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Abstract

Background: Identifying factors associated with Quality of Life (QoL) of elderly people with dementia could contribute to finding pathways to improve QoL for elderly people in dementia.

Aim: This paper systematically reviews all possible factors that influence QoL of elderly people with dementia, identifies how these factors are different by different stages of dementia and living settings, and explores how the influencing factors could be perceive differently by elderly people with dementia, family members, and caregivers.

Method: PubMed, PsycINFO, Web of Science and DelphiS searches from 2000 to 2015 and hand searches of publication lists, reference lists and citations were used to identify primary studies on ‘quality of life’ and ‘dementia’ elderly people.

Results: The results suggest that there are a complex variety of factors influencing QoL of elderly people with dementia, and the factors cover demographic, physical, psychological, social, and religious aspects. And the factors influencing QoL of elderly people with dementia are different in different living settings (care institutions and communities) as well as different people’s perspectives (elderly people with dementia, family members and care staff). Environmental factors and quality of care are important for elderly people in care institutions; while religious seem to only affect QoL of those living in communities. However, this review fails to comprehensively identify unique or common factors associated QoL in dementia across three stages. Further study should pay more attention to comparing factors associated with QoL in dementia across three stages of dementia.

1. Introduction

1.1 Dementia and Quality of Life (QoL)

As with population aging, increasing older people are affected by dementia in the world. In the future, the number of people with dementia in the world is expected to be 65.7 million in 2030 and 115.4 million in 2050, and over 90% of all the cases start among people with age over 65 (WHO, 2012). Such increasing prevalence is important because these people are usually heavy consumers of health care (Ferri et al., 2005). Although a variety of therapies and interventions are being developed, there is little prospect of a cure for preventing or regressing the progression of dementia (WHO, 2012). Therefore, maximizing Quality of Life for elderly people with dementia has been paid more attention from either health authorities or dementia researchers (Raeymaekers & Rogers, 2010; Moniz-Cook et al., 2008). For example, improving QoL for elderly people with dementia is one important priority outlined by the National Dementia Strategy in the UK (DH, 2011). Moreover, as a highly significant outcome of health service, QoL has become the focus of dementia research. Increasing dementia researches concentrate on pathways or interventions that can improve QoL (Kane, 2001; Rabins and Black, 2007). To successfully improve QoL of elderly people with dementia by interventions, identifying factors that associated with their QoL is essential.

1.2 Changing QoL of elderly people with dementia

Brod et al (1999) pointed out that an individual's subjective experience of QoL are shaped by their life circumstance along with their personality or characteristics. For elderly people with dementia, changes in their social or physical environment, or manifestations of dementia may have an influence on their QoL. According to the World Alzheimer's Report (2009), dementia in different stages are characterised by different levels of deterioration in cognition and functions. As with changes in environment and progressions of dementia, it is assumed that the level of QoL for elderly people with dementia changes as well.

Considering ongoing cognitive impairments, it is assumed that QoL of elderly people with dementia could decrease with the progression of dementia. Nevertheless, Beerens et al (2014) found that over 50% of elderly people with dementia report either maintenance or improvement of QoL after two years in a longitudinal survey. This suggests that the natural progression of dementia is not associated with inevitable decrease in QoL. However, the reason for this is unclear. Therefore, identifying factors influencing QoL in each stage of dementia could contribute to a better understanding of the relationship between QoL and the progression of dementia.

Moreover, as with progression of dementia, family caregivers need to provide increasingly intensive care for elderly people with dementia. When caregivers are unable to deal with the condition of their family members with dementia, it is common to transfer elderly people with dementia from home to care institutions (Moyle et al., 2007). This change of environment, from a familiar environment to an unfamiliar one, could have an influence on the QoL of elderly people with dementia. Most care institutions provide various facilities and professional care for elderly people with dementia, which is usually regarded as benefit for them; however, studies comparing QoL between elderly people with dementia in the community and those living in care institutions showed that living in the community contributed to a better QoL of elderly people with dementia (Nikmat et al., 2015; Kuo et al., 2010; Winzelberg et al., 2005). In addition, Borowiak & Kostka (2004) pointed out that determinants of QoL in older adults are different between in the communities and care institutions. Therefore, it is supposed that influencing factors on QoL of elderly people with dementia are different between community and care institution. However, few studies compared the factors associated with QoL of elderly people with dementia differences between community settings and care institution settings (Guo et al., 2010).

1.3 Discrepancies in perceptions of QoL for elderly people with dementia

Directly interviewing elderly people with dementia is usually regarded as the most desirable and reliable method to evaluate their QoL (Thorgrimsen et al., 2003). However, considering the comprehension and reliability issues brought by this method, most researchers prefer to indirect interviews with family members or caregivers of elderly people with dementia, which has been the most common method to collect relevant information (i.e. Brod et al., 1999). Although adopting such method may decrease nonresponse and lead to additional sets of issues, it is well accepted that there is a lack of concordance in answers to the same questions between elderly people with dementia and other informants including caregivers, family members, and observers (Brod et al., 1999). This concordance is usually attributed to impairment cognition of elderly people with dementia and their inabilities to accurately answer the questions. Moreover, the reliability of the information which were indirectly collected from their caregivers, families, or observers can be influenced by other factors, such as the degree of objectiveness of the questions and the relationship with elderly people with dementia (Magaziner et al., 1988). Compared with QoL of elderly people with dementia rated by other informants (either families or caregivers), the level of QoL reported by elderly people with dementia themselves are often significantly higher (Crespo et al., 2011; Conde-Sala et al., 2013). This indicates that

there exists discrepancies in perceptions of QoL in elderly people with dementia between individuals with dementia and their families and caregivers. Based on this, it can be expected that these three groups (elderly people with dementia, their family members, and their caregivers) perceive the influencing factors on QoL of elderly people with dementia in different ways. Reamy et al (2011) pointed out that individuals usually have different values and preferences with regard to improving QoL, which can result in different actions in dementia care. Therefore, understanding how elderly people with dementia, family members, and caregivers perceive the influencing factors can provide some implications in terms of making dementia care as well as delivering dementia education.

Although several previous studies (Beerens et al., 2013; Letts et al., 2011; O'Rourke et al., 2015) have conducted systematic reviews in terms of factors influencing QoL of people with dementia, all of them just focused on one special aspect in relation to the influencing factors. For example, Beerens et al (2013) only paid attention to factors associated with QoL of people with dementia in long-term care facilities, and O'Rourke et al (2015) only reviewed the factors that influence the QoL from the perspective of people with dementia. These studies failed to discuss the influencing factors at a broader level, i.e. QoL in different context (environment, stage of

dementia, perceptions).

1.4 Objectives

The objective of this review was to review all the relevant papers discussing factors associated with QoL for people with dementia, and therefore we could outline a comprehensive set of factors that affect QoL in dementia from a broader perspective. Be more specific, this review aimed to provide systematically review on the factors influencing QoL that could be different with changes of environment and progression of dementia, and even different from different perceptions. None of previous studies systematically made comparison or distinction in terms of all the factors in different context (environment, stage of dementia, perceptions). Therefore, our review also aimed to fill this gap and contribute to a better understanding of how the influencing factors change under different contexts.

2. Method

2.1 Search strategies and study selection

In attempt of identifying all factors influencing QoL for elderly people with dementia, we carried out a systematic search. Electronic database searches and bibliography reviews were conducted. Firstly, we searched PubMed, PsycINFO, Web of Science

and DelphiS electronic databases. In order to obtain comprehensive results, we only used ‘quality of life’, ‘dementia’ and ‘Alzheimer’ as the terms in the electronic database searches. specifically, we coupled the terms ‘dementia’ and ‘Alzheimer’ separately with the other term ‘quality of life’.

It should be noticed that the influence of some factors associated with QoL can be changed by social development in various aspects like technology, social welfare and values (for example, savings are important determinant of QoL of the elderly in the absence of social welfare in later life; while the development of social security for elderly people could result in the influence of savings on QoL may not be obvious). Therefore, to eliminate the influence brought by social changes, limits were set to studies published in English after the year of 2000.

All the references retrieved were checked via title and abstract screening. Studies included in our review are all associated with factors influencing QoL specifically for elderly people with dementia. Our exclusion criteria used to further refine the results involves: (1) papers whose main focus is not QoL for elderly people with dementia (2) papers are concerned with weighting intervention or treatment for dementia using indicators of QoL, though they provide the context of QoL in dementia (3) papers are

mainly on medically specific areas (focusing on effectiveness of certain drugs or treatment) (4) papers only report the level of QoL for elderly people with dementia without study the factors influencing QoL explicitly. In addition, we reviewed the reference lists of all the included articles, and identified additional relevant studies .

2.2 Data extraction and study classification

We created an Excel spreadsheet to record key information extracted from each included study, including country of study, study design, study setting, study size, characteristics of the sample, methods used to evaluate QoL and results.

Then we classified each study into different categories. Though organising or grouping the selected papers, our literature review tends to be more effective. All the literature for review were grouped into four categories.

(1) Country of origin

(2) Methodology (literature review, quantitative research method, qualitative research method, mixed method)

(3) Settings (community, care institutions)

(4) Stages of dementia (mild, moderate, severe)

2.3 Quality assessment

As the quality of studies included can directly determine the reliability of our review in this paper, therefore it is necessary to evaluate the level of their quality. Then we discussed the quality of the literatures included in our review. According to Horsburgh (2003), applying quantitative conceptualisation of validity and reliability in assessing quality of qualitative researches is not appropriate. As the result, we evaluated the quality of literatures included by different research methods (quantitative methods and qualitative methods).

2.3.1 Quality of quantitative studies reviewed

Each quantitative study included in our review was evaluated from five aspects: study descriptions, sample, measurement used, analysis and interpretation of the results. This checklist is based on the critical appraisal tools from Zaza et al. (2000), which is tailored for used in systematic review. Specifically, there are five criteria used to judge the quality of the studies: (1) providing clear study descriptions in relation to research objective, data collection methods and participant characteristics (2) clear sampling methods and adequate sample size ($N \geq 200$) (3) adopting valid and reliable measurements (4)an appropriate analysis of the data (5) discussion and conclusion keeping consistent with the results. If the studies meet all the criteria, their quality is regarded as high. A study of moderate quality should meet three of the five criteria as

a minimum. If the study only meet one or two criteria, it will be judged as low quality.

2.3.2 Quality of qualitative studies reviewed

Popay et al (1998) argued that the key criteria that are recognised as the foundation of a good qualitative research includes interpretation of findings and qualitative research design. Therefore we evaluated the qualitative studies using these two criteria. In terms of interpretation of subjective meaning, we mainly focus on whether the findings were clear, and consist with supporting quotations. Also, we assessed that whether the objectives of each research are clear, and the questions are well answered using its qualitative method.

3. Results

3.1. Literature search results

Figure 1 shows the results of our systematic literature search. A total of 968 results were retrieved from the literature search, of which there were 533 articles with full text available for review. After applying our four exclusion criteria, a total of 486 irrelevant studies were excluded. There were 9 additional relevant papers identified from our bibliography reviews. As the result, there are 56 references used for our

literature review.

3.2 Quality of the literature for review

Assessments of 39 quantitative studies in terms of the five criteria are shown in the Table 1. Majority studies give a clear description of research background, purpose, participants, and data collection method. In terms of sampling method, 16 studies describe specifically inclusion and exclusion criteria. The sample size varies from 49 to 1266. The sample size (n=51) in one study is rather small (Clare et al., 2014). In conclusion, only eight quantitative studies (Li et al., 2012; Edvardsson, 2014; Marventano et al., 2015; Wetzels et al., 2010; Crespo et al., 2011; Black et al., 2012; Terada et al., 2012; Monteiro et al., 2014) are considered to be as high quality, which meet all the quality criteria. Five articles were considered to be low-quality articles (Altus et al., 2002; Winzelberg et al., 2005; Hodgson et al., 2014; Heggie et al., 2011; Banerjee et al., 2005), as they only meet one or two criteria (See Table 1). The quality of the remaining 26 studies are judged as moderate. It is evident that majority studies are moderate to high quality, therefore, the findings from these 39 quantitative surveys are reliable in general.

Figure 1 Literature search and data classification flow diagram

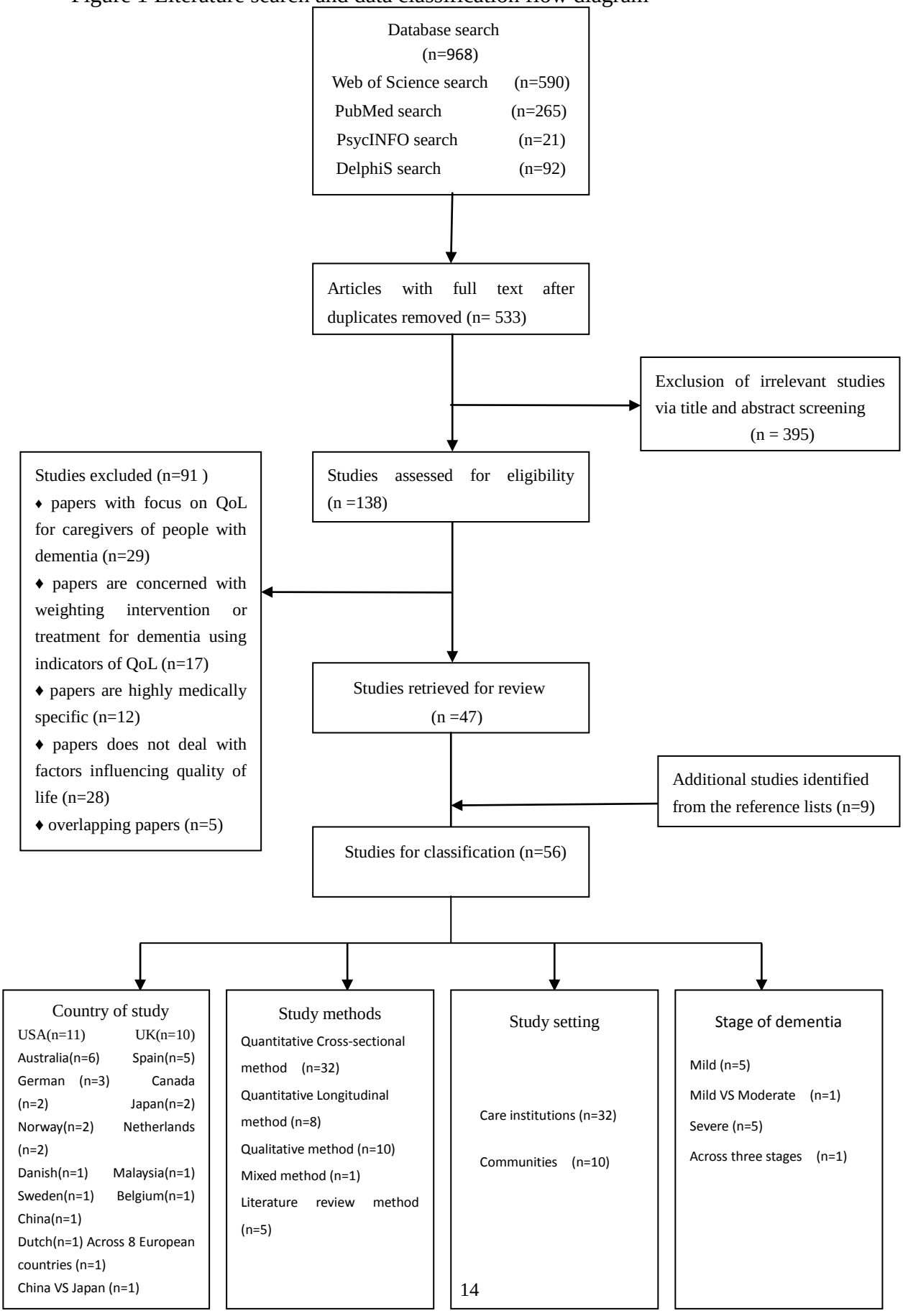

Table 1: Quality assessments for quantitative studies included

	clear Descriptions	adequate sample size	reliable measurements	appropriate analysis	reasonable discussion
Kuo et al 2010	+	+	−	+	+
Banerjee et al 2005	−	−	+	−	−
Andersen et al 2004	+	+	−	+	+
Grske et al 2014	−	+	+	−	+
Nagpal et al 201	+	−	+	+	+
Marventano et al 2015	+	+	+	+	+
León-Salas et al 2015	+	+	−	+	+
Dawson et al 2012	+	−	+	+	+
Hendriks et al 2014	−	+	+	−	+
Woods et al 2014	+	−	+	+	+
Clare et al 2014	+	−	+	+	+
Giebel et al 2013	+	−	+	+	+
Clare et al 2014 b	+	−	+	+	+
Garre-Olmo et al 2012	+	−	+	+	+
Heggie et al 2011	−	−	+	+	−
Nikmat et al 2015	+	−	−	+	+
Terada et al 2012	+	+	+	+	+
Hodgson et al 2014	−	−	−	+	+
Wolf-Ostermann et al 2014	+	−	+	+	−
Castillo et al 2010	+	−	+	+	+
Gräske et al 2015	+	+	−	+	−
Salvador et al 2000	+	−	−	+	+
Mjørud et al 2014	+	−	+	+	+
Black et al 2012	+	+	+	+	+

Monteiro et al 2014	+	+	+	+	+
Beerens et al 2014	+	+	−	+	+
Li et al 2012	+	+	+	+	+
Edvardsson 2014	+	+	+	+	+
Ven-Vakhteeva et al 2013	+	+	−	+	−
Beer et al 2010	−	+	+	+	−
Samus et al 2005	+	−	+	+	+
Sloane et al 2005	+	+	−	+	+
Winzelberg et al 2005	−	−	+	+	−
Zimmerman et al 2005	+	+	−	+	−
Crespo et al 2011	+	+	+	+	+
Missotten et al 2007	+	−	+	+	+
Altus et al 2002	+	−	−	−	+
Barca et al 2011	−	+	−	+	+
Wetzels et al 2010	+	+	+	+	+

Source: Author's own research

With regard to the included 9 qualitative studies, eight studies used qualitative interviews while one study adopted focus group method. Each study successfully addressed its research question using its research method, and all studies provide clear findings supported by quotations. Thus, we believe that the quality of the 9 qualitative studies is comparative high with reliable findings.

In conclusion, majority literatures included in this review are of moderate to high

quality, and the findings from the literatures reviewed can be reliable in general. The quality assessment is important for the interpretation of the findings of this review: results based on the studies of low quality are supposed to be treated with more cautious.

3.3 Factors influencing QoL

Findings from the 56 studies provided evidence of influencing factors that significantly associated with QoL for elderly people with dementia. And we reported the factors by grouping them into demographic characteristics, physical factors, psychological and emotional factors, social factors, and religious, environmental and other factors of elderly people with dementia. Table 2 shows a summary of the results for each article, grouped by these five factors.

3.3.1 Demographic characteristics

Seventeen studies took demographic characteristics of elderly people with dementia (i.e. age, gender, race, marital status and personal characteristics) into account, examining the relationship between these demographic characteristics and QoL. Although there are nine studies did not find any relationship between demographic characteristics and QoL (Andersen et al, 2004; Grske et al, 2014; Moyle et al, 2015;

Monteiro et al, 2014; Sloane et al, 2005; Winzelberg et al, 2005; Zimmerman et al, 2005; Wetzels et al, 2010; Salvador et al., 2000), other studies found that higher education (Marventano et al, 2015; Li et al, 2012), males (Woods et al, 2014; Barca et al 2011), white (Black et al, 2012), widowed (Samus et al, 2005) and extroverted characteristic (Li et al., 2012) tended to be positively associated with better QoL for elderly people with dementia. Moreover, Banerjee et al (2005) found that QoL of people with dementia showed decline as with the increasing age, while Mjørud et al (2014) indicated that the QoL was worse among the youngest (<79) and oldest (>90) people with dementia.

3.3.2 Physical factors

According to the findings from the previous studies, physical factors associated with QoL in dementia can be grouped into 5 main factors: physical independence, physical health, physical and behavioural symptoms, physical activities and physical body.

Twenty-two studies indicated that physical independence in performing the activities of daily living (e.g. dressing, mobility and personal toiletry) have an important effect on QoL for elderly people with dementia, indicating that greater functional dependency in activities of daily living is related to lower QoL ratings. While only

Banerjee et al (2005) reported a different findings as to the relationship between physical independence and QoL, suggesting functional limitation remained statistically insignificant. However, it should be noticed that the quality of Banerjee et al (2005) has been assessed as poor. With lower statistical power, explanations of the different findings in Banerjee et al (2005) are problematic, and should be treated cautiously.

Factors in relation to the physical health of elderly people with dementia consist of four influencing sub-factors: general health status, comorbidity, cognitive status and severity of dementia. QoL showed higher among the elderly people with dementia whose general health status is better (Marventano et al, 2015; Nikmat et al, 2015; Black et al, 2012; Samus et al, 2005; Zimmerman et al, 2005; Byrne et al, 2006; Silberfeld et al, 2002). Four studies (León-Salas et al, 2015; Beerens et al, 2014; Monteiro et al, 2014; Zimmerman et al, 2005) examined the relationship between comorbidity and QoL for elderly people with dementia, results indicating that the increasing number of chronic health problems is a negative association with QoL. In regard to cognitive status, it is interesting that studies show mixed results in general. Seventeen studies reported the influence of cognitive status on QoL of elderly people with dementia. 15 studies (León-Salas et al., 2015; Garre-Olmo et al., 2012; Hodgson

et al., 2014; Salvador et al., 2000; Black et al., 2012; Beerens et al., 2014; Beer et al., 2010; Samus et al., 2005; Sloane et al., 2005; Winzelberg et al., 2005; Beerens et al., 2013; Missotten et al., 2007; Barca et al., 2011; Wetzels et al., 2010; Mjørud et al., 2014) concluded that cognitive impairment are inversely associated with QoL of elderly people with dementia, except for Monteiro et al (2014) and Zimmerman et al (2005). These two studies failed to find a statistically significant association between cognitive status and QoL. As to the severity of dementia, only two studies (Marventano et al, 2015; Mjørud et al, 2014) explored its influence on QoL for elderly people with dementia. Both of them indicated that QoL for elderly people with dementia tends to decrease with increasing severity of dementia. Such results may be supportive to the finding regarding the negative association between cognitive impairment and QoL.

With regard to physical symptoms, pain can be one negative factor influencing QoL for elderly people with dementia (Hendriks et al, 2014; Hodgson et al, 2014; Beer et al, 2010). It is assumed that such influence may be more evident among elderly people with severe dementia. Occurrence of challenging behaviours such as physical aggressive behaviours are recognised as another adverse predictor in QoL rating (Grske et al, 2014; Winzelberg et al, 2005; Zimmerman et al, 2005).

The influences of physical activities on QoL for elderly people with dementia were identified by five studies (Potter et al, 2011; Beerens et al, 2014; Letts et al, 2011; Silberfeld et al, 2002; Orpwood et al, 2007). The results indicate that active participation into daily physical activities has a positive effect on QoL in elderly people with dementia. Such physical activities can involve physical exercise (like aerobic, balance and flexibility) and leisure activities (like parlour games or excursions). In addition to physical activities, there are various factors related to physical body reported by studies. Keeping physical body safety (Beer et al, 2010; Samus et al, 2005), cleanliness (Russell et al, 2008), comfort (Silberfeld et al, 2002) and nourishment (Li et al, 2012; Russell et al, 2008) can contribute to a better QoL in elderly people with dementia. While keeping physical restrained (Beer et al, 2010) and fatigue (Silberfeld et al, 2002) predict lower QoL rating for elderly people in dementia.

3.3.3 Psychological and emotional factors

Psychological and emotional factors including psychological and behavioural symptoms, positive mood, control, autonomy, dignity, contributing, and self-efficacy perception play an important role in determining QoL in elderly people with

dementia. The influence of psychological and emotional symptoms on QoL in elderly people with dementia is examined by 21 studies. Symptoms involving depression, agitation, irritability, anxiety and apathy are negatively associated with QoL for elderly people with dementia, indicating that more psychological symptoms are related to lower QoL. Among these symptoms, the negative effect of depression on QoL was reported by the majority of studies (n=16) indicating that depressive symptom tends to be a stronger predictor than other psychological symptoms. Moreover, based on Byrne et al (2006) and Clare et al (2014), positive mood like felling happy and satisfaction with life is usually related with higher QoL for elderly people with dementia. In addition, O'Rourke et al (2015) and Crespo et al (2011) pointed out that making choices independently for elderly people with dementia is an important determinant in improving their QoL in dementia care. This suggests that autonomy is a positive predictor of higher QoL of elderly people with dementia cared by other people. Other factors influencing a positive QoL of elderly people with dementia are related to needing some control over their life in dementia care (Moyle et al, 2011; Moyle et al, 2015), enforcement of dignity(Manthorpe et al, 2010; Venturato, 2010; Russell et al, 2008), respecting their personhood (Venturato, 2010), and being useful and contributing to society (Moyle et al, 2011; O'Rourke et al, 2015; Byrne et al, 2006; Silberfeld et al, 2002). Besides, Dawson et al (2012) pointed out

that greater self-efficacy perception (inner stength and personal growth) of elderly people with dementia also positively affect their self-rated QoL.

3.3.4 Social factors

In regard to social factors, relationship, communication and social connection and volunteering are four important determinants of QoL for elderly people with dementia. According to the findings of seven studies (Moyle et al., 2011; Woods et al., 2014; Clare et al., 2014b; Nikmat et al., 2015; O'Rourke et al., 2015; Orpwood et al., 2007; and Moyle et al., 2015) it is suggested that higher quality of relationship with family, friends, neighbours and caregivers, either family caregivers or care staff, is associated with increased QoL of elderly people with dementia. In addition, effective communication with their caregivers for elderly people with dementia will enhance their QoL (Young et al, 2011; Zimmerman et al, 2005; Orpwood et al, 2007). Social connection with family, community and nature, such as gathering and talking with family, friends, and neighbours (Marventano et al., 2015; Moyle et al., 2015; Moyle et al., 2011; O'Rourke et al, 2015; Castillo et al, 2010; Gräske et al., 2015; Byrne et al., 2006; Orpwood et al., 2007), access to nature (Orpwood et al., 2007), and participation in social activities like organised outside activities (Moyle et al., 2015; Silberfeld et al., 2002; Orpwood et al., 2007), contribute to a higher level of QoL for

elderly people with dementia. Besides, two studies (George, 2010; Letts et al., 2011) explored the role of volunteering in QoL for elderly people with dementia. George (2010) examined the relationship between international volunteering experience of elderly people with dementia (hour-long visits with a kindergarten classroom) and their QoL. Letts et al (2011) explored the association between volunteer visit to elderly people with dementia and the QoL. Both two studies indicate that volunteering benefits improving QoL in elderly people with dementia.

3.3.5 Religious, environmental and other factors

Only two studies considered religion as one influencing factor in QoL for elderly people with dementia. One is Nagpal et al (2014), it concluded that caregivers' religiosity is positively related to self-reported QoL for elderly people with dementia while religiosity of elderly people with dementia is negatively associated with their QoL based on their caregivers' reports. Another is Byrne et al (2006), this study discovered 22 issues including religion contributing to QoL for elderly people with dementia.

As to factors related to environment, accommodation situation is one of the important factors influencing QoL for elderly people with dementia. Elderly people with

dementia living in their own home tended to report higher QoL than those living in care institutions. This is supported by four studies (Kuo et al, 2010; Nikmat et al, 2015; Salvador et al, 2000; Winzelberg et al, 2005). Besides, Zimmerman et al (2005) recognised that elderly people with dementia in residential care/assisted living settings showed higher QoL than those in nursing homes. Moreover, Marventano et al (2015) pointed out that elderly people with dementia in public centers (public ownership or publicly-funded care institutions) were also associated with higher QoL than those in private/mixed centers. On the contrary, there is only one study (Andersen et al, 2004) claiming that the level of QoL showed no statistically significant between elderly people with dementia in community and those in care institutions. The characteristics of environment are also valuable for QoL in dementia, especially for elderly people with dementia in care institutions. For example, high temperature and low lightening level in bedroom or high noise level all could impair QoL. In addition, having a single room (Russell et al., 2008; Moyle et al., 2014), a window to look out of and fresh air (Russell et al., 2008), placing their ‘mark’ on the environment through familiar objects such as furnishings and photographs (Moyle et al., 2014), and homelike environment (Wolf-Ostermann et al., 2014), all could improve the level of QoL for elderly people with dementia. However, the positive influence of homelike environment on QoL was questioned by Samus et al (2005). Their study indicated that homelike environment as

well as facility size were not significant predictors of quality of life for elderly people with dementia.

With regard to other factors associated with QoL in elderly people with dementia, medication use can be one important factor. A total of five studies explored the relationship between use of medication and QoL of elderly people with dementia. Ven-Vakhteeva et al (2013) found no evidence for the relationship between QoL and use of antipsychotics drug. However, three studies (Wetzels et al., 2010; Clare et al., 2014b; Clare et al., 2014) pointed out that use of psychotropic drug is related to lower QoL for elderly people with dementia. In addition, Black et al (2012) suggested that the level of QoL for elderly people with dementia could decrease when they take more medication including psychotropic medication, and other types of medication. In fact, elderly people with dementia taking more medications indicate that they may have more other diseases. This finding may be supportive that comorbidity is associated with lower QoL of elderly people with dementia.

Another influencing factor in QoL is financial security for elderly people with dementia. Four studies (Fukushima et al., 2004; Nikmat et al., 2015; Li et al., 2012; Byrne et al., 2006) explored the association between financial status and QoL for

elderly people with dementia, and the results suggested that financial security is a key factor in determining QoL. Additionally, quality of dementia care is also an essential factor influencing QoL. Person-centered/individualised dementia care (Terada et al., 2012; Winzelberg et al., 2005; Moyle et al., 2014), supportive care staff (Moyle et al., 2014) and their positive, confident attitude towards dementia (Winzelberg et al, 2005; Zimmerman et al, 2005) can directly enhance QoL for elderly people with dementia in care institutions. Moreover, staff training is also important in improving QoL through enhancing quality of dementia care (Winzelberg et al, 2005; Zimmerman et al, 2005). While Beer et al (2011) found that delivery of education for either general practitioners or care staffs have no effect on improving QoL in residents with dementia. Also, Orpwood et al (2007) recognised that application of dementia-led assistive technology, such as a simple music player and a conversation prompter, in elderly people with dementia appears linked to increase in their QoL.

This section has reviewed various important factors that determine QoL of elderly people with dementia from demographical, physical, psychological, social, religious and other aspects. However, not every factor has significant influences on QoL for elderly people with dementia, and its influence can be different by settings and the progression of dementia. Therefore, the next section focuses on the factors under

different contexts of living settings.

Table 2: Summary of results

References	Factors & Results				
	Demographic Characteristics	Physical factors	Psychological and emotional factors	Social factors	Religious, environmental and other factors
Andersen et al 2004	There was no significant association between demographic characteristics and QoL.				No statistically significant differences were found for those elderly people with dementia living in community and in care institutions.
Grske et al 2014		Physical aggressive behaviours were negative association with QoL.			
Monteiro et al 2014		Comorbidity was associated with QoL for elderly people with dementia; increasing			

		number of chronic health problems was negative with QoL. There was no statistically significant association between cognitive status and QoL.			
Moyle et al 2015			Needing some control over their life in dementia care was positive associated with higher QoL of elderly people with dementia.	Higher quality of relationship with family, care staff and other residents was associated with increased QoL of elderly people with dementia. Social interaction with family, friends, residents, and staff contributed a higher level of QoL for elderly people with	

				dementia. Participation in social activities like organised outside activities were linked to better QoL of elderly people with dementia.	
Sloane et al 2005		Cognitive impairment was inversely associated with QoL of elderly people with dementia.			
Wetzels et al 2010		Cognitive impairment was inversely associated with QoL of elderly people with dementia.			Psychotropic drug could lower QoL for elderly people with dementia.
Winzelberg et al 2005		Physical aggressive behaviours were negative association with QoL.	Scores on the QoL were most strongly associated with depression among		Elderly people with dementia living in their own home tended to report higher QoL

		Cognitive impairment was inversely associated with QoL of elderly people with dementia.	elderly people with dementia.		than those living in care institutions. Person-centred/individualised dementia care can directly enhance QoL for elderly people with dementia in care institutions. And staff training was also important in improving QoL through enhancing quality of dementia care.
Zimmerman et al 2005		Better general health status was associated with higher QoL among the elderly people with dementia. Comorbidity		Effective communication with their caregivers improved QoL of elderly people with dementia.	Elderly people with dementia in residential care/assisted living settings showed higher QoL than those in nursing homes. Positive, confident

		was associated with QoL for elderly people with dementia; increasing number of chronic health problems is negative with QoL. No statistically significant association between cognitive status and QoL. Physical aggressive behaviours are negative association with QoL.			attitude towards dementia of staff can directly improve QoL for elderly people with dementia in care institutions. And staff training was also important in improving QoL through enhancing quality of dementia care.
Banerjee et al 2005	The older age was significantly associated with lower QoL for	The effect of functional limitation was statistically insignificant on QoL.	Decreased QoL was statistically significantly correlated with higher levels of psychological		

	elderly people with dementia.		disturbance.		
Black et al 2012	White elderly people enjoyed better QoL than non-white elderly people.	Better general health status was associated with higher QoL among the elderly people with dementia. Comorbidity was associated with QoL for elderly people with dementia; increasing number of chronic health problems was negative associated with QoL. Cognitive impairment was inversely associated with QoL of elderly	QoL was related significantly to depression of elderly people with dementia.		Having more medication was negative associated with the level of QoL for elderly people with dementia.

		people with dementia.			
Li et al 2012	Higher education level and extroverted characteristic tended to have a better QoL.	Keeping physical body nourishment can contribute to a better QoL.	Depression was one of the influencing factors of dementia patient's QoL.		Having financial security was associated with better QoL of elderly people with dementia.
Marventano et al 2015	Higher education level tended to have a better QoL.	Better General health status was associated with higher QoL among the elderly people with dementia. QoL for elderly people with dementia tends to decrease with increasing severity of dementia.	Higher levels of depression had a negative effect on QoL.	Gathering with family, friends or neighbours was associated with a higher level of QoL for elderly people with dementia.	Elderly people with dementia living in public centres (public ownership or publicly-funded care institutions) was associated with higher QoL than those in private/mixed centres.

Mjørud et al 2014	Higher education level tended to have a better QoL. White elderly people enjoyed better QoL compared with non-white elderly people	QoL for elderly people with dementia tended to decrease with increasing severity of dementia, and cognitive impairment was inversely associated with QoL of elderly people with dementia. QoL for elderly people with dementia tended to decrease with increasing severity of dementia.			
Samus et al 2005	Widowed elderly people with dementia was associated with	Better general health status was associated with higher QoL among the elderly people with	Depression was a significant predictor of QoL.		Homelike environment and facility size were not significant predictors of QoL for elderly people with

	better QoL	dementia. Comorbidity was associated with QoL for elderly people with dementia, increasing number of chronic health problems is negative with QoL. Cognitive impairment was inversely associated with QoL of elderly people with dementia. Keeping physical body safety can contribute to a better QoL.			dementia.
Barca et al 2011	Males with dementia usually	Cognitive impairment was inversely associated	Major depression was associated with lower		

	reported better QoL than females.	with QoL of elderly people with dementia.	QoL of people with dementia.		
Woods et al 2014		Cognitive impairment was not related to QoL.		Higher quality of relationship with the care-giver was associated with increased QoL of elderly people with dementia.	
Beer et al 2010		Pain and cognitive impairment were negative factors with QoL for elderly people with dementia. Keeping physical body safety can contribute to a better QoL. Keeping physical restrained could lower			

		QoL.			
Beer et al 2011					Delivery of education for either general practitioners or care staffs had no effect on improving QoL in residents with dementia.
Beerens et al 2013		Cognitive impairment was inversely associated with QoL of elderly people with dementia.	Depressive symptoms were negatively related to QoL of people with dementia.		
Beerens et al 2014		Comorbidity was associated with QoL for elderly people with dementia; increasing number of chronic health problems is negative	More depressive symptoms at baseline were associated with declined proxy-reported QoL.		

		with QoL. Better cognitive abilities at baseline were associated with a decrease in QoL. Daily physical activities have a positive effect on QoL in elderly people with dementia.			
Byrne et al 2006		Better general health status was associated with higher QoL among the elderly people with dementia. Comorbidity was associated with QoL for elderly people with dementia; increasing	There was negative effect of depressive symptom on QoL of elderly people with dementia. Felling happy and satisfaction with life were usually related with higher QoL. And	Social interaction with partner, children, other family, friends were associated with a higher level of QoL for elderly people with dementia.	Religion contributed to QoL for elderly people with dementia. Financial security was a key factor in determining QoL of elderly people with dementia.

		number of chronic health problems was negative with QoL.	elderly people with dementia who feel being useful and contributing to society were associated with better QoL.		
Castillo et al 2010			Psychological symptoms had an indirect effect on elderly people with dementia's QoL.	Community involvement, company by other people were associated with a higher level of QoL for elderly people with dementia.	
Clare et al 2014			There was negative effect of depressive symptom on QoL of elderly people with dementia. Felling happy		Use of psychotropic drug was related to lower QoL for elderly people with dementia

			and satisfaction with life were usually related with higher QoL.		
Clare et al 2014 b				Higher quality of relationship with carer was associated with increased QoL of elderly people with dementia.	Psychotropic drug could lower QoL for elderly people with dementia.
Crespo et al 2011			Making own choices was an important determinant in improving QoL of elderly people with dementia in dementia care.		
Dawson et al 2012			Greater self-efficacy perception (inner		

			strength and personal growth) of elderly people with dementia also positively associated with their self-rated QoL.		
Fukushima et al 2004					Having financial security was associated with better QoL of elderly people with dementia.
Garre-Olmo et al 2012		Cognitive impairment was inversely associated with QoL of elderly people with dementia.			
George 2010				Volunteering experience of elderly people with dementia was associated with improved	

				QoL.	
Gräske et al 2015				Family visit were associated with a higher level of QoL for elderly people with dementia.	
Heggie et al 2011			Depressed mood was a significant predictor of QoL of elderly people with dementia.		
Hendriks et al 2014		Pain was a negative factor with QoL for elderly people with dementia.			
Hodgson et al 2014		Pain and cognitive impairment were negative factors with QoL for elderly people			

		with dementia.			
Kuo et al 2010					Elderly people with dementia living in their own home tended to report higher QoL than those living in care institutions.
León-Salas et al 2015		Comorbidity was associated with QoL for elderly people with dementia; increasing number of chronic health problems was negative with QoL. Cognitive status had an influential role in QoL			
Letts et al 2011		Daily physical activities		Having volunteer visitors to	

		had a positive effect on QoL in elderly people with dementia.		elderly people with dementia were linked to improved QoL of elderly people with dementia.	
Manthorpe et al 2010			Enforcement of dignity was positive associated with higher QoL of elderly people with dementia.		
Missotten et al 2007		Cognitive impairment was inversely associated with QoL of elderly people with dementia.			
Moyle et al 2011			Needing some control over their life in dementia care was	Higher quality of relationship with family and other residents and care staff was associated	

			positive associated with higher QoL of elderly people with dementia. Elderly people with dementia who feel being useful and contributing to society was associated with better QoL.	with increased QoL of elderly people with dementia; and regular family visits, making friends could contribute a higher level of QoL for elderly people with dementia.	
Moyle et al 2014					Having a single room and placing their 'mark' on the environment through familiar objects could improve the level of QoL for elderly people with dementia. Person-centred/individualised

					dementia care and supportive care staff can directly enhance QoL for elderly people with dementia in care institutions.
Nagpal et al 2014					Caregivers' religiosity was positively related to QoL for elderly people with dementia while religiosity of elderly people with dementia was negatively associated with their QoL based on their caregivers' reports.
Nikmat et al 2015		Better general health status was associated with higher QoL among the elderly people with	No significant differences were found by depression between the study cohorts of QoL	Higher quality of relationship with children was associated with increased QoL of elderly people with dementia.	Elderly people with dementia living in their own home tended to report higher QoL than those living in care

		dementia.	among people with mild dementia.		institutions. Financial security was a key factor in determining QoL of elderly people with dementia.
O'Rourke et al 2015			Making own choices was an important determinant in improving QoL of elderly people with dementia in dementia care. Elderly people with dementia who feel being useful and contributing to society were associated with better QoL.	Higher quality of relationship with family, friends, long-term, care staff, and other residents was associated with increased QoL of elderly people with dementia; and positive interactions with other people contributed a higher level of QoL for elderly people with dementia.	

Orpwood et al 2007		Daily physical activities had a positive effect on QoL in elderly people with dementia.		Higher quality of relationship with local community was associated with increased QoL of elderly people with dementia. Effective communication with their caregivers improved QoL of elderly people with dementia. Gathering and talking with family, friends, and neighbours, and access to nature contributed a higher level of QoL for elderly people with dementia. Participation in social activities like organised outside activities were linked	Application of dementia-led assistive technology, such as a simple music player and a conversation prompter, in elderly people with dementia appears linked to increased QoL.

				to better QoL of elderly people with dementia.	
Potter et al 2011		Daily physical activities had a positive effect on QoL in elderly people with dementia.			
Russell et al 2008		Keeping physical body cleanliness and nourishment can contribute to a better QoL	Enforcement of dignity was positive associated with higher QoL of elderly people with dementia.		Having a single room and a window to look out of and fresh air could improve the level of QoL for elderly people with dementia.
Salvador et al 2000		Cognitive impairment was inversely associated with QoL of elderly people with dementia.	Worse depression was associated with lower QoL scores.		Elderly people with dementia living in their own home tended to report higher QoL than those living in care institutions.

Silberfeld et al 2002		Better general health status was associated with higher QoL among the elderly people with dementia. Daily physical activities had a positive effect on QoL in elderly people with dementia. Keeping physical body comfort can contribute to a better QoL, while, keeping physical fatigue could lower QoL rating.	Elderly people with dementia who feel being useful and contributing to society was associated with better QoL.	Participation in social activities like organized outside activities were linked to better QoL of elderly people with dementia.	
Terada et al 2012					Person-centered/individualized dementia care can directly enhance QoL for elderly

					people with dementia in care institutions.
Venturato 2010			Enforcement of dignity were positive associated with higher QoL of elderly people with dementia and elderly people with dementia who were respected their personhood were associated with better QoL.		
Ven-Vakhteeva et al 2013					There was no evidence of a significant effect of use of antipsychotics drug on QoL.
Wolf-Ostermann					Homelike environment could

et al 2014					improve the level of QoL for elderly people with dementia.
Young et al 2011				Effective communication with their caregivers improved QoL of elderly people with dementia.	

3.4 Factors in different settings

It is assumed that the association between different factors and QoL may be different for elderly people with dementia living in community and living in care institutions. Therefore, we compared the factors between these two living settings based on 10 studies in community settings and 32 studies in care institution settings involving nursing home, residential home, and long-term care facility. Table 2 shows the influencing factors in QoL of elderly people with dementia in two settings separately, as well as the number of studies for each factor.

Table 2 Frequency of the influencing factors in two settings

Factors associated with QoL		Times of being reported (communities)	Times of being reported (care institutions)
Physical factors	challenging behaviors	2	2
	functional independence	6	13
	current health status	2	9
	cognitive status	1	12
	pain	2	1
	everyday activities		1
	safety		1
	restrained		1
	control over life		3

Psychological factors	valuable		1
	dignity or human rights		1
	resident mood	1	1
	psychological symptoms	4 (depression 3)	12 (depression 6)
	self-efficacy perception	1	
Social factors	international volunteering		1 1
	effective communication		2
	relationship	2	1
	family		4
	social interaction	2	1
Religious factor	church visit	1	
	religiosity	1	
Environmental factors	private room		2
	homelike environment		1
	temperature, lightening, noise		1
Other factors	supportive staff		3
	Financial security	1	2
	maintenance		1
	years of living institution		1
	institutions characteristics		4
	use of antipsychotric medication	1	2
	person-centred care		2
	sleep disruption	1	
	unmet need	1	

Source: author's review of the literature

3.4.1 Factors influencing QoL of elderly people with dementia in both communities and care institutions

Functional independence, challenging behaviors, current general health, cognitive status, psychological mood and symptoms, relationship, social interactions, financial security and use of antipsychotric medication are the common factors that influencing QoL for elderly people with dementia in two living settings. Among these factors, functional independence and psychological symptoms (particularly for depression) have been more focused both in communities or care institutions. Cognitive status is an important factor in QoL for elderly people with dementia in care institutions, which is confirmed by 12 studies. While in communities the influence of cognition is identified in only one study. This may suggest that cognition is a more obvious influence factor on QoL of elderly people with dementia in care institutions than QoL of those in communities. And such result may be explained by the fact that elderly people with dementia who show poorer cognition, greater disability and greater neuropsychiatric symptoms are more likely to live in care institutions. This means that majority elderly people with dementia in care institutions are usually in the severe stage of dementia. As the result, functional independence, cognitive status, and depressive symptom have been more obviously influence on QoL of elderly people with dementia in care institutions than those living in communities.

3.4.2 Factors influencing QoL of elderly people with dementia only in care institutions

As to factors influencing QoL of elderly people with dementia only in care institutions, most are concerned with the characteristics and environment of institutions and quality of care provided by care staff. Elderly people with dementia in facilities with specialized workers or GPs usually have higher QoL (Marventano et al., 2015; Zimmerman et al., 2005). Besides, elderly people living in residential care perceived their QoL better than those in nursing homes (Zimmerman et al 2005). High quality of care provided by care staff, for example person-centered care, treating elderly people with dementia with respect and dignity, being supportive to residents, have an positive influence on the QoL. Moreover, it should not be neglected that increasing years of living in care institutions is a negative predictor of QoL for elderly people with dementia. One possible reason could be the longer the elderly people staying in care institutions may indicate the greater severity of dementia they are.

3.4.3 Factors influencing QoL of elderly people with dementia only in communities

In terms of elderly people with dementia living in communities, religion is the only main factor influencing QoL for them. Nagpal et al (2014) point out that family caregivers' religiosity is positively related to QoL of their relatives with dementia.

Besides, church visit also plays an important role in improving QoL for elderly people with dementia living in communities. Additionally, greater self-efficacy perception (inner strength, personal growth) could improve the QoL while sleep disruption and increasing unmet need have an negative impact on the QoL, only for elderly people with dementia in communities.

Based on the discussion above, it is obvious that factors influencing QoL of elderly people with dementia change with different living settings. Factors including environmental factors and quality of dementia care only have an influence on QoL of elderly people with dementia in care institutions; while, religious factors seem to only affect QoL of those in communities. Though QoL of elderly people with dementia can be influenced by cognition and functional independence regardless of settings, these two factors produce greater effects on the individuals in care institutions.

3.5 Factors in different stages of dementia

For all the studies reviewed in our study, 9 studies explored influencing factors in the QoL by different stages of dementia. It is assumed that factors related to QoL can be different in different stages of dementia. Table 3 presents these 9 studies related to QoL of elderly people with dementia across three stages (mild, moderate and severe).

Table 3: Factors in different stages of dementia

Study	Method	Stages	Influencing factors in QoL
Hendriks et al. 2014	Cross sectional	Severe	pain, agitation
Woods et al. 2014	Cross sectional	Mild	depressed mood, severity of irritability, self-concept, relationship, male gender
Clare et al. 2014a	Cross sectional	Severe	use of antipsychotric medication, mood, cognition
Giebel et al. 2013	Cross sectional	Three stages	continence (mild), ADL performance (moderate), transfer (severe)
Clare et al. 2014b	Longitudinal	Mild	use of medication, relationship with caregivers
Garre-Olmo et al. 2012	Cross sectional	Severe	cognition, environmental factors, (temperature,lighting, noise)
Heggie et al. 2011	Longitudinal	Mild	depression, functional ability
Nikmat et al. 2015	Cross sectional	Mild	setting, financial status, relationship with children, ADL, depression, general health
Russell et al. 2008	Qualitative	Severe	physical body, physical and social environment, treatment with dignity and respect

Source: author's review of the literature

3.5.1 Factors in the early stage

There are five studies (Woods et al., 2014; Clare et al., 2014b; Nikmat et al., 2015; Giebel et al., 2013; Heggie et al., 2011) that reported factors associated with QoL in elderly people with mild dementia. Among factors in the early stage, depression and relationship are reported three times. Woods et al (2014), Heggie et al (2011) and

Nikmat et al (2015) all indicated that depression is related with lower QoL for elderly people in mild dementia. A good quality of relationship between elderly people with mild dementia and their caregivers or family members predicts a higher level of QoL (Woods et al., 2014; Clare et al., 2014b; Nikmat et al., 2015). Two studies (Heggie et al., 2011; Nikmat et al., 2015) both pointed out that functional abilities also play an important role in determining QoL in elderly people with mild dementia. Additionally, other factors, which are reported only once, including female, irritability, negative self-concept, use of antipsychotic medications, incontinence, decreasing financial status, living in care institutions, and poor general health are all associated with reduced QoL in the mild stage. However, it is highlighted that two studies (Woods et al., 2014; Heggie et al., 2011) find that general cognitive impairment have effect on QoL for elderly people with mild dementia.

3.5.2 Factors in moderate the stage

The information regarding factors associated with QoL in the moderate stage is limited. Only the influence of functional abilities in QoL in the moderate stage is identified. Giebel et al (2013) showed that total activities of daily living (ADLs) performance was only impacting on QoL for elderly people with moderate dementia.

3.5.3 Factors in the severe stage

Five studies focus on elderly people with severe dementia, investigating factors associated with their QoL. Among all the influencing factors，cognitive status and environment are mentioned in two studies. It is suggested that QoL of elderly people with severe dementia would be lower with decreasing cognitive status (Garre-Olmo et al., 2012; Clare et al., 2014). Environmental factors are usually discussed with care institution settings. These factor varies from private room for residents with dementia to temperature, lighting and noise level of their rooms. The remaining factors involving pain, agitation, use of antipsychotric drugs, mood, transfer, social interactions, and treatment with dignity all have an effect on QoL in the severe stage. In addition, keeping physical clean, safety and comfort is also recognised as an important influencing factor on QoL for elderly people with dementia in later stage (Russell et al., 2008).

3.5.4 Comparison of factors between the three stages

Due to limited studies on different stages of dementia, especially factors in the moderate stage, it seems impossible to comprehensively identify unique or common factors associated QoL in dementia across three stages. However, we still can find some implications for this question based on the available information. What should

be noted is that functional ability is the single factor affecting QoL in all three stages. In severe stage, transfer (e.g. getting into/out of the bed, chair) is one of activities of daily living, which is regarded as one of the influencing factor (Giebel et al., 2013), and this suggests that functional abilities may be a determinant in QoL for elderly people with severe dementia. In terms of comparing factors in the mild and severe stages, an interesting finding is associated with the influence of cognitive status. In the mild stage, cognitive status appeared to have no association with QoL for elderly people with dementia, while cognitive impairment are strongly associated with the lower QoL in the severe stage. In addition to cognition, antipsychotric medication use can impair QoL for either elderly people with mild dementia or those with severe dementia (Clare et al., 2014).

3.6 Factors from different people's perspective

In order to explore factors that associated with QoL for elderly people with dementia, most researchers usually choose to investigate the factors from their family members or care staff's perspective instead of elderly people with dementia themselves due to their cognitive impairment. It is well accepted that the meaning of QoL is different for different people, and the influencing factors in QoL can be different for different people. Therefore, we can assume that factors reported by three different populations

(elderly people with dementia, family member, and care staff) can be different from each other. To eliminate the effect of living settings, we will discuss the results by two different living settings: care institutions and communities. There are 11 studies available to make a comparison regarding influencing factors in QoL between three populations. Table 4 shows basic summary of the analysed studies.

Table 4: Factors from the different perspectives

Study	Method	Setting	perceptions	influencing factors in QoL
Young et al. 2011	Qualitative	institutions	care staff	effective communication
Moyle et al. 2014	Qualitative	institutions	family members	environment of care institutions, individualized care, supportive staff
Moyle et al. 2011	Qualitative	institutions	PWD	family, people, things
Fukushima et al. 2005	Qualitative	institutions	PWD	money, family, maintenance, acceptance of dementia by care staff
Clare et al. 2014	Cross sectional	institutions	care staff VS family members	antipsychotric medication (family), resident mood, awareness (care staff)
Moyle et al. 2015	Qualitative	institutions	PWD	independence, control over life, having something to do, social interactions
Black et al. 2012	Cross sectional	Community	PWD VS caregivers	race, unmet needs, depression, medication (PWD), function, unmet needs, depression, health(carers)

Beerens et al. 2014	Longitudinal	institutions	PWD VS caregivers	cognitive abilities, comorbidity (PWD), depression, dependence, comorbidity (carers)
Beer et al. 2010	Cross sectional	institutions	PWD VS caregivers	restrained, fallen, pain, neuropsychiatric symptoms(PWD), severity of cognitive, fallen, neuropsychiatric symptoms (caregivers)
Zimmerman et al. 2005	Longitudinal	institutions	PWD VS caregivers	facility type, health, communication(carers) , care staff (PWD)
Byrne et al. 2006	Qualitative	Community	PWD	health, psychological well-being, church, social interaction, independence, financial security

PWD: elderly people with dementia. Source: Author's review of the literature

3.6.1 Factors from caregivers' perspectives within care institutions

The majority of the influencing factors reported by caregivers are related to physical factors. For example, cognitive status, physical safety, general physical health, neuropsychiatric symptoms, and functional abilities are all associated with QoL for elderly people with dementia in care institutions. As to psychological factors, the mood of the residents with dementia can determine their QoL (Black et al., 2012; Beerens et al., 2014; Clare et al., 2014). Especially, QoL of residents with dementia could be impaired with depressive mood (Black et al., 2012; Beerens et al., 2014). In addition, effective communication with caregivers is one of the preferred factors influencing the QoL from caregivers' perspectives (Zimmerman et al., 2005;Young et al., 2011). The last factor is concerned with the characteristics of care institutions. Residents with dementia in care institutions with specialized workers or those providing more staff training are usually have higher levels of QoL(Zimmerman et al., 2005).

3.6.2 Factors from family members' perspectives within care institutions

There are only two studies focusing on the factors in the perceptions of family members. A total of three factors are recognized as the determinants of QoL in residents with dementia. They are environment of care institutions, individualized

care, supportive staff and use of antipsychotic medication. The environment, in particular to the resident's room, individualized care and supportive staff are positive related to the QoL (Moyle et al., 2014). While antipsychotric medication use is negative associated with the QoL in the view of family members of elderly people with dementia (Clare et al., 2014). Based on the current studies reviewed, family members may perceive care staff and environment of the institutions to be central in determining QoL of the residents with dementia.

3.6.3 Factors from perspectives of elderly people with dementia living in care institutions

Different with family member and caregivers, elderly people with dementia considered social and psychological factors as the influencing factors the most frequently. Social factors including relationship with other people, social interaction, connection with family and society, family visit are perceived important in improving the QoL (Moyle et al., 2015; Moyle et al., 2011; Fukushima et al., 2005). Additionally, residents with dementia believe that their QoL will increase when they can control over their life, or have something to do, or have a feeling of useful, and or could maintaining maintain their life in an ordinary way (Moyle et al., 2015; Moyle et al., 2011; Fukushima et al., 2005). Of course, residents also reported negative physical

factors influencing their QoL, and they involve physical restrained, safety, pain, comorbidity and neuropsychiatric symptoms (Beerens et al., 2014; Beer et al., 2010). It should be noticed that better cognition of the elderly people are associated with decreased self-reported QoL (Beerens et al., 2014). Same with family members, residents with dementia think that positive, active care staffs can affect positively their QoL as well (Zimmerman et al., 2005; Fukushima et al., 2005). Additionally, financial security is another important positive factor influencing the QoL in the perceptions of residents with dementia.

3.6.4 Factors from perspectives of elderly people with dementia and their family caregivers within community settings

Both elderly people with dementia and their caregivers think that depression, poorer general health, decreased functional abilities and unmet needs can impair QoL for elderly people with dementia living in the communities (Black et al., 2012;). Besides, use of medication, race (white VS nonwhite), physical well-being, church visit, social interactions and financial security are all important determinants in the QoL from the perspectives of elderly people with dementia (Byrne et al., 2007), which are not identified by their family caregivers.

This section not only provides a comprehensive overview of factors associated with QoL in elderly people with dementia, but also discusses it within different context (living settings and different stages of dementia) and from different people's perspectives (elderly people with dementia, their families, and their caregivers). This could contribute a better understanding of the influencing factors associated with QoL of elderly people with dementia.

5 Discussion

5.1 Revisiting the Research Question

Having reviewed systematically the literature relevant with factors that influencing QoL for elderly people with dementia, we are able to have a better understanding of this topic. This study outlines all the possible factors that may affect QoL for elderly people with dementia, and the findings suggest that QoL of elderly people with dementia is determined by a range of factors rather than one single aspect of personal life. Systematically summarising the influencing factors could help us build the comprehensive knowledge gained from previous studies. This can inform us the level of recognition to factors associated with QoL in current dementia researches. At the same time, this systematic review provides a comprehensive overview or guidance in making interventions with aims of improving the QoL in dementia care.

The finding regarding the association between QoL and cognitive function is very interesting. Though there are 13 studies showing that impaired cognition is associated with decreased QoL in dementia, 5 studies failed to find such relationship. However, it should be noticed that 2 of the five studies only focus on elderly people with dementia in the early stage (mild). Elderly people with dementia in the early stage usually have gentle cognitive impairment, which may allow them to function independently. As the result, their QoL may not be influenced significantly by the status of cognition. Therefore, we cannot simply conclude that impaired cognition have no relationship with decreased QoL. Another explanation for the irrelevance of impaired cognition to the QoL in dementia is that elderly people with damaged cognition are insensitive to the negative influences bought by dementia. Conde-Sala et al. (2013) corrected for anosognosia, which is a decreased awareness about the physical and mental consequences of dementia. They claimed that, instead of cognition, anosognosia would be associated with higher self-reported QoL ratings, which means that awareness about having dementia may lead elderly people with dementia to have a more negative view about their QoL. In conclusion, the main finding of our study is that quality of life in dementia does not have a simple relationship with cognition. This finding is important, as it indicates that cognitive

improvement may have poor effects on increasing QoL for elderly people with dementia. This brings into question about the validity of cognition and function based assessments of the value of interventions for elderly people with dementia, such as those included in the recent UK draft guidelines for the prescription of anti-dementia drugs (NICE, 2005).

In addition, this study reviewed a large number of important factors that determine the level of QoL for elderly people with dementia. As caregivers may fail to take every factor into account when they make care plans, the review can provide some implications in care planning. However, not every factor can produce the same influences on QoL of elderly people with dementia. Therefore, focusing on the influencing factors under a specific context (living setting, different stages of dementia) can help identify the most affected aspects under different context, and react effectively to help maintain or improve the QoL of individuals with different background. Therefore, QoL of elderly people with dementia can be improved in an efficient way with adequate resources.

Our study showed that main factors influencing QoL of elderly people with dementia are different in two different living settings (care institutions and communities). Our

new review suggests that cognition has a stronger influence on QoL of elderly people with dementia in care institutions than QoL of those in communities. This may be explained by the fact that characteristics of elderly people with dementia in two living settings are different. Namely, elderly people with dementia living in care home are usually with more severe dementia (Nikmat et al., 2015), and so their QoL can be heavily influenced by cognition status compared with those living the communities who are usually with less impaired cognition. Moreover, homelike comfort environment and connection with family is identify as an key determinant of QoL for elderly people with dementia living in the care institutions. In fact, these two factors both reflect the important role of family in determining QoL for elderly people with dementia. While for those living in communities, church visit is an important factor. Church visit is not only relate to religion, but also is an important social activity which allow elderly people with the same believes to get together and share with each other. However, the influence of this factor on QoL is not identified with care institution settings. The possible explanation is that the elderly people in care institutions may be not sensitive to their religion due to the restriction of severely impaired cognition.

Our study failed to find the unique factors associated with QoL in each stage of

dementia because of limited available literature. Based on the current studies, what we have known is that functional abilities is the only factor that affect QoL for elderly people with dementia across three stages of dementia. It is unclear what the other common factors influencing QoL of elderly people with dementia across three stages. In the future, researchers could pay more attention to the influencing factors by different stages of dementia, especially for the moderate stage.

Another main finding in our study is that three important populations involved in dementia care (elderly people with dementia, family member, caregivers) have different priorities in outlining the influencing factors on QoL of elderly people with dementia. Family members may perceive care staff and environment of the institutions to be central in determining QoL of the residents with dementia. While caregivers, especially for care staff, primarily concentrates on physical aspect. With regard to the factors highlighted by residents with dementia, most are related to social and psychological factors, instead of physical and environmental factors. Such residents' perspectives may be associated with the perspectives of caregivers and family members. As individuals' perceptions can directly influence their actions or behaviours, both caregivers and family members may ignore the importance of social interactions and psychological care in dementia care based on their preferences

(Rabins & Black, 2007). As the result, in the view of residents with dementia, social and psychological factors can be dominant among all the factors related to QoL for elderly people with demenia.

5.2 Limitation

Some limitations should be noticed. First of all, only published papers is included for conducting the review. And the whole review merely based on the papers from the four database (PubMed, PsycINFO, Web of Science and DelphiS). Grey literature was not taken into account. Additionally, some authors may have some additional information or explanations in terms of their findings or research methods such as sample selection methods, characteristics of samples, and study settings. However, we did not contact the authors of included studies to obtain them. As the result, we may have some missing information.

Secondly, the diversity of measurement instruments used in the papers reviewed can be another limitation. As QoL is still an ambiguous concept, and the included studies used eleven different measurement instruments of QoL. Different measurement instruments with different indicators may be sensitive to different factors associated with QoL in dementia. For example, Andersen et al (2004) used EuroQol instrument

(EQ-5D) to examine the key factors influencing QoL among elderly people with dementia. EQ-5D involves five dimensions , and they are mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. One of the findings of Andersen et al (2004) is that there seems no relationship between QoL of elderly people with dementia and their cognitive status, which is conflict with the findings from other papers. The possible explanation is that the EQ-5D does not consider cognition as a separate attribute, unlike other instrument (e.g. QoL-AD). This means that the influence of impaired cognition on QoL in dementia may exist actually, but the influence failed to be identified using this instrument. As the result, there exists some contradictory results among the papers reviewed, which need to be cautious. Lacking uniform measurement instrument may also add difficulties to comparing the results of the papers reviewed, and weaken the meaning of such comparison. However, majority researches reviewed in this paper adopted reliable and valid measurements, which could improve reliability of my findings in some degree.

Thirdly, some key information is lacking, which restricts the comparison of the influencing factors on QoL of elderly people with dementia by different stages and living settings. For example, there is only one study providing limited information about factors associated with QoL in the moderate stage. Therefore, it is impossible to

successfully identify the differences of the factors between different three stages. In addition, 10 papers focus on the factors within the community settings while there are 32 papers discussed the factors within the care institution settings. The gap between the two numbers implies that we have a better and more comprehensive knowledge of the influencing factors within the care institutions than within the communities. As the result, our comparison and findings are supposed to be treated with cautious based on such discrepancy of the recognition.

Finally, the effect of culture on the QoL was an unexplored area. The papers reviewed in this paper varies across 15 countries. These countries have the different culture. However, culture is a vital part in determining an individual's QoL, and there exists differences in significance of factors associated with QoL of elderly people with dementia on the basis of socioeconomic status of countries, culture and value. For example, based on this literature review, in developing countries like China financial status is an important factor determined QoL of elderly people with dementia, while the significant influence of financial status is not identified by the literatures focusing on developed countries. Therefore, such international comparisons would be subject to uncertainty because language and culture would heavily influence responses.

5.3 Implications

Though there are some limitations in our review, it still have important implications for dementia care practice and social policy to improve QoL for elderly people with dementia.

5.3.1 Encouraging families to involve in dementia care

The importance of family on QoL has been recognised among elderly people with dementia living in care institutions. It may difficult to change their living arrangement from care institutions back to communities, but connection with family members can be a potentially modifiable factor. Care staff in care institutions could be positive to provide, even create opportunities for family members to work with them, and so contribute to integrating family into the care institutions as a partner in dementia care. Incorporating families into dementia care in the care institutions is of importance for elderly people with dementia in the care institutions. Connections with families may help them to recall their past memories, and also may allow them to have association with the community, reminding them of their existence in the outside world (Kane, 2001). Therefore, health care providers could support family visits and encourage relatives to visit residents with dementia.

5.3.2 Delivering target education to care staff and family care givers in dementia care

Dementia care education should be paid more attention, as it is an efficient way to improve quality of dementia care. For family caregivers, it is necessary to make them realise their important role in improving QoL, and equip them with key dementia care skills and information. For care staff, it is important to provide training with focusing on individualised care. Moreover, enhancing their cognition of psychological and social well-being for elderly people with dementia.

5.3.3 Improving quality of dementia care in care facilities

Another implication for practice from our study is that improving quality of care delivered to elderly people with dementia, especially for those in care institutions, could be effective strategy to promote the QoL. Besides addressing fundamental care needs from people with dementia, caregivers also should be encouraged to provide more humanistic and individualized care which may be not yet legally obligated to do in their dementia care practice. For example, caregivers could spend more time to talk or company with people with dementia, or provide activities specifically tailored to the personal preferences or interests for the elderly with dementia, or act positively towards people with dementia. This implication is significant as improving quality of

care can be under the control of the caregivers, which means that it can be implemented with few new resources.

5.3.4 Building a dementia-friendly environment

As we have discussed, environmental factors are important determinant for QoL of elderly people with dementia. Therefore, it is suggested that QoL in elderly people with dementia can be improved through building a dementia-friendly environment, such as providing a familiar and comfort living environment for elderly people with dementia. Moreover, a dementia-friendly environment has gone beyond of physical environment, to human environment. Elderly people could actively give more understandings and helps to those with dementia within the same community, which can make elderly people with dementia have a feeling of warm and being loved. However, to such human environment, every individual in the community could take responsibilities to make his or her own contributions.

5.4 Future directions

In the future, researchers could pay more attention to the factors influencing QoL by stages of dementia. In particular, this review shows that studies regarding factors associated with QoL among elderly people with moderate dementia are scarce. In the

future, researchers can conduct a comparative study between different stages of dementia in terms of factors influencing QoL of elderly people with dementia. In addition, as the symptoms are present to different extents depending on the type of dementia, and across individuals (Thomas, 2008), it is expected that the influencing factors on QoL in dementia are different among elderly people with different types of dementia. However, little information is available in relation to the influence of dementia subtypes on QoL, based on the literatures in my review. Therefore, another direction that needs to be explored in the future is the role of subtypes of dementia in determining the QoL. Researchers can compare the difference of the influencing factors on QoL among elderly people with different forms of dementia including Alzheimer's disease, elderly people with vascular dementia, mixed vascular dementia and Alzheimer's disease, Lewy body dementia, and frontotemporal dementia.

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