (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.95	1.077	0.762	0.927	1.079
80+	0.786	0.949	0.602*	0.836	0.49
Gender					
male (ref)					
female	0.847			0.868	0.75
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.073	0.898	1.312	1.114	1.157
Marital status					
not married (ref)					
married	0.791	0.854	0.708	0.801	0.546
Illiterate					
no (ref)					
yes	0.956	0.789	1.33	0.857	2.549**
Smoking					
having never smoked (ref)					
former smokers	1.007	0.997	0.874	1.027	1
currently smoking	1.112	1.494	0.891	1.133	0.894
Daily alcoholic drinks consumption					
no (ref)					
yes	0.962	0.979	0.972	0.952	0.972
whether having exercise every week					
no (ref)					
yes	1.133	0.979	1.424	1.012	2.586**
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	1.137	1.139	1.178		
Living arrangements					
living with others (ref)					
living alone	0.396***	0.411***	0.347**	0.344***	1.037
The number of living children					
no or one living child (ref)					
at least two living children	1.627*	1.491	1.910*	1.968**	0.806
Earned income	1.014	1.048	0.99	1.018	1
Health insurance					
none (ref)					
public or other type of health insurance	1.093	0.842	1.863	1.225	0.533
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.797	0.643	0.968	0.696	1.128
Number of chronic diseases					
none or one chronic disease (ref)					
at least two chronic diseases	0.996	1.005	0.952	0.976	1.442
Number of ADL limitations					
none (ref)					
at least one ADLs limitations	1.159	1.092	1.29	1.183	1.211
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	1.205	1.284	1.082	1.295	0.755

N		2161	1320	841	1848	313

Source: Author's analysis of the Life History Survey (2014), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Earned income is computed as log(income+1). ④ Binary experience of hunger is employed.

Appendix E

Table E.1 Predictors of each pattern of the dynamic social care needs and unmet needs for ADLs using logistic regression models (N=384)

	No longer having social care needs for ADLs (1)	Repeated met needs for ADLs (2)	Newly arisen met needs for ADLs (3)	Repeated unmet needs for ADLs (4)
Predisposing factors				
Age				
60–69 (ref)				
70–79	0.961	1.306	1.035	0.843
80+	1.53	0.607	2.594	0.391
Gender				
male (ref)				
female	1.061	0.532	2.296	1.816
Ethnicity				
Han ethnicity (ref)				
ethnic minorities	0.597	1.835	0.867	1.095
Marital status				
married (ref)				
not married	0.739	1.249	0.524	3.337[*]
Illiterate				
no (ref)				
yes	1.192	0.655	1.037	1.108
Smoking				
having never smoked (ref)				
former smokers	0.88	0.728	1.319	2.668
currently smoking	0.988	0.598	1.033	2.836
Daily alcoholic drinks consumption				
no (ref)				
yes	1.756	0.626	1.07	0.676
Enabling factors				
Hukou Status				
urban hukou (ref)				

rural hukou	1.486	0.67	1.326	1.433
Living arrangements				
living with others (ref)				
living alone	3.303	0.236	0.438	0.899
The number of living children	1.397	0.625	0.665	1.188
Earned income	0.905	0.896	1.183*	1.104
Health insurance				
none (ref)				
public or other type of health insurance	0.745	1.157	0.554	2.972
Need factors				
Diagnosed with a memory-related disease				
none (ref)				
a memory-related disease	0.641	1.912	1.796	0.254
Number of chronic diseases				
none (ref)				
one or two chronic diseases	0.84	1.617	0.802	0.601
at least three chronic diseases	0.626	2.678	0.648	0.926
Changes in ADL limitations from Wave 3 to 4				
same or improved status (ref)				
deteriorated status	0.378**	1.451	2.231	1.532
Number of IADL limitations				
none (ref)				
one or two IADL limitations	0.186***	7.903***	4.064	0.802
at least three IADL limitations	0.125***	9.979***	3.638	0.938
Changes in IADL Limitations from Wave 3 to 4				
same or improved status (ref)				
deteriorated status	0.497*	1.59	1.599	1.98
Early-life factors				
Having experienced hunger prior to the age of 17				
no (ref)				
yes	1.954*	0.472*	2.018	0.778
N	384	384	384	384

Source: Author's analysis of the Life History Survey (2014), Wave 3 (2015), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables are measured using data from the Wave 3 of CHARLS.; the experiences of hunger before the age of 17 are measured using data from the 2014 Life History Survey of CHARLS; time-variant variables are measured using data from Wave 3 and 4 of CHARLS. ④Earned income and the number of living children are continuous variables and earned income is the log(income)
⑤Binary experience of hunger is employed.

Table E.2 The predictors of each pattern of the dynamic social care needs and unmet needs for IADLs using logistic regression models (N=1,258)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.851	0.98	0.966	1.174	1.618
80+	0.464*	2.001*	1.148	1.062	1.003
Gender					
male (ref)					
female	1.650*	1.051	0.629	0.579	0.978
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.092	0.806	0.602	1.850*	0.81
Marital status					
married (ref)					
not married	0.85	0.713	1.601	0.851	2.221**
Illiterate					
no (ref)					
yes	0.636**	1.072	0.987	1.649*	1.41
Smoking					
having never smoked (ref)					
former smokers	1.899**	0.9	0.622	0.605	1.02
currently smoking	1.126	0.896	0.812	0.765	1.636
Daily alcoholic drinks consumption					
no (ref)					
yes	0.817	1.129	0.838	1.46	0.822
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.644*	1.096	1.121	1.171	1.738
Living arrangements					
living with others (ref)					
living alone	1.626	0.617	0.336*	0.953	1.872

The number of living children	1.016	0.951	1.068	1.006	1.004
Earned income	1.055	0.946	1	1.021	0.979
Health insurance					
none (ref)					
public or other type of health insurance	0.883	1.175	1.294	0.897	0.783
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.589	1.433	0.4	1.241	1.943
Number of chronic diseases					
none (ref)					
one or two chronic diseases	0.883	1.101	1.507	1.535	0.623
at least three chronic diseases	0.543**	1.459	1.665	1.803	0.71
Number of ADL limitations					
none					
one or two ADL limitation (none)	0.661**	1.162	0.893	1.222	2.064**
at least three ADL limitation	0.307***	1.585*	1.366	1.769*	2.041*
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.456***	1.026	2.686***	1.129	1.236
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0558***	2.999***	2.151***	1.875**	2.068**
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	0.998	0.899	0.867	0.922	2.129*
N	1258	1258	1258	1258	1258

Source: Author's analysis of the Life History Survey (2014), Wave 3 (2015), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Note: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables are measured using data from the Wave 3 of CHARLS; the experiences of hunger before the age of 17 are measured using data from the 2014 Life History Survey of CHARLS; time-variant variables are measured using data from Wave 3 and 4 of CHARLS. ④Earned income and the number of living children are continuous variables and earned income is the log (income). ⑤Binary experience of hunger is employed.

Table E.3 The predictors of each pattern of the dynamic social care needs and unmet needs for IADLs using logistic regression models based on the female subsample (N=824)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	repeated unmet needs for IADLs (5)
Predisposing factors					
Age					
60–69 (ref)					
70–79	0.805	0.869	1.203	1.345	1.7
80+	0.545	1.71	0.439	2.19	1.1
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	1.316	0.619	0.293	2.902**	0.74
Marital status					
married (ref)					
not married	0.784	0.849	1.238	0.851	2.163*
Illiterate					
no (ref)					
yes	0.591**	1.245	0.994	1.395	1.565
Smoking					
having never smoked (ref)					
former smokers	1.454	0.952	1.151	0.311	0.928
currently smoking	1.398	0.835	0.652	0.822	1.096
Daily alcoholic drinks consumption					
no (ref)					
yes	0.628	1.058	1.241	2.256*	0.804
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.758	0.986	1.321	1.178	1.492
Living arrangements					
living with others (ref)					
living alone	1.564	0.907	0.446	0.924	1.079
The number of living children	1.028	0.956	1.119	0.883	1.054
Earned income	1.044	0.94	1.043	0.99	0.999
Health insurance					

none (ref)					
public or other health insurance	0.889	1.357	0.82	0.851	0.865
Need factors					
Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.515	1.726	0.733	1.311	1.279
Number of chronic diseases					
none (ref)					
one or two chronic diseases	0.701	2.265*	1.251	0.847	0.55
at least three chronic diseases	0.419**	3.263***	1.155	1.148	0.72
Number of ADL limitations					
none					
one or two ADL limitation (none)	0.856	0.786	0.881	1.579	2.033*
at least three ADL limitation	0.408***	1.174	1.395	2.655**	1.57
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.588*	0.991	2.481**	1.021	0.999
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0633***	3.652***	2.697***	1.586	1.661
Early-life factors					
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	0.964	0.789	0.892	1.33	1.975
N	824	824	824	824	824

Source: Author's analysis of the Life History Survey (2014), Wave 3 (2015), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables are measured using data from the Wave 3 of CHARLS; the experiences of hunger before the age of 17 are measured using data from the 2014 Life History Survey of CHARLS.; time-variant variables are measured using data from Wave 3 and 4 of CHARLS. ④Earned income and the number of living children are continuous variables and earned income is the log (income). ⑤Binary experience of hunger is employed.

Table E.4 Predictors of each pattern of the dynamics social care needs and unmet needs for IADLs using logistic regression models based on the male subsample (N=434)

	No longer having social care needs for IADLs (1)	Repeated met needs for IADLs (2)	Newly arisen unmet needs for IADLs (3)	Newly arisen met needs for IADLs (4)	Repeated unmet needs for IADLs (5)
Predisposing factors					
60+	0.988	1.028	0.997	0.987	1.03
Ethnicity					
Han ethnicity (ref)					
ethnic minorities	0.865	1.219	1.246	0.668	0.728
Marital status					
married (ref)					
not married	1.087	0.435	4.948**	0.514	1.308
Illiterate					
no (ref)					
yes	0.6	1.019	0.955	2.313*	0.788
Smoking					
having never smoked (ref)					
former smokers	2.04	0.786	0.463	0.815	2.317
currently smoking	1.034	0.85	0.792	0.946	4.461
Daily alcoholic drinks consumption					
no (ref)					
yes	1.028	1.201	0.672	0.914	0.923
Enabling factors					
Hukou Status					
urban hukou (ref)					
rural hukou	0.477*	1.238	1.024	1.196	2.146
Living arrangements					
living with others (ref)					
living alone	2.239	1	0.0722*	1.438	15.40**
The number of living children	1.011	0.899	0.99	1.124	1.054
Earned income	1.076	0.961	0.952	1.027	0.955
Health insurance					
none (ref)					
public or other health insurance	0.854	0.894	7.838	1.171	0.535
Need factors					

Diagnosed with a memory-related disease					
none (ref)					
a memory-related disease	0.62	1.539	0.0797*	1.23	3.680*
Number of chronic diseases					
none (ref)					
one or two chronic diseases	1.289	0.479*	2.362	6.295	0.925
at least three chronic diseases	0.84	0.489	3.954	6.495	0.85
Number of ADL limitations					
none					
one or two ADL limitation (none)	0.416**	2.460***	0.927	0.882	1.801
at least three ADL limitation	0.185***	2.839***	1.421	1.135	2.741
Changes in ADL limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.266***	1.121	2.778**	1.483	1.544
Changes in IADL Limitations from Wave 3 to 4					
same or improved status (ref)					
deteriorated status	0.0338***	2.353**	1.744	2.428*	3.293*
Early-life factors					
Having experienced hunger prior to the age of 17					
no (ref)					
yes	1.1	1.168	0.848	0.519	5.120*
N	434	414	434	434	434

Source: Author's analysis of the Life History Survey (2014), Wave 3 (2015), Wave 4 (2018) of CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③Time-invariant variables are measured using data from the Wave 3 of CHARLS; the experiences of hunger before the age of 17 are measured using data from the 2014 Life History Survey of CHARLS; time-variant variables are measured using data from Wave 3 and 4 of CHARLS. ④Age, earned income and the number of living children are continuous variables and earned income is the log (income). ⑤Binary experience of hunger is employed.

Table E.5 Predictors of no longer needing help with each IADL using logistic regression models (N=1,258)

	No longer needing help					
	Doing housework (1)	Cooking (2)	Shopping for groceries (3)	Making phone calls (4)	Taking medications (5)	Managing money (6)
Predisposing factors						
Age						
60–69 (ref)						
70–79	0.752	0.884	0.942	1.031	0.756	0.758
80+	0.638	1.418	0.666	1.121	1.184	0.412*
Gender						
male (ref)						
female	1.905*	1.082	1.391	1.157	1.39	1.406
Ethnicity						
Han ethnicity (ref)						
ethnic minorities	1.905*	1.082	1.391	1.157	1.39	1.406
Marital status						
married (ref)						
not married	1.196	0.772	0.847	0.781	1.462	1.054
Illiterate						
no (ref)						
yes	0.656*	0.650*	1.096	1.825***	0.663	1.322
Smoking						
having never smoked (ref)						
former smokers	2.971***	2.314**	1.344	0.635	0.669	1.235
currently smoking	1.519	1.855*	0.835	0.99	0.488	1.723*
Daily alcoholic drinks consumption						
no (ref)						
yes	0.817	0.972	0.775	1.118	1.574	1.185
Enabling factors						
Hukou Status						
urban hukou (ref)						
rural hukou	0.577*	0.716	0.724	1.349	0.972	0.809
Living arrangements						
living with others (ref)						
living alone	1.07	0.846	0.92	1.398	0.603	0.679
The number of living children	1.311	0.68	1.131	1.593	1.06	1.363
Earned income	0.996	0.964	0.972	1.017	0.94	0.932

Health insurance						
none (ref)						
public or other type of health insurance	1.106	0.959	0.789	0.874	0.646	0.788
Need factors						
Diagnosed with a memory-related disease						
none (ref)						
a memory-related disease	1.264	0.914	1.084	0.8	0.915	0.833
Number of chronic diseases						
none (ref)						
one or two chronic diseases	0.896	0.799	1.227	1.014	0.664	0.748
at least three chronic diseases	1.308	1.171	1.113	0.557**	0.786	0.7
Number of ADL limitations						
none						
one or two ADL limitation (none)	1.842**	1.942**	2.626***	0.712*	1.509	1.312
at least three ADL limitation	2.094**	1.878*	2.734***	0.528**	2.144*	1.315
Changes in ADL limitations from Wave 3 to 4						
same or improved status (ref)						
deteriorated status	1.293	0.998	2.076***	1.123	1.13	0.943
Changes in IADL Limitations from Wave 3 to 4						
same or improved status (ref)						
deteriorated status	0.295***	0.237***	0.107***	0.336***	0.273***	0.230***
Early-life factors						
Numbers of episodes having experienced hunger prior to the age of 17						
zero(ref)						
one	1.181	1.031	1.12	0.792	1.099	0.874
two	1.718	1.063	0.753	0.605*	1.83	1.198
three	1.324	1.181	0.958	0.971	1.311	0.856
N	1258	1258	1258	1258	1258	1258

Source: Author's analysis of the Life History Survey (2014), Wave 3 (2015), Wave 4 (2018) of the CHARLS, and the harmonised CHARLS.

Notes: ①Exponentiated coefficients; *p < 0.05, ** p < 0.01, *** p < 0.001. ②ADLs stands for Activities of Daily Living. IADLs stands for Instrumental Activities of Daily Living. ③ Time-invariant variables are measured using data from the Wave 3 of the CHARLS; the experiences of hunger before the age of 17 are measured using data from the 2014 Life History Survey of the CHARLS; time-variant variables are measured using data from Wave 3 and 4 of the CHARLS. ④Earned income and the number of living children are continuous variables and earned income is the log (income).

Appendix F

ERGO II – Ethics and Research Governance Online https://www.ergo2.soton.ac.uk

This email has been sent to you because you are named as the supervisor for this student's ERGO submission
Submission ID: 61978
Submission Title: What are the Healthcare Needs of China's Elderly? A Prediction of Social Care Demand and a Prediction/Blueprint for Future Needs
Submitter Name: Wanting Huang

Your submission has now been approved by the Faculty Ethics Committee. You can begin your research unless you are still awaiting any other reviews or conditions of your approval.

Comments:

- Ethical approval is granted and good luck with your research.

The research title changed after the confirmation review in response to the examiners' feedback. However, the Ethical approval of this study is based on the Ethics Application Form for SECONDARY DATA ANALYSIS shown in Appendix G. The CHARLS is still the only dataset employed in this study.

Appendix G

Ethics Application Form for SECONDARY DATA ANALYSIS
Version September 2019

Please consult the guidance at the end of this form before completing and submitting your application.

1. **Name(s):**   Wanting Huang
2. **Current Position:**   PhD Student
3. **Contact Details:**
     Division: Department of Gerontology
     Email: W.Huang@soton.ac.uk
     Phone: +86 15600791028
4. **Is your research being conducted as part of an education qualification?**
     Yes ☑   **No** ☐
5. **If Yes, please give the name of your supervisor:**
     Prof Athina Vlachantoni and Prof Maria Evandrou
6. **Title of your research project / study:**
     What are the Healthcare Needs of China's Elderly? A Prediction of Social Care Demand and a Prediction/Blueprint for Future Needs

7. **Briefly describe the rationale, aims, design and research questions of your research**
     Please indicate clearly whether you are applying for ethics approval for a specific piece of research, or for overarching ethics approval to use certain datasets for a range of research activities. Approval for the latter will only cover the datasets specified here, for a maximum of 3 years and then subject to renewal.
     I am applying the ethics approval for my doctoral project in the following three years, from 2020 to 2023, especially for the usage of the dataset CHINA HEALTH AND RETIREMENT LONGITUDINAL STUDY (CHARLS). Against the background of China's fast ageing, my research is expected to focus on the investigation of the divergence in the health status and demands of the older Chinese people. In consistency of "Healthy China 2030" planning, this research will be conducted from the perspective of policy and practice, with the aim of guiding improved and targeted social care services and models.
     Based on the descriptive and analytical statistic data processing, this research revolves around three main research questions as follows, which are the future health trends for the elderly, identifying the old group in the most care need and match different types of care to the elderly group according to their care needs:
     1. What are the future health trends for older people?
     2. What characteristics do elderly the population who are in the most care need have?
     3.Which type of care do the elderly prefer, residential home care, institutional home care or mixed type?
     Through employing panel data composed of wave2, wave3 and wave4 from CHARLS, this research will apply multistate life table and multiple linear regression methods to answer research questions.

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8. **Describe the data you wish to analyse**
Please give details of the title of the dataset, nature of data subjects (e.g. individuals or organisations), thematic focus and country/countries covered. Indicate whether the data are qualitative or quantitative, survey data, administrative data or other types of data. Identify the source from where you will be obtaining the data (including a web address where appropriate).

The China Health and Retirement Longitudinal Study (CHARLS) collects high quality nationally representative quantitative data on individuals aged 45 years and older living in private households in order to provide demographic and socioeconomic information on mid-life and later life for policy relevant research. CHARLS national baseline survey was carried out in 2011, 150 counties and 450 communities (villages) from 28 provinces. The follow-up survey was carried out in 2013, 2015 and 2018 respectively. My research will employ panel data composed of wave2, wave3 and wave4 from CHARLS.

The CHARLS dataset contain the following information: basic personal information, family structure and financial support, health status, physical measurements, medical service utilization and medical insurance, work, retirement and pensions, income, consumption, assets, and basic conditions of the community. The data will be available to the academic community one year after the survey. For academic purpose, any researcher can apply for CHARLS in this website: http://charls.pku.edu.cn/pages/about/111/en.html.

9. **What are the terms and conditions around the use of the data? Did data subjects give consent for their data to be re-used? If not, on what basis is re-use of the data justified?**
Please state what (if any) conditions the data archive imposes (e.g. registration, signing of confidentiality agreement, specific training etc.). In many cases the data controller will have given explicit permission for data re-use. Please explain how you justify the use of data if approval and consents for the original data collection and re-use are not in place. This may be the case where, for example, the original data collection predated requirements for ethics review or occurred in a jurisdiction where explicit consent and approval are not required.

According the CHARLS website, there are four main rules when I plan to use CHARLS. First of all, the usage of CHARLS data is limited to academic research. Secondly, Raw data must not be published in any form. And the personal information of interviewees should not be disclosed in statistics or analysis results. Thirdly, CHARLS data shall not be released, transferred, sold, leased, loaned or given to others. Fourthly, one must provide real personal information when applying for the data.

10. **Do you intend to process personal data** (https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/key-definitions/what-is-personal-data) **that are sensitive ('special category') personal data as defined by the the Data Protection Act 2018 following the General Data Protection Regulation (GDPR) (**https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/lawful-basis-for-processing/special-category-data/**), or data relating to a person's criminal convictions, even if such data are publicly available and/or have been pseudonymised (**https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/what-is-personal-data/what-is-personal-data/**)?**
Yes ☑   **No** ☐

If YES, please specify what personal data will be processed and why.

Since my research is closely connected with the elderly health status, the analysis may involve demographic and socioeconomic characteristics of individuals.

11. **Do you intend to link two or more datasets?**
Data linkage refers to merging of information from two or more sources of data to consolidate facts concerning an individual or an event that are not available in any separate record. Please note that for the purposes of research ethics we are not interested in the merging of different waves of a particular survey, or the merging of data from different countries for the same survey.

Yes ☐ **No** ☑

If YES, please give details of which datasets will be linked and for what purposes.

12. **How will you store and manage the data <u>before</u> and <u>during</u> the analysis? What will happen with the data <u>at the end of</u> the project?**
Please consult the University of Southampton's Research Data Management Policy (http://library.soton.ac.uk/researchdata/storage and http://www.calendar.soton.ac.uk/sectionIV/research-data-management.html), and indicate how you will abide by it.

During my doctoral journey, I will store my data on the OneDrive through Office 365, one of the University's network storage spaces, which is consistent with the University of Southampton's Research Data Management Policy. Storing data in the cloud will ensure my data's safety from a wide range of hardware damage. As a back-up, I will also set up a special folder on my laptop to store the data in order to prevent the data loss on the network space.

13. **How will you minimise the risk that data subjects (individuals or organisations) could be identified in your presentation of results?**
Please consider whether disclosive ID codes have been used (e.g. date of birth) and whether it is theoretically possible to identify individuals by combining characteristics (e.g. widow in Hampshire with 14 children) or by combining datasets. How will you protect individuals' anonymity in your analysis and dissemination?

My Phd research project is based on the quantitative secondary analysis of the characteristics of different population groups rather than certain individuals, like women over 80s in rural area in China. The results will be processed through statistical models and presented in grouped or aggregate statistics. There is very little possibility of identifying individuals in my research project, which is not the purpose of my PhD research.

14. **What other ethical risks are raised by your research, and how do you intend to manage these?**
Issues may arise due to the nature of the research you intend to undertake and/or the subject matter of the data. Examples include data or analysis that are culturally or socially sensitive; data relating to criminal activity, including terrorism, and security sensitive issues.

So far, I don't plan to address any research questions associated with individuals' race, region belief and other factors related to cultural or sensitive issues.

15. **Please outline any other information that you feel may be relevant to this submission.**

For example, will you be using the services or facilities of ONS, ADRN, or HSCIC and/or are you obtaining ethical review from NRES (through IRAS) or other? Please confirm whether the data being used are already in the public domain.

The data in my PhD research is based upon the CHARLS dataset, which is widely accessible to the academic community. And according to the CHARLS_2018_Users_Guide, it has received ethical approval:

"*Ethical approval for all the CHARLS waves was granted from the Institutional Review*
Board at Peking University. The IRB approval number for the main household survey,
including anthropometrics, is IRB00001052-11015; the IRB approval number for biomarker collection, was IRB00001052-11014."

16. **Please indicate if you, your supervisor or a member of the study team/research group (including any institution that they act for, if different from the University) are a data controller and/or data processor in relation to the personal data you intend to process as defined by the Data Protection Act 2018 following the GDPR, and confirm that you/they understand your/their respective responsibilities (** https://ico.org.uk/for-organisations/guide-to-data-protection/guide-to-the-general-data-protection-regulation-gdpr/key-definitions/controllers-and-processors// **)**

After reading guidelines in the GDPR, we dicussed that both of my supervisors and I are neither data controller nor data processor.

Appendix H

Table H.1 The comparison of Policy titles in Figure 2.3 in English and Chinese.

Policy title in English	Policy title in Chinese	Department issuing policies	Date	Accessible location
The Guidance on the National Agriculture Development (1956-1967)	1956 年 1967 年全国农业发展纲要	the Political Bureau of the Central Committee	1956.1	https://www.gov.cn/gongbao/shuju/1956/gwyb195605.pdf
The Seven-Year Development Outline on Work Concerning Older People in China (1994-2000)	中国老龄工作七年发展纲要（ 1994—2000 年)	multiple departments (National Development and Reform Commission, Ministry of Civil Affairs, Ministry of Human Resources and social security, National Health Commission, Ministry of Finance, Ministry of Education, All-China Federation of Trade Unions, All-China Women's Federation, and China National Committee on Ageing)	1994. 12	http://www.reformdata.org/1994/1214/4014.shtml
The Law on the Protection of the Rights and Interests of Older People	中华人民共和国老年人权益保障法	National People's Congress	1996.8	https://law.pkulaw.com/falv/865d4f9d80b80371bdfb.html

The Opinions on accelerating the development of the older-age services	全国老龄委办公室和发展改革委等部门关于加快发展养老服务业意见的通知	multiple departments (China National Committee on Ageing, National Development and Reform Commission, Ministry of Education, Ministry of Civil Affairs, Ministry of Human Resources and social security, National Health Commission, Ministry of Finance, Ministry of Housing and Urban-Rural Development, State Administration of Taxation)	2006.2	https://www.gov.cn/gongbao/content/2006/content_245668.htm
The 12th Five-Year Plan of the Undertakings related to the Older People	中国老龄事业发展"十二五"规划	State Council	2011.9	https://www.gov.cn/zwgk/2011-09-23/content_1954782.htm
The Construction Plan of Social Care System for Older People (2011-2015)	社会养老服务体系建设规划（2011－2015年	State Council	2011.12,	https://www.gov.cn/gongbao/content/2012/content_2034729.htm
The Implementation Opinions on Encouraging Private Capital to Participate in Older-Age Services for	关于鼓励民间资本参与养老服务业发展的实施意见	multiple departments (National Development and Reform Commission, Ministry of Education, Ministry of Civil Affairs, Ministry of Human Resources and social security, National Health	2015.2,	http://www.nhc.gov.cn/rkjcyjtfzs/zcwj2/201502/63108b1a97594007b9e13b267bd7bad1.shtml

		Commission, Ministry of Finance, Ministry of Housing and Urban-Rural Development, National Financial Regulatory Administration)		
older people				
The Opinions on Building a Comprehensive System of Subsistence Allowance for Indigent and Disabled People and Attendance Allowance for Severely Disabled People	国务院关于全面建立困难残疾人生活补贴和重度残疾人护理补贴制度的意见	State Council	2015.9	https://www.gov.cn/zhengce/content/2015-09/25/content_10181.htm
The Guidance on Launching the Pilot Long-Term Care Insurance	人力资源社会保障部办公厅关于开展长期护理保险制度试点的指导意见	Ministry of Human Resources and Social Security	2016.7	https://www.gov.cn/xinwen/2016-07/08/content_5089283.htm
The Opinions on Expanding the Pilot Long-Term Care Insurance	关于扩大长期护理保险制度试点的指导意见	National Health Security Administration	2020.9	https://ww w.gov.cn/zhengce/zhengceku/2020-11/05/content_5557630.htm
The 14th Five-Year Plan on	国务院关于印发"十四五"国家老龄	State Council	2021.12	https://www.gov.cn/zhengce/content/2022-02/21/content_5674844.htm

the Undertakings related to Older People and Older-Age Service System	事业发展和养老服务体系规划的通知			

Source: Author's work

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