 doi:10.20944/preprints202010.0536.v1

Article

Depression, loneliness, activities of daily living, social support, and life satisfaction in older adults at high-risk for dementia

Sunghee Kim[1], Heesook Son[1], Kwisoon Choe[1,] and Kyoungsook Lee[1]*

[1] Department of Nursing, Chung-Ang University, Seoul, Korea, 84 Heukseok-ro, Dongjak-gu, Seoul 06974, Republic of Korea; sung1024@cau.ac.kr (S.K.); hson@cau.ac.kr (H.S.); kwisoonchoe@cau.ac.kr (K.C.); kyoungsooklee0628@gmail.com (K.L.)

* Correspondence: kyoungsooklee0628@gmail.com; Tel.: +82-2-10-4740-2030

Abstract: As the number of older adults with dementia increases, early diagnosis and intervention are crucially important. The purpose of this study was to conduct dementia screening on older adults to determine whether there are differences in daily activities of living, depression, loneliness, social support, and life satisfaction between older adults at high-risk for dementia compared with low-risk older adults. We hypothesized a negative relationship between high-risk older adults and these factors. This study also hypothesized a moderating effect for social support on the relationship between daily living activities and life satisfaction. This study used a cross-sectional design with survey data. Participants were recruited at 15 public community health centers in South Korea. A total of 609 older adults (male 208, female 401) living in the community were screened for early dementia, and 113 participants (18.9 %) were assigned to the high-risk group. As hypothesized, participants in the high-risk group showed significantly more negative results in terms of activities of daily living, depression, loneliness, social support, and life satisfaction compared with participants in the low-risk group. The findings of this study provide a theoretical basis for the importance of early screening for dementia and policies for effective dementia prevention.

Keywords: dementia; depression; loneliness; activities of daily living; social support; life satisfaction

1. Introduction

The rapid increase in the elderly population worldwide has been accompanied by a concomitant increase in the incidence and prevalence of dementia within this population. In 2019, the Korean Center for Dementia reported that the number of older adults with dementia over the age of 65 years was approximately 750 000 in South Korea [1]. Dementia is a disease that leads directly to a deterioration in the quality of life of older adults [2] and places severe physical, psychological, and economic burdens on both persons with dementia and their family care givers [3]. Given the increased incidence and prevalence of dementia, and the devastating effects of the disease, it is of paramount importance that dementia be detected early and that intervention is made as soon as possible to slow the progress of the disease to maintain the patient's quality of life and alleviate the burden on family care givers.

The dementia evaluation test generally consists of a series of assessments including patient history, physical examination, functional assessment, cognitive testing, laboratory studies, and imaging studies. An initial screening test is performed for patients with suspected dementia before these are conducted.

Early screening for cognitive impairment in older adults is pivotal, particularly once older adults or their family members notice a decline in memory or difficulty performing daily activities such as paying bills, shopping, or managing medications [4]. Daily life performance ability, the so-called activities of daily living (ADL), is closely related to life satisfaction of older adults with dementia; ADL is a useful index that can predict the functional level, prognosis, and death of older adults with dementia [5]. ADL are related with life satisfaction among older adults regardless of dementia [6].

 doi:10.20944/preprints202010.0536.v1

Depression lowered daily activities of older adults with dementia [7] and increased the risk of dementia [8,9].

Social support through community engagement and marriage is known to be a protective factor against the risk of dementia [10,11]. Social support from family members such as children reduced the risk of dementia, whereas negative social support increased the risk [12]. Loneliness increased the risk of dementia in older adults [13,14].

In the literature review outlined above, the authors aimed to identify findings from previous studies relating to differences in ADL, depression, loneliness, social support, and life satisfaction between older adults at high-risk for dementia and those at low-risk. Furthermore, the authors sought to identify studies relating to the moderating role of social support between ADL and life satisfaction since there is a dearth of studies that confirm the moderating effect of social support on the life satisfaction of older adults with dementia.

Given the dearth of studies relating to these issues, the purpose of this study was to identify patients at high-risk for dementia by means of an early screening test for dementia in adults aged 60 years or older, and hypothesized negative differences in ADL, depression, loneliness, social support, and life satisfaction between the high-risk group and older adults in the low-risk group. In addition, the study hypothesized the moderating effect of social support on the relationship between ADL and life satisfaction. This study's findings provide a theoretical basis for the importance of early screening for dementia and implications for caregivers and medical personnel and filling the gaps in the literature.

2. Materials and Methods

2.1. Research design

This study used a cross-sectional design with survey data.

2.2. Participants

Participants were recruited at 15 public health centers in South Korea. The inclusion criteria were: adults aged 60 years or older, willingness to take a test for early dementia screening, living in the community, and able to communicate without cognitive impairment. Only those prospective participants who understood the purpose and methods of the study and voluntarily agreed to participate were eligible to complete the survey.

2.3. Instruments

2.3.1. Mini-Mental State Examination for Dementia Screening (MMSE-DS)

The Korean version of the MMSE-DS was used to identify cognitive impairment in participants. MMSE-DS is one of the most widely used cognitive function instruments and has proven reliability and validity in screening for dementia. MMSE-DS is composed of items that investigate orientation (time, place), memory (memory registration and recall), attention and calculation capabilities, language skills, understanding, and judgment.

2.3.2. Geriatric Depression Scale Short Form-Korea

The Geriatric Depression Scale Short Form-Korea (GDSSF-K) was used to assess depression. The GDSSF-K was standardized by Kee [15]. It comprises 15 items with a “yes” or “no” response resulting in a total possible score of 15 points. The higher the score, the higher the degree of depression. This scale is a shortened form of the 30-item Geriatric Depression Scale (GDS) developed by Yesavage et al. [16]. Cronbach's α in this study was 0.97.

 doi:10.20944/preprints202010.0536.v1

2.3.3. UCLA Loneliness Scale

The revised UCLA (University of California, Los Angeles) Loneliness Scale [17] was used to measure loneliness. This is a 4-point Likert-type scale, consisting of 20 items, and the range of total score is 20–80. The higher the score, the greater the degree of loneliness experienced. Cronbach's α was 0.92 in this study.

2.3.4. Instrumental Activities of Daily Living Scale

The Korean version of the Instrumental Activities of Daily Living Scale [18] was used to evaluate everyday functions such as shopping, food preparation, housekeeping, laundry, transportation, responsibility for own medications, and handling finances. This 15-item scale was developed based on Lawton's Instrumental Activities of Daily Living Scale [19] and rated on a 4-point Likert-type scale. The range of total score is between 15 and 60. Cronbach's α was 0.97 in this study.

2.3.5. Lubben Social Network Scale

Social support was measured using the Lubben Social Network Scale [20]. The scale measures the degree of social support received from the older person's family network, network of friends, caregivers, and living arrangements. It consists of 10 items rated on a 6-point Likert-type scale from 0 to 5; a score of 20 or less shows a limited social network. In this study, Cronbach's α was 0.86.

2.3.6. Life Satisfaction Scale

The Life Satisfaction Scale was developed by Yoon [21] based on the Memorial University of Newfoundland of Scale for Happiness [22]. It consists of a total of 20 items rated on a 4-point Likert-type scale ranging from 0 to 3 points. The higher the score, the higher the level of life satisfaction. In this study, Cronbach's α was 0.90.

2.4. Data collection and ethical considerations

This study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the institutional review board of Chung-Ang University (1041078-201410-HR-151-01). The authors recruited senior nursing and social welfare college students on a part-time basis. We educated them about the purpose of the study and how to collect the data using the questionnaire. After obtaining cooperation from the public health centers for data collection, trained college students explained the aims of the research to older persons who came for dementia screening. Participants who volunteered to participate in this study were asked to complete a consent form and a questionnaire. The questionnaire took an average of approximately 20 min to complete. After removing 11 questionnaires due to missing data, a total of 609 questionnaires were used in the data analysis.

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 27 October 2020 doi:10.20944/preprints202010.0536.v1

2.5. Data analysis

The data were analyzed using SPSS Statistics 23.0 and AMOS 23.0 (IBM Corp., Armonk, NY). We analyzed the general characteristics of the participants in terms of frequencies, percentages, means, and standard deviations. As a result of the Kolmogorov-Smirnov and Shapiro-Wilk tests, the Mann-Whitney U test was used to compare differences between the two groups because the dependent variable was not normally distributed. The correlations between variables were analyzed using Pearson's correlation analysis. Multigroup structural equation modeling was used to determine if social support was a moderating variable. All statistical tests were set at the 0.05 significance level with a 95 % confidence interval. Internal consistency reliability was assessed using Cronbach's alpha.

3. Results

3.1. General characteristics

A total of 609 older persons living in the community (208 males, 401 females) were screened for early dementia. Based on MMSE-DS scoring criteria, 113 people (18.9 %) were assigned to a high-risk group for dementia. There were no statistically significant differences in other general characteristics except marital status (Table 1). There were more single participants (widowed, separated, divorced, unmarried) in the high-risk group.

Table 1. Demographic characteristics

Demographic characteristics		High-risk group (n = 113) (number)(%)	Low-risk group (n = 496) (number)(%)	Chi-square	
				χ^2	*P*
Sex	Male	45(39.8 %)	163(32.9 %)	1.98	0.159
	Female	68(60.2 %)	333(67.1 %)		
Marital status	Single	70(61.9 %)	236(47.6 %)	7.60	0.006
	Married	43(38.1 %)	260(52.4 %)		
Age (years)	60–69	13(11.5 %)	59(11.9 %)	1.93	0.588
	70–74	28(24.8 %)	144(29.0 %)		
	75–79	32(28.3 %)	149(30.1 %)		
	80 and over	40(35.4 %)	144(29.0 %)		
Education level	None	40(35.4 %)	216(43.5 %)	8.40	0.078
	Elementary school	45(39.8 %)	177(35.7 %)		
	Middle school	20(17.7 %)	49(9.9 %)		
	High school	5(4.4 %)	39(7.9 %)		
	Bachelor's and higher	3(2.7 %)	15(3.0 %)		

3.2. Depression, loneliness, ADL, social support, and life satisfaction between the two groups

There were differences in depression, loneliness, ADL, social support, and life satisfaction between the groups. The mean depression and loneliness scores of the high-risk group were higher than those of the low-risk group while the mean scores of ADL, social support, and life satisfaction were lower than those of the low-risk group (Table 2).

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 27 October 2020 doi:10.20944/preprints202010.0536.v1

Table 2. Univariate analyses in both group (N = 609)

	Group	N	Mean rank	U	Z	*P*
Depression	High-risk	113	347.60	23210.000	-2.872	0.004
	Low-risk	496	295.29			
Loneliness	High-risk	113	364.68	20828.000	-4.162	< 0.001
	Low-risk	492	288.83			
ADL	High-risk	113	266.45	23668.000	-2.656	0.008
	Low-risk	496	313.78			
Social support	High-risk	113	253.46	22199.500	-3.398	0.001
	Low-risk	494	315.56			
Life satisfaction	High-risk	112	247.25	21364.500	-3.742	< 0.001
	Low-risk	493	315.66			

3.3. Correlations between variables

Positive correlations were found between depression and loneliness (r = .536, *P* < .01) and between ADLs, social support, and life satisfaction. However, negative correlations were found between two negative emotions (depression and loneliness) and positive variables (ADL, social support, and life satisfaction; Table 3).

Table 3. Spearman's correlation between variables (N = 609)

	1	**2**	**3**	**4**	**5**
1. Depression	1				
2. Loneliness	.536**	1			
3. ADLs	-.298**	-.297**	1		
4. Social support	-.325**	-.564**	.255**	1	
5. Life satisfaction	-.693**	-.632**	.301**	.438**	1

** $p < 0.01$

3.4. Moderating effect of social support on the relationship between ADL and life satisfaction

Our results show that, as hypothesized, social support had a moderating role on the relationship between daily life activities and life satisfaction. In both the high-risk and low-risk groups for dementia, ADL influenced life satisfaction, and the higher the social support, the higher the life satisfaction (Table 4).

Table 4. Moderating effect of social support on the relationship between ADL and life satisfaction (N = 609)

	Step 1		**Step 2**		**Step 3**		**Step 4**	
	β	***P* value**	**β**	***P* value**	**β**	***P* value**	**β**	***P* value**
Sex	0.004	0.934	0.028	0.540	0.005	0.901	< 0.001	0.997
Age	-0.048	0.263	0.017	0.689	0.021	0.580	0.024	0.526
Education level	0.092	0.047	0.075	0.093	0.097	0.018	0.093	0.022

Preprints (www.preprints.org) | NOT PEER-REVIEWED | Posted: 27 October 2020 doi:10.20944/preprints202010.0536.v1

Marital status	-0.118	0.040	-0.111	0.046	-0.107	0.035	-0.105	0.037
ADL			0.278	< 0.001	0.176	< 0.001	0.222	< 0.001
Social support					0.390	< 0.001	0.393	< 0.001
ADL × Social support							0.108	0.006
F	.873	0.457	45.577	< 0.001	39.180	< 0.001	32.667	< 0.001
R^2	0.053		0.124		0.263		0.272	
Adjusted R^2	0.043		0.114		0.253		0.261	
△R^2	0.053	<.001	0.071	< 0.001	0.139	< 0.001	0.009	0.006

4. Discussion

This study screened older adults living in local communities for their dementia risk using MMSE-DS. Based on the results of this test, 113 (18.9 %) participants were identified as the high-risk group. In this study, participants at high-risk for dementia showed significantly more negative results than those of the low-risk group. In other words, the older adults in the high-risk group experienced higher levels of depression and loneliness, and lower levels of daily living activities, social support, and life satisfaction than their low-risk counterparts.

The finding that older adults in the high-risk group had higher depression scores than those in the low-risk is consistent with previous findings that depression increases the risk of dementia [8,9]. Depression in older adults manifests in physical aspects such as loss of appetite and sleep disturbance, and psychological aspects such as cognitive decline and lack of motivation. Depression and dementia influence each other in diagnosis and treatment [23]. To prevent dementia in older adults, staff working at facilities for older adults in the community should provide them with interventions aimed at relieving depression. Staff working with older adults must learn to recognize depressive symptoms such as loss of appetite, lessened speech, decreased activity, and sleep disturbances for early detection of dementia.

In this study, the high-risk group had a higher loneliness score than the low-risk group. Loneliness occurs when individuals cannot satisfy their needs in meaningful social relationships [24]. Several factors, such as deterioration in health, changes to the family structure, loss of roles, and reduced contact with family and friends can induce loneliness. Feeling of loneliness may signal early dementia [14]. Although lowered cognitive functioning may not exacerbate loneliness [25], we need to pay attention to loneliness among older adults and attempt to alleviate their loneliness to prevent dementia.

The results of this study show that older adults in the high-risk group had lower ADL scores than those in the low-risk group. The problems of daily activities in older adults with dementia deteriorates approximately three times faster than in older adults who do not have dementia [26]. Previous studies [27–29] reported that a low ADL score effectively predicts the onset of cognitive disorders such as Alzheimer's disease. Even though the ability to perform daily activities gradually decreases due to aging, we should continuously observe older adults' ability to perform daily activities since a decline in daily activities may reflect a decline in cognitive function.

Older adults in the high-risk group showed smaller social support network size and satisfaction than their counterparts in this study. Low social participation, infrequent social contacts, and loneliness are significantly associated with dementia [30]. In addition, this study's results are consistent with other studies that report that social isolation is a more significant risk factor for dementia than physical inactivity, hypertension, diabetes, and obesity [31]. Moreover, social support has a moderating role between daily living activities and life satisfaction in both high-risk and low-

risk groups in this study. It will be possible to increase older adults' life satisfaction by enhancing their social networks, such as participation in social activities.

In this study, more older adults in the high-risk group were without spouses (widowed, separated, divorced, unmarried) than those in the low-risk group. Among other social factors, community engagement was protective for women, while for men, being married was associated with a lower incidence of dementia [10]. More research is needed to understand the relationship between dementia and marriage, but social support from a spouse may be buffering against dementia. Older adults living alone are at risk for early and late dementia [13]. Establishing meaningful social support from interpersonal relationships is a valuable preventive intervention to enhance life satisfaction and reduce the risk of dementia among older adults. In addition to family relations, there is a need to prepare various social supports in the form of relationships that seniors care for older adults with early dementia or young adults take care of older adults by residing in an intimate living space.

Life satisfaction is an essential concept in dementia research [32,33]. In this study, the high-risk group had a lower life satisfaction score than the low-risk group. Low life satisfaction alone did not directly affect dementia but may lead to an increased death risk after five years [34]. We should constantly seek ways to increase the life satisfaction of older adults to prevent dementia.

This study has several limitations. Participants were limited to a small sample of older adults living in a particular region of South Korea, therefore limiting the generalizability of our findings. Another limitation derives from the study's cross-sectional design which means that while we observed a relationship between social structure and life satisfaction, causality was not established.

5. Conclusions

Older adults in the high-risk group for dementia showed significantly more negative results than the low-risk group in terms of depression, loneliness, social support, daily activities, and life satisfaction. This study clearly shows the importance of early screening test dementia. For early detection of dementia, it is necessary to carefully examine older adults' psychological changes, such as depression and loneliness, and assess and promote social support from their social networks. It is also necessary to actively provide opportunities for older adults to belong to families and communities, and to make it as convenient as possible for them to access such resources.

Author Contributions: Conceptualization, S.K. and K.C.; methodology, S.K., H.S., and K.C.; formal analysis, H.S.; writing—original draft preparation, S.K., K.L., and K.C.; writing—review and editing, K.L.; All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: The authors are most grateful to the participants for their participation in this study. We also would like to thank Editage (www.editage.com) for English language editing.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Korean Center for Dementia. Korean dementia observatory 2019. Available online at https://www.nid.or.kr/info/dataroom_view.aspx?bid=209 (accessed 11 June 2020).
2. Suvosree, B.; Asmus, V.; Marie-Louise, H.H.; Frans, B.W.; Gunhild, W. Generic and disease-specific measures of quality of life in patients with mild Alzheimer's disease. *Dement Geriatr Cogn Disord* **2010** *30*, 327–333.

3. World Health Organization. Dementia: A public health priority. Available online at https://apps.who.int/iris/bitstream/handle/10665/75263/9789241564458_;jsessionid=E2450FBE77E063FF93E43388200F2D93?sequence=1 (accessed on 6 July 2020).
4. Panegyres, P.K.; Berry, R. & Burchell, J. Early dementia screening. *Diagnostics* **2012** *6*(1), 6.
5. Karttunen, K.; Karppi, P.; Hiltunen A.; Vanhanen, M.; Välimäki, T.; Martikainen, J.; Valtonen, H.; Silvenius, J.; Soininen, H.; Hartikainen, S.; Suhonen, J.; Pirtillä, T.; ALSOVA Study Group. Neuropsychiatric symptoms and quality of life in patients with very mild and mild Alzheimer's disease. *Int J Geriatr Psychiatry* **2010** *26*, 473–482.
6. Ng, S.T.; Tey, N.P.; Asadullah, M.N. What matters for life satisfaction among the oldest-old? Evidence from China. *PLOS ONE* **2017** *12*(2), e0171799.
7. Palmer, K.; Di Iulio, F.; Varsi.; A.E.; Gianni, W.; Sancesario, G.; Caltagirone C.; Spalletta, G. Neuropsychiatric predictors of progression from amnestic mild cognitive impairment to Alzheimer's disease: The role of depression and apathy. *J Alzheimers Dis* **2010** *20*:175–183. doi: 10.3233/JAD-2010-1352. PMID: 20164594
8. Kaup, A.R.; Byers, A.L.; Falvey, C.; Simonsick, E.M.; Satterfield, S.; Ayonayon, H.N.; Yaffe, K. Trajectories of depressive symptoms in older adults and risk of dementia. *JAMA Psychiatry* **2016** *73*(5), 525–531.
9. Köhler, S.; van Boxtel, M.; Jolles, J.; Verhey, F. Depressive symptoms and risk for dementia: A 9-year follow-up of the Maastricht Aging Study. *Am J Geriatr Psychiatry* **2011** *19*(10), 902–905.
10. Murata, C.; Saito, T.; Saito, M.; Kondo, K. The association between social support and incident dementia: A 10-year follow-up study in Japan. *Int J Environ Res Public Health* **2019** *16*(2), 239.
11. Penninkilampi, R.; Casey, A.N.; Singh, M.F.; Brodaty, H. The association between social engagement, loneliness, and risk of dementia: a systematic review and meta-analysis. *J Alzheimers Dis* **2018** *66*(4), 1619–1633. doi: 10.3233/JAD-180439
12. Khondoker, M.; Rafnsson, S.B.; Morris, S.; Orrell, M.; Steptoe, A. Positive and negative experiences of social support and risk of dementia in later life: An investigation using the English Longitudinal Study of Ageing. *J Alzheimers Dis* **2017** *58*(1), 99–108.
13. Sundström, A.; Westerlund, O.; Kotyrlo, E. Marital status and risk of dementia: a nationwide population-based prospective study from Sweden. *BMJ Open* **2016** *6*(1):e008565. doi: 10.1136/bmjopen-2015-008565
14. Holwerda, T.J.; Deeg, D.J.; Beekman, A.T.; van Tilburg, T.G.; Stek, M.L.; Jonker, C.; Schoevers, R. A. Feelings of loneliness, but not social isolation, predict dementia onset: results from the Amsterdam Study of the Elderly (AMSTEL*). J Neurol Neurosurg Psychiatry* **2014** *85*(2), 135–142.
15. Kee, B.S. A preliminary study for the standardization of geriatric depression scale short form-Korea version. *J Korean Neuropsychiatr Assoc* **1996** *35*(2), 298–307.
16. Yesavage, J. A., Brink, T. L., Rose, T. L., & Adey, M. Development and validation of a Geriatric Depression Screening Scale: a preliminary report. *J Psychiatr Res* **1983** 17, 37–49. https://doi.org/10.1016/0022-3956(82)90033-4
17. Russell, D.; Peplau, L.A.; Cutrona, C.E. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *J Pers Soc Psychol* **1980** *39*(3), 472–480.
18. Song, M. *Construction of a functional status prediction model for the elderly*. Seoul National University: 1990 (dissertation in Korean).
19. Lawton, M.P.; Brody, E.M. Assessment of older people: self-maintaining and instrumental activities of daily living. *Gerontologist* **1996** *9*(3), 179–186.
20. Lubben, J.E. Assessing social networks among elderly populations. *Fam Community Health* **1998**, 11(3), 42–52. https://doi.org/10.1097/00003727-198811000-00008
21. Yoon, G. Successful aging and quality of life. In Korean Psychological Association Conference Proceeding, Seoul, Korea, May, **1995**, 45–75. (In Korean)
22. Kozma, A.; Stones, M.J. The measurement of happiness: Development of the Memorial University of Newfoundland Scale of Happiness (MUNSH). *Geront* **1980** *35*(6), 906–912.
23. Bennett, S.; Thomas, A.J. Depression and dementia: cause, consequence or coincidence? *Maturitas* **2014** *79*(2), 184–190.
24. Teguo, M.T.; Simo-Tabue, N.; Stoykova, R.; Meillon, C.; Cogne, M.; Amiéva, H.; Dartigues, J. F. Feelings of loneliness and living alone as predictors of mortality in the elderly: the PAQUID study. *Psychosom Med* **2016** *78*(8), 904–909.
25. Donovan, N.J.; Wu, Q.; Rentz, D.M.; Sperling, R.A.; Marshall, G.A.; Glymour, M.M. Loneliness, depression and cognitive function in older US adults. *Int J Geriatr Psychiatry* **2017** *32*(5), 564–573.

26. Lee, H.J. Changes in cognitive function and functional disability in older adults. Comparison of groups converted and not converted to dementia among cognitively normal older adults. *Korean Journal of Social Welfare Studies* **2013** *44*(2), 323-355.
27. Roehr, S.; Riedel-Heller, S.G.; Kaduszkiewicz, H.; Wagner, M.; Fuchs, A.; van der Leeden, C.; Wolfsgruber, S. Is function in instrumental activities of daily living a useful feature in predicting Alzheimer's disease dementia in subjective cognitive decline? Int J Geriatr Psychiatry **2019** *34*(1), 193–203
28. Mao, H.F.; Chang, L.H.; Tsai, A.Y.J.; Huang, W.N.W.; Tang, L.Y.; Lee, H.J.; Shyu, Y.I.L. Diagnostic accuracy of Instrumental Activities of Daily Living for dementia in community-dwelling older adults. *Age and Ageing* **2018** *47*(4), 551–557.
29. Cornelis, E.; Gorus, E.; Beyer, I.; Bautmans, I.; De Vriendt, P. Early diagnosis of mild cognitive impairment and mild dementia through basic and instrumental activities of daily living: Development of a new evaluation tool. *PLoS Medicine* **2017** *14*(3), e1002250.
30. Kuiper, J.S.; Zuidersma, M.; Voshaar, R.C.O.; Zuidema, S.U.; van den Heuvel, E.R.; Stolk, R.P.; Smidt, N. Social relationships and risk of dementia: A systematic review and meta-analysis of longitudinal cohort studies. *Ageing Res Rev* **2015** *2*, 39–57.
31. Desai, R.; John, A.; Stott, J.; Charlesworth, G. Living alone and risk of dementia: A systematic review and meta-analysis. *Ageing Res Rev* **2020** Sep; 62:101122. doi: 10.1016/j.arr.2020.101122
32. Moniz-Cook, E.; Manthorpe, J. *Early psychosocial interventions in dementia evidence-based practice*. London, Philadelphia: Jessica Kingsley, 2009.
33. Rabins, P.V.; Black, B.S. Measuring quality of life in dementia: Purposes, goals, challenges and progress. *Int Psychogeriatr* **2007** *19*(3), 401–407.
34. Peitsch, L.; Tyas, S.L.; Menec, V.H.; St John, P.D. General life satisfaction predicts dementia in community living older adults: a prospective cohort study. *Int Psychogeriatr* **2016** *28*(7), 1101.