



ARTICLE

## Caring trajectories and health in mid-life

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### Abstract

Previous research has found varied effects of informal care provision on the carer's health status. Few studies have, however, examined this relationship dynamically. This paper is the first to analyse trajectories of care among men and women in mid-life and their impact on health outcomes using a nationally representative prospective cohort study. Data from three waves of the United Kingdom (UK) National Child Development Study (N = 7,465), when the respondents were aged 46, 50 and 55, are used to derive care trajectories capturing the dynamics of care provision and its intensity. Logistic regression investigates the impact of caring between the ages of 46 and 55 on the carers' report of depression and poor health at age 55. At age 46, 9 per cent of men and 16 per cent of women provided some level of informal care; rising to 60 per cent for both genders at ages 50 and 55. Just 7 per cent of women and 4 per cent of men provided care at all observation points, with the most common trajectory being 'starting to care' at ages 50 or 55. New carers experienced a lower risk of depression at age 55, reflecting that they may not have experienced the caring role long enough to have an adverse impact on their well-being. The findings highlight that the majority of individuals with surviving parents experience caring at some point during mid-life, underlining the need for further longitudinal research to better understand the complex relationships between care-giving and health for different groups of carers.

**Keywords:** informal care; cohort; intensity; mid-life; depression; health; education; National Child Development Study (NCDS)

### Introduction and background

Providing informal care for a frail older relative or friend is an increasingly common experience for individuals, primarily as a result of increasing longevity (Pickard, 2015; Broese van Groenou and De Boer, 2016). Previous research has shown that mid-life (*i.e.* between ages 45 and 55) is the age at which one's risk of providing informal care peaks across the lifecourse, with implications for

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individuals' health and economic participation (Dykstra and Komter, 2012; Evandrou *et al.*, 2015; Bardoel and Drago, 2016; Hanson and Starr, 2017). Since the inclusion of a question regarding informal care provision in the UK Census 2001, repeated in 2011, and the increased availability of longitudinal data internationally such as the Survey of Health, Ageing and Retirement in Europe (SHARE), a substantial body of literature has examined patterns of informal care provision across different age groups, as well as the more detailed nature of the care-giving activity such as the number of hours dedicated to care, the relationship between the person caring and the person cared for, and whether they live in the same household (Dahlberg *et al.*, 2007; Norman and Purdam, 2013; Robards *et al.*, 2015).

A more limited body of work has focused on the relationship between care provision and the health of the carer, producing mixed results depending on whether the study is cross-sectional or longitudinal (Vlachantoni *et al.*, 2013). This paper analyses prospectively collected data from a UK cohort study to describe trajectories of care provision in mid-life for men and women. It then investigates how different care trajectories are associated with carers' health status measured in two different ways: report of depression, reflecting mental health; and self-reported general health, reflecting overall health status. The findings address an important gap in the literature in two ways. Firstly, previous literature on caring trajectories and their impact on the carers' health has tended to focus on broad age groups covering the whole adult population; here the research explicitly focuses on the experience of mid-life individuals who are at the highest risk of 'juggling' the demand for care provision towards older relatives with caring for younger relatives (Vlachantoni *et al.*, 2020). Secondly, the study of caring patterns during mid-life has implications for other life domains for individuals at this important stage of the lifecourse, including their continued economic activity patterns as they approach retirement and their relationships with both younger and older generations of relatives (Evandrou *et al.*, 2018; Gómez-León *et al.*, 2019).

This paper is the first, to our knowledge, to use prospectively collected cohort data to map the caring trajectories of individuals across mid-life in the UK, and to assess the impact of such trajectories on the individuals' health status. The analysis allows us to take into account a range of factors which have been found to be important in previous research in this area, such as the carer's gender and the number of hours of care provided during a week, reflecting the intensity of the care provided.

## Review of the literature

To provide the broader context for this research, it is first important to outline the social care landscape within which our analysis is located. In the UK, individuals who need social support can receive such support from a range of sources, including informal sources (*e.g.* family members), formal state sources (*e.g.* local government services) or formal paid sources (*e.g.* private sector). However, as in many other countries, the majority of care is provided by family, particularly by female partners or daughters over most of the lifecourse (Maplethorpe *et al.*, 2015), and male spouses in later life (Robards *et al.*, 2015). There are some differences in

the way formal social care is organised across the countries of the UK. Within England, where the majority of the UK population resides, local authorities are legally responsible for adult social care, and both carers and care recipients are assessed before any support can be provided in the form of a caring allowance and/or support with day-to-day activities in the home of the care recipient. For individuals who are middle-aged themselves, and are providing care to older relatives, the receipt of support from the state often interacts with their economic activity patterns (and earnings). Existing research has aimed to disentangle the interactions between economically active individuals' work and care-giving, indicating, for instance, that many female carers remain 'trapped' in low-paid jobs in order to combine their paid work with their caring obligations, whilst at the same time receiving some support from the state (Carmichael and Charles, 2003; Buckner and Yeandle, 2006).

Existing research on the impact of care provision on the carer's health has shown mixed results, depending on the nature of the data analysed. From an empirical viewpoint, cross-sectional research has broadly shown that care provision is associated with poor health for the carer, although there exist differences depending on the specific health outcome measured (Young *et al.*, 2005; Brown and Brown, 2014), and the health and demographic characteristics of the person cared for (O'Reilly *et al.*, 2008; Capistrant *et al.*, 2012). For example, Doran *et al.* (2003) analysed data from the 2001 UK Census and found that individuals who did not provide any care were somewhat more likely to report good health compared to individuals who were providing care. However, research by O'Reilly *et al.* (2008) using the 2001 Northern Ireland Census introduced the intensity of care provided in the equation and showed that although overall carers were indeed less likely than non-carers to report a limiting long-term illness (LLTI), it was those who provided more than 50 hours of care per week who showed the worst health outcomes. Also using the 2001 UK Census and focusing on couples aged 65 and over where at least one of the spouses reported a LLTI, Young *et al.* (2005) found that individuals who provided more intense care (*i.e.* more than 20 hours per week) were more likely to report poor health than those who provided less intense care. Along similar lines, Harris *et al.* (2020) used data from the Health and Employment After Fifty study, a cross-sectional sample of individuals aged 50–64 recruited from general practices, to show that men and women caring for more than 20 hours per week were more likely to report health problems such as musculoskeletal pain, poor or fair self-rated health, depression and sleep problems.

By contrast, longitudinal analysis from the UK and elsewhere has examined the impact of care trajectories on the carers' wellbeing over time and has either shown care provision to have no negative effect on the carer's health (*see e.g.* Rahrig Jenkins *et al.*, 2009; Tooth and Mishra, 2014) or it has shown a slightly lower mortality risk among carers compared to non-carers once a range of demographic and socio-economic characteristics are controlled for. For example, O'Reilly *et al.* (2008) used linked data from the 2001 Northern Ireland Census to examine the health of informal carers and their mortality risk four years later and found that care-givers had a lower mortality risk than non-care-givers, but such risk increased among care-givers as the number of hours of care provided increased. Fredman *et al.* (2010) analysed data between 1999 and 2007 on care-givers and non-care-givers

in the United States of America; they also found that overall care-givers face a lower mortality risk than non-care-givers, although care-givers are more likely to report specific types of conditions such as stress. By contrast, Lawton *et al.* (2000) analysed data over a four-year period for more than 600 women aged 65 and over, and found that women who had provided care for at least 12 months were more likely to report poor physical and mental health compared to those who had not provided any care or care of a shorter duration over the four years. Other recent research has also found adverse effects on informal carers, *e.g.* using data from three waves of the Korean Longitudinal Study of Aging, Kyung Do *et al.* (2014) showed that providing informal care to one's parents-in-law has significant adverse health effects on daughters-in-law along multiple health dimensions, such as the report of pain during daily activities, worsening self-reported general health and regular prescription drug use. Finally, Barbosa *et al.* (2020) used data from the SHARE to show that co-residential carers aged 50+ in Portugal at Wave 4 were 60 per cent more likely than non-carers to report depressive symptoms at Wave 6.

Research examining the health impact of movements into and out of the caring role has also offered valuable empirical insights, highlighting the role of the relationship between the care provider and the care recipient in this respect. Ross *et al.* (2008) investigated the impact of moving into or out of caring between 2004 and 2006, and found that there were no differences in the health of carers between the two time-points. However, those who moved out of caring between 2004 and 2006 were slightly more likely to report poor health in 2006. Kaufman *et al.* (2019) analysed data from four waves of the Health and Retirement Study and also found elevated symptoms of depression among exit care-givers, as well as among new and continuing care-givers, compared to non-carers. Exploring the impact of juggling multiple roles simultaneously (*e.g.* carer, parent, paid worker), Glaser *et al.* (2005) analysed data from the 1988–1989 and 1994 longitudinal Retirement Survey and found that occupying multiple roles between 1988 and 1989 resulted in poorer health outcomes in 1994. The analysis of 2004/5 and 2006/7 data from the English Longitudinal Study of Ageing showed that compared to non-care-giving, entry into spousal or child care-giving was associated with a decline in the carer's quality of life (although entry into care-giving for other kin relations increased life satisfaction and lowered depressive symptoms), while exiting care-giving was related to increased depression in both spousal/child carers and carers of other kin relations (Rafnsson *et al.*, 2017). Along the same lines, more recent cross-national analysis by Uccheddu *et al.* (2019), focusing on spousal care provision over five waves of the SHARE, showed that although transitions into care-giving have a detrimental effect on the carer's health, nevertheless transitions out of care-giving, in most cases, do not have beneficial effects on the carer's health.

Taking into account the intensity of the care provided has also been shown to be an important dimension when exploring the impact of care-giving over time. Vlachantoni *et al.* (2016) analysed data from the Office for National Statistics Longitudinal Study, linking the 2001 and 2011 UK Census respondents for England and Wales, and found that individuals who provided care in 2011 (regardless of their caring status ten years earlier) were less likely to report poor health in 2011 than those who had not provided care in 2001 and 2011; while those

providing more than 20 hours of care per week in 2001 who were not caring in 2011 faced a higher risk of poor health than non-carers at the two time-points. Finally, using a shorter time-frame with data on women aged between 21 and 53 years between 2004 and 2009 from the China Health and Nutrition Survey, Lu *et al.* (2019) found that 'rising-to-high-intense' and 'stable-low-intense' care-givers of parents/parents-in-law faced a higher risk of metabolic syndrome compared to non-care-givers.

The theoretical framework for the analysis in this paper draws on the care-giving and stress model (Pearlin *et al.*, 1990) and the earlier transactional model of stress and care (Lazarus and Folkman, 1984). These models point to the potentially adverse effect of care-giving-related factors such as the nature, duration and intensity of care provided, on the carer's health over time, and have been utilised in previous research examining the impact of care-giving on the carer's health and mortality outcomes (*see e.g.* Fredman *et al.*, 2010). Two possible outcomes to this process have been identified in the literature. The 'wear-and-tear' hypothesis indicates that there is an accumulation of demands and stress, measured with a variety of indicators, which results in the continuous deterioration of the carer's wellbeing and coping resources. By contrast, the 'adaptation' hypothesis points to the gradual adjustment on the carer's part to the demands of the care-giving process, with a less adverse impact on their own health and wellbeing. Our paper considers key care-giving-related factors such as the intensity of care provided over three points in time and takes into account two distinct indicators of wellbeing on the part of the carer (self-reported health, depression). The 'wear-and-tear' hypothesis would predict worse self-reported health and a higher risk of depression for all carers, compared to the baseline; while the 'adaptation' hypothesis would predict a decline in the carer's wellbeing earlier in the care-giving process (*i.e.* when starting care-giving) compared to carers who have provided care at more than one point in time.

Considering the key empirical findings of existing research and our theoretically based expectations, it is possible that mid-life carers are overall more likely to report poor health compared to non-carers. Among those who provide care, the intensity of the care provided is likely to be pivotal, with those who provide less intense care during a week expected to be less likely to report poor health outcomes, taking into account their health status at baseline. However, some of the empirical evidence behind such an expectation is based on research using linked census data where observations are a decade apart, with no knowledge of care provision patterns between the time-points under study; having more detailed information in the intervening periods could yield different results. The analysis in this paper allows us to consider a number of control variables utilised in previous research, such as the carer's marital status (Vlachantoni *et al.*, 2016; Lu *et al.*, 2019) and their educational qualifications (Kyung Do *et al.*, 2014), following a cohort of individuals born in 1958 through mid-life.

## Research questions

This paper employs three waves from a British cohort study, the National Child Development Study (NCDS), in order to address the following research questions:

- (1) What is the pattern of caring trajectories (*i.e.* in and out of care provision) during mid-life?
- (2) Among male and female carers, how does the intensity of caring vary between ages 46 and 55?
- (3) How are different caring trajectories between ages 46 and 55 associated with the carer's health outcomes at age 55, and what are the gender differences in this respect?

The focus of the paper is on mid-life carers (aged between 46 and 55) who provide care to their parents or parents-in-law. As such, this paper makes an original contribution to the body of work examining adult children's care provision towards their parents from a dynamic, lifecourse perspective (Alessie *et al.*, 2014; Evandrou *et al.*, 2018). Two health outcomes are focused upon, reflecting different aspects of an individual's health status: self-reported health and diagnosis of depression.

## Empirical strategy

### *Data and analytical sample*

To date there is relatively little empirical research that has involved analysis of caring trajectories. Keating *et al.* (2019) hypothesised three family care trajectories which they labelled generational, career and serial. Their subsequent empirical analysis using Statistical Canada's General Social Survey on Caregiving and Care Receiving operationalised four components of care trajectories: age of onset of the first care episode; number of episodes of care in the individual's lifecourse; total duration of all episodes of care; and the extent to which episodes overlapped one another (Fast *et al.*, 2021). Latent Profile Analysis was then used to create a set of caring trajectories using this retrospectively collected data. This study differs in its approach, utilising prospectively collected cohort data.

The paper analyses data from three waves (Waves 7, 8 and 9) of the NCDS, a cohort study of more than 17,000 children born in a single week in March 1958 in Britain who have been followed up through the course of their lives (University of London, Institute of Education and Centre for Longitudinal Studies, 2015). The information employed in this study was collected when the cohort members were aged 46, 50 and 55, respectively. From a total sample of 7,469 individuals interviewed at least once between the ages of 46 and 55, the analysis here is restricted to those individuals who are 'at risk' of providing parental care, *i.e.* who had at least one living parent/parent-in-law at any of the three points in time, resulting in a final analytical sample of 7,013 individuals.

Table 1 shows the number of individuals (and sample proportion) who were at risk of caring for their parents/parents-in-law. Most of the cohort members were at risk of providing help to parents/parents-in-law at all three observation points, *i.e.* at ages 46, 50 and 55. Approximately 13 and 19 per cent of men and women, respectively, faced an intermittent risk of caring, meaning that they were at risk in one or two waves; this group includes those cohort members whose parent died during the period of study; as we are interested in caring trajectories, it was

**Table 1.** Respondents at risk of caring for a parent or parent-in-law in Waves 7, 8 and 9, by gender (%)

Status	Males		Females	
	N	%	N	%
At risk <sup>1</sup> in all three waves	2,950	82.0	2,864	74.0
At risk <sup>1</sup> in one or two waves (intermittent risk)	472	13.1	727	18.8
Not at risk in any wave (excluded from analytical sample)	177	4.9	279	7.2
Total	3,599	100		100
Final analytical sample	3,422		3,591	

Note: 1. Individuals with at least one parent or a parent-in-law alive.

Source: Authors' analysis of the National Child Development Study.

felt important to retain these individuals in the analytical sample so as to capture those who cease caring during mid-life due to bereavement. The sample may also include those cohort members who gain a parent-in-law during mid-life through marriage and thus become at risk of providing care. Just 5 per cent of male and 7 per cent of female cohort members did not have a surviving parent or parent-in-law at any observation point and so were excluded from the final analytical sample.

As is the case with most longitudinal studies, the NCDS is affected by attrition. Previous analysis of attrition and missing data in this dataset has found that attrition is higher among male respondents, among individuals with a lower socio-economic status and those with lower educational qualifications (Hawkes and Plewis, 2006). The analytical sample used here may also be affected by differential mortality amongst the respondents' older parents (Office for National Statistics, 2019). Given this, gender, socio-economic status and education were all included as control variables in the analysis.

### **Definition of key variables**

#### *Caring trajectories and caring intensity*

The NCDS collected a range of information on the provision of informal care which allows us to derive two measures of care-giving: (a) intensity of care-giving and (b) care-giving trajectories.

The following question was used to construct a variable on 'Caring for parents/parents-in-law' at ages 46, 50 and 55, the question wording being the same in each of the three waves analysed here:

*Do you regularly or frequently do any of the things listed for your parents or parents-in-law? Response: Please select Yes or No for each activity listed below: Dressing, eating, bathing, washing, ironing, cleaning, cooking, financial assistance, shopping, transportation, gardening and others, none of these.*

For those who mentioned they did provide care with at least one of these tasks, the survey then included information on how much time they spent providing care.



**Table 2.** Deriving caring trajectories: the provision of care at ages 46, 50 and 55

Age 46	Age 50	Age 55	Caring trajectory	%
Yes	Yes	Yes	'Repeat' carers	5.7
No	Yes	Yes	New carer	32.8
No	No	Yes	New carer	13.2
No	Yes	No	Sporadic/intermittent carers	14.2
Yes	No	Yes	Sporadic/intermittent carers	0.9
Yes	Yes	No	Stopped caring	3.3
Yes	No	No	Stopped caring	2.6
No	No	No	No caring	27.3

Notes: Total N = 7,013. 'Repeat' carers refers to those caring at the three points of observation (ages 46, 55 and 55).  
Source: Authors' analysis of the National Child Development Study.

This question was asked of respondents who provide care with *any* of the aforementioned tasks:

*How many hours do you spend doing this/these things for [parents or parents-in-law] in a typical week?*

Although the question was consistent between the three waves, the response categories differed slightly. In Waves 8 and 9, the response is continuous, ranging from 0 to 168 hours. However, in Wave 7, the response includes the following categories: not caring, 0–9 hours, 10–19 hours, 20–34 hours, 35–49 hours, 50–99 hours, 100+ hours and it varies/other.

Responses were therefore combined to derive a new variable called 'Caring intensity' which showed the intensity of care provision in four categories: not caring, 9 or fewer hours a week, 10–19 hours a week and 20+ hours a week. This categorisation has been applied by other published research on the same topic (e.g. Evandrou *et al.*, 2018).

In order to examine the care-giving role from a dynamic perspective, a 'care-giving trajectories' variable was then derived that captures changes in the respondents' caring status between ages 46, 50 and 55 (Table 2). Three of the four categories in this variable (categories 1, 2 and 4) have been used in previous studies (Kaufman *et al.*, 2019; Hurh *et al.*, 2021):

- (1) Repeat carers (caring at all three points of observation).
- (2) New carers (those who started caring in the second or third point of observation).
- (3) Sporadic or intermittent carers (first and third waves, or only second wave).
- (4) Stopped caring (those who stopped caring at second or third wave).

We use the term 'repeat carers' to describe respondents who were providing care at all three data collection points, however, it is not possible to ascertain whether



respondents were also providing care in the intervening periods. Thus, we are cognisant of the limitations of this concept, and careful in the interpretation of the findings (see also Robards *et al.*, 2015).

### Outcome variables

The two outcome variables were the report of depression and poor self-reported health. For the former, the question was slightly different between the waves. In Wave 7, respondents were asked to report any type of long-standing illness, disability or infirmity, which included depression as one of the responses. In Wave 9, depression was included in the responses as a type of emotional condition.

For self-reported health, the question was:

*Please think back over the last 12 months about how your health has been. Compared to people of your own age, would you say that your health has, on the whole, been: excellent, good, fair, poor or very poor?*

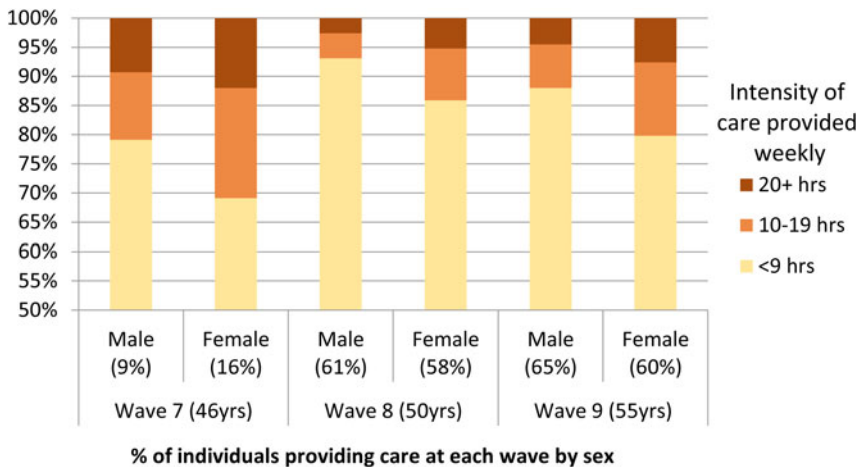
### Control variables

The variable for educational qualifications distinguished between four categories: up to low O-level, high O-level, A-level and sub-degree, and degree or higher. The categories for the respondents' living arrangements included: living alone, living with partner only, living with partner and others, and living with others only. Two variables were used regarding relationships: on one hand, we included a variable recoded into three categories (married/civil partnership, single never married and divorced/separated/widowed); on the other hand, we included a variable to account for the possibility of becoming widowed along the period of observation, between the ages of 46 and 55.

To account for possible reverse causality deriving from the fact that poor health may influence the provision of support, we also included the carer's health status at baseline, an approach that has been used in previous studies to account for reverse causality (Johnson, 2005; Baker and Silverstein, 2008; Tosi and Grundy, 2018; Arpino and Gómez-León, 2020). This allows us to account for the initial health status of the care-giver and its potential influence on providing care to others.

### Methodology

In the first part of the analysis, descriptive statistics are used in order to examine the intensity of care provided only among the respondents at risk of caring across the three waves, and to map the trajectories of care provision between ages 46 and 50. The second part of the analysis uses logistic regressions to examine the association between the different caring trajectories between Waves 7 and 9, and two health outcomes in Wave 9, controlling for these health characteristics at baseline (Wave 7). Throughout the analysis, male and female carers are distinguished, as previous research has shown gender to directly affect the nature of care provision (see *e.g.* Saraceno and Keck, 2011).



**Figure 1.** Percentage of individuals providing care in each wave, by wave (respondents’ age), gender and intensity of caring.

Notes: yrs: years. hrs: hours.

Source: Authors’ analysis of the National Child Development Study.

## Results

### Descriptive results

#### *Prevalence of care provision at ages 46, 50 and 55 amongst those ‘at risk’*

As discussed in the ‘Data and analytical sample’ section above, the analytical sample used in this paper is restricted to those cohort members who were ‘at risk’ of providing informal care to their parents/parents-in-law. **Figure 1** shows the percentage of respondents at risk of caring in each of the three waves, by their gender, caring status and care intensity. At age 46, around 9 per cent of men and 16 per cent of women were providing care to a parent/parent-in-law, of whom around one in ten were providing care of 20 or more hours per week. By the age of 50, the proportion of both men and women providing care had increased significantly (61% of men and 58% of women), but the majority of such care (93% among male carers and 86% among female carers) was of low intensity (up to 9 hours per week). By age 55, the proportion providing care had further increased slightly amongst both men and women (65% of men and 60% of women), and the intensity of care provision also increased. About 8 per cent of male and 13 per cent of female carers at age 55 were providing care for between 10 and 19 hours per week, and about 5 and 8 per cent, respectively, were caring for 20 hours or more per week.

As illustrated in **Table 1**, the majority of the original sample were at risk of providing help to parents/parents-in-law at all three points in time (82% of men and 74% of women), *i.e.* at ages 46, 50 and 55; amongst these, 87 per cent of men and 89 per cent of women had provided care to their parent/parent-in-law at least once between the ages of 46 and 55 (Table S1 in the online supplementary material). Within our sample, about 13 and 19 per cent of men and women, respectively, faced an intermittent risk of caring, meaning that they were at risk in one or two waves; amongst these, around a half had provided care at least once during mid-life,

**Table 3.** Caring trajectories between ages 46, 50 and 55, by gender

Caring trajectories	No. of caring episodes	Males		Females	
		N	Column %	N	Column %
'Repeat' carers	3	148	4.3	254	7.1
New carers	1-2	1,770	51.7	1,457	40.6
Sporadic/intermittent carers	1-2	510	14.9	552	15.4
Stopped caring	1-2	137	4.0	274	7.6
'Repeat' non-carers	0	857	25.0	1,054	29.4
Total N		3,422	100.0	3,591	100.0

Source: Authors' analysis of the National Child Development Study.

highlighting that caring during mid-life is far from a rare occurrence. More detailed patterns of the risk of caring are shown in Table S1 in the online supplementary material.

### Caring trajectories

Table 3 shows the caring trajectories among all respondents who were at risk of caring. About 4 per cent of male and 7 per cent of female cohort members had provided care in all three waves, described as 'repeat carers'. Similar proportions had stopped providing care either at ages 50 or 55. About 15 per cent of both men and women were 'intermittent carers', caring at ages 46 and 55 but not at age 50; or at age 50 only. The most common trajectory was as a 'new carer' (52% for men and 41% for women), comprising cohort members who had taken up caring at ages 50 or 55. One-quarter of men and 29 per cent of women in the sample reported not providing any care to their surviving parents/parents-in-law in any of the three waves.

For the next part of the analysis, repeat non-carers were excluded from the sample. Focusing on those cohort members who reported providing care at least once, we examined their caring trajectories and the care intensity (up to 9 hours, 10-19 hours, 20 hours or more) of such provision over the three time-points (Table 4). Among those mid-life men caring in all three waves, 81 per cent provided up to 9 hours of care per week at age 46, compared with 70 per cent of women at the same age; and about 5 per cent of men and 8 per cent of women in this category provided 20 hours or more of care per week. As they aged, a higher proportion of 'repeat carers' provided more intense care; by age 55, 8 per cent of male and 18 per cent of female repeat carers were providing 20 or more hours of care per week, reflecting the *intensification of care provision through mid-life* as their surviving parents/parents-in-law also aged and their age-related care needs increase. In contrast, among new carers, *i.e.* those who provided care for the first time at ages 50 or 55, the vast majority provided low-intensity care for up to 9 hours per week, among both men and women. Again, however, there is some evidence to support the

**Table 4.** Caring trajectories<sup>1</sup> by intensity at each age and gender

Caring trajectories	Men			Women		
	Age 46	Age 50	Age 55	Age 46	Age 50	Age 55
<i>Percentages</i>						
<b>Repeat carers:</b>						
Sample N	148	148	148	254	254	254
0–9	81.1	88.5	80.4	69.7	70.1	65.0
10–19	13.5	6.1	11.5	22.1	18.1	17.3
20+	5.4	5.4	8.1	8.3	11.8	17.7
Total	100	100	100	100	100	100
<b>New carers:</b>						
Sample N	1,759	1,758	1,770	1,452	1,453	1,457
Not caring	100.0	27.4	0	100.0	29.7	0
0–9	0	68.4	88.5	0	63.7	82.3
10–19	0	3.2	7.3	0	4.7	11.7
20+	0	1.0	4.2	0	2.0	6.0
Total	100	100	100	100	100	100
<b>Sporadic/intermittent carers:</b>						
Sample N	506	509	373	552	551	363
Not caring	94.9	4.9	93.0	93.1	6.7	89.5
0–9	4.6	89.8	6.7	4.9	84.4	8.8
10–19	0.4	2.8	0.3	1.1	4.7	1.7
20+	0.2	2.6	0	0.9	4.2	0
Total	100	100	100	100	100	100
<b>Stopped caring:</b>						
Sample N	137	103	58	274	217	106
Not caring	0	28.2	100.0	0	29.0	100.0
0–9	75.2	53.4	0	68.3	46.5	0
10–19	10.2	5.8	0	16.4	15.7	0
20+	14.6	12.6	0	15.3	8.8	0
Total	100	100	100	100	100	100
Total N	2,550	2,518	2,349	2,532	2,475	2,180

*Note:* 1. Individuals who cared for someone at least in one wave.  
*Source:* Authors' analysis of the National Child Development Study.

notion of intensification of care provision during mid-life, especially amongst women carers. At age 55, 12 per cent of 'new carers' were caring for 10–19 hours and 6 per cent were caring for 20 or more hours.

**Table 5.** Individuals by caring trajectories according to depression status and gender (age 55)

Trajectories	Males		Females	
	No depression	Depression	No depression	Depression
Sample N	3,106	314	3,049	541
	<i>Row percentages</i>			
Repeat carers	89.2	10.8	83.1	16.9
New carers	91.9	8.1	86.9	13.1 <sup>1</sup>
Sporadic/intermittent	89.4	10.6	84.8	15.2
Stopped caring	86.0	14.0	83.9	16.1
Non-carers	90.4	9.6	83.0	17.0 <sup>1</sup>
Total sample	90.8	9.2	84.9	15.1 <sup>2</sup>

Notes: 1. Care trajectories differences between health status using Tukey's test (significant differences at 10% for women non-carers versus new carers). 2. Gender differences between health status using  $\chi^2$  ( $p = 0.000$ ).

Source: Authors' analysis of the National Child Development Study.

Intermittent care provision was less indicative of a pattern: 89 per cent of men and 84 per cent of women aged 50 in this category provided up to 9 hours of care per week, but the vast majority were not providing any care at ages 46 or 55. Looking at those who stopped caring, the proportion providing intensive care necessarily declines as those who previously provided care now do not.

*Report of depression and poor health status at age 55, by gender and caring trajectory* Tables 5 and 6 present the health status at age 55 of individuals according to their care trajectories (Table 5 for the prevalence of depression, whilst Table 6 shows self-reported health) for males and females separately. About 9 per cent of male respondents reported symptoms of depression, with a higher prevalence among those who stopped caring (14%) followed by sporadic/intermittent carers and repeat carers with a prevalence around 10 per cent (Table 5). The lowest prevalence was found among the new carers (8%). Women show a much higher prevalence of depression overall (15%) compared to men, with the highest prevalence found among female non-carers and repeat carers (17%), and the lowest among new carers (13%). The results show significant gender differences for depression, with women showing significantly higher depression symptoms than men. However, when looking at differences in depression between care trajectories within each sex (using the *post hoc* Tukey's test, which allows us to make pairwise comparisons between the means of each group while controlling for the family-wise error rate), we found only significant differences at the 10 per cent level in the depression reported between female new carers and female non-carers (Table 5).

Regarding self-perceived health at age 55 (Table 6), women again show significantly higher prevalence of poor health than men (5.7 and 4.7%, respectively). The highest prevalence of poor health was found among men who stopped caring and among female sporadic/intermittent carers, although differences by caring trajectory within gender were not statistically significant.

**Table 6.** Individuals by caring trajectories according to self-perceived health and gender (age 55)

Trajectories	Males		Females	
	Excellent to fair health	Poor health	Excellent to fair health	Poor health
Sample N	3,262	160	3,388	203
<i>Row percentages</i>				
Repeat carers	94.6	5.4	94.5	5.5
New carers	96.2	3.8	95.5	4.5
Sporadic/ intermittent	94.9	5.1	92.8	7.3
Stopped caring	93.4	6.6	93.4	6.6
Non-carers	94.2	5.8	93.8	6.2
Total	95.3	4.7	94.4	5.7 <sup>1</sup>

Notes: 1. Gender differences between health status using  $\chi^2$  ( $p=0.065$ ). Care trajectories differences between health status using Tukey's test (non-significant differences).

Source: Authors' analysis of the National Child Development Study.

### **The predictors of depression and self-reported poor health**

Multivariate analysis was then used to examine the association between the caring trajectories and the two health outcomes. Table 7 shows the predictors of (a) depression (*versus* no depression) and (b) self-reported poor health (*versus* excellent/very good/good/fair health), with both health outcomes measured at age 55, and includes the health status measured at baseline to account for reverse association. In terms of their mental health, new mid-life carers were less likely to report depression at age 55 than repeat carers, although it was not possible from this analysis to compare new carers with non-carers. Those with lower educational qualifications were also less likely to report depression compared to those with higher qualifications, although gender-specific additional analysis indicated that providing non-repeated care is associated with slightly higher educational qualifications for women, but the opposite is the case for men (Tables S2 and S3 in the online supplementary material).

Table 7 also shows that health at baseline is very important. Those who had reported depression at age 46 were significantly more likely (odds ratio = 17.68,  $p < 0.01$ ) to report depression at age 55. However, even after controlling for this, women (compared to men), those who were single, never married or divorced (compared to being married), having become widowed between ages 46 and 50 (compared to not) and those who lived with one's partner (compared to living alone) have higher likelihood of being depressed at age 55. The results in terms of self-reported poor health at age 55 were similar, except that the effects of the carer's gender and their caring trajectory were not significant. Those who had reported poor health at age 46 were nearly 20 times more likely to report poor health at age 55 (odds ratio = 20.36,  $p < 0.01$ ), and this effect was much higher among men than among women (*see* Tables S4 and S5 in the online supplementary material).

**Table 7.** Logistic regression showing the predictors of depression and self-reported poor health at age 55

	Depression at age 55	Self-reported poor health at age 55
	<i>Odds ratios (standard errors)</i>	
Repeat carers (Ref.)	1	1
New carers	0.735* (0.12)	0.748 (0.18)
Sporadic/intermittent carers	0.858 (0.15)	1.001 (0.27)
Stopped caring	0.936 (0.19)	0.988 (0.31)
Non-carers	0.863 (0.14)	0.947 (0.24)
Males (Ref.)	1	1
Females	1.667*** (0.13)	1.182 (0.14)
No depression at age 46 (Ref.)	1	-
Depression at age 46	17.68*** (4.10)	-
Excellent/very good/good/fair health at age 46 (Ref.)	-	1
Poor health at age 46	-	20.36*** (4.35)
Married/civil partnership (Ref.)	1	1
Single never married	2.117*** (0.35)	2.840*** (0.63)
Divorced/separated/widowed	1.828*** (0.29)	2.396*** (0.51)
Did not become widowed between age 46 and 55 (Ref.)	1	1
Became widowed between age 46 and 55	2.761*** (0.34)	2.269*** (0.41)
Living alone (Ref.)	1	1
Living with partner only	1.353*** (0.14)	1.550*** (0.23)
Living with partner and others	1	1
Living with others only	0.796 (0.14)	0.698 (0.16)
No qualifications (Ref.)	1	1
Low O-level	0.581*** (0.08)	0.691** (0.12)
High O-level	0.618*** (0.07)	0.485*** (0.07)
A-level and sub-degree	0.642*** (0.09)	0.467*** (0.09)
Degree and higher	0.495*** (0.06)	0.311*** (0.06)
N	7,004	7,007

Notes: Exponentiated coefficients. -: not applicable. Ref.: reference category.

Significance levels: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## Discussion and conclusion

This paper has been the first to analyse the caring trajectories among men and women in mid-life in Britain and their impact on two health outcomes for the carers using a nationally representative cohort study. The descriptive results and



the results from the logistic regression support the key finding that starting to care for one's parents/parents-in-law in mid-life is associated with a lower risk of reporting depression, controlling for health status at baseline and a range of demographic and socio-economic characteristics including becoming widowed. However, the same was not the case when poor self-rated health was examined, as the findings for this outcome were not statistically significant.

The existing literature has aimed to differentiate the impact of providing care on the carer's health using a range of health outcomes. Although the studies are not directly comparable, the paper's key finding is in line with longitudinal research from South Korea which focused on adult daughters and sons providing care to their parents/parents-in-law over three waves, finding adverse effects for daughter carers only (Kyung Do *et al.*, 2014). It is also in line with Fredman *et al.* (2010) who found that carers face a lower mortality risk overall but are more likely to report mental health issues. Taking into account the different caring trajectories, the lower risk of new carers reporting depression is in contrast with the studies by Kaufman *et al.* (2019) and Lu *et al.* (2019) who used metabolic syndrome as the outcome variable, and with evidence from the UK by Robards *et al.* (2015) who found that individuals who had provided care in 2001 but who were not providing care in 2011 were at greatest risk of poor health in 2011. The discrepancies may be explained partly by the health indicators used, and also important methodological differences, for instance Robards *et al.* (2015) analysed data which were ten years apart and focused on a much broader age range than the present paper.

The finding that starting to care for one's parents/parents-in-law in mid-life is associated with a lower risk of reporting depression compared to repeat caring is relevant to the 'wear-and-tear' hypothesis. The absence of adverse health outcomes associated with new carers can imply that this group of carers has not experienced the caring role long enough to start experiencing the impact of 'wear-and-tear' on their wellbeing, lending some support to the 'wear-and-tear' hypothesis. Importantly, the key finding in our analysis is a reminder of the complexity of examining the impact of care trajectories on the carers' health status. From a theoretical viewpoint, it highlights the need not only for further longitudinal research in order to better understand the impact of care-giving on the carer's health for different groups of carers, but also a more nuanced interpretation of existing hypotheses in order to take into account the complexity of caring trajectories.

In terms of caring trajectories, the analysis also highlighted that the proportion of men and women caring for their parents/parents-in-law increases significantly between the ages of 46 and 55 (from 9% of men and 16% of women at age 46, to about 60% of both genders at ages 50 and 55). From an empirical viewpoint, this finding is consistent with existing cross-sectional evidence from England showing that informal care provision peaks between the ages of 45 and 65 for men and women (Robards *et al.*, 2015) and with cohort-comparative analysis in Australia showing that a large number of women begin providing care between the ages of 53 and 61 (Tooth and Mishra, 2014). What is novel, however, is the finding that just 25 per cent of men and 29 per cent of women from the 1958 cohort did not report any caring responsibilities at ages 46, 50 or 55, highlighting that over the

life course the majority of individuals with a surviving parent or parent-in-law will provide some care.

Our research also provides evidence of a narrowing gender gap in informal care provision with increasing age (Bardoel and Drago, 2016), although it is important to note that such narrowing of the gender gap 'masks' differences both in the intensity of care provision and the types of care that men and women provide (Vlachantoni *et al.*, 2013). It is notable that women are more likely to be 'repeat' carers, caring at ages 46, 50 and 55, than men (7% *versus* 4%), and that amongst repeat carers over a third of women were providing 10 or more hours of care at age 55 compared to a fifth of men. To our knowledge this paper provides the first insights into caring trajectories across mid-life in the UK that also distinguishes how intensity of care is changing. From a theoretical viewpoint, the patterns of care provision towards one's parent/parent-in-law that we observe in mid-life could be described as a combination of 'doing tasks' and 'being in relationships' in what Keating *et al.* (2019: 147) define as 'generational care trajectories', taking place 'within high-obligation close-kin relationships with generational sequencing to cared-for persons'. As improvements in life and healthy life expectancy continue (Jagger *et al.*, 2016), examining patterns of informal care provision in mid-life and their impact on the carer's health and other resources will continue to be of paramount importance.

The study has a number of limitations which should be taken into account when interpreting the findings. Firstly, as highlighted in other research using the NCDS study (Gómez-León *et al.*, 2019), the construction of the caring trajectories and the care intensity variable used information from when the respondents were aged 46, 50 and 55. However, it is possible that the sample includes respondents who stopped or started providing care *between* the observation points, or who switched the person they were providing care for between these time-points. In reality, the trajectories described in this paper may be even more complex. A second issue with the current paper is the possibility of unobserved heterogeneity due to the dataset not including information on certain aspects of the care provision and receipt, such as the health status of the parents/parents-in-law. Existing research has highlighted the importance of taking the care recipients' need of care into account (Fingerman *et al.*, 2010). Finally, the NCDS cohort study does not provide information on whether the respondent used help from the public or private sector, in addition to providing informal care to their parents/parents-in-law. The question of the extent to which care from different sources is complementary or substitutable is pertinent in this debate (*see e.g.* Burchardt *et al.*, 2018), however, in empirical terms, it is beyond the remit of the present paper.

The findings in this paper have key implications for the design of social policies in terms of supporting informal carers in mid-life, who often juggle informal care provision for older relatives with paid employment whilst also caring for younger relatives (*see* Department of Health and Social Care, 2018; Vlachantoni *et al.*, 2020). Such policies should focus both on supporting carers to continue providing care to elderly relatives, *e.g.* in the form of respite care, and on supporting carers who wish to combine care provision with paid employment, *e.g.* providing greater flexibility in working patterns. There are a number of directions which future research in this area could take, such as the examination of the role of informal

care provision by mid-life individuals in the context of the formal social care system, the study of parents/parents-in-law preferences in terms of where their informal care support comes from (e.g. son, daughter-in-law), and the investigation of how the care responsibility for parents/parents-in-law is negotiated and distributed among adult siblings in mid-life.

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