Archives of Gerontology and Geriatrics 90 (2020) 104068

Contents lists available at ScienceDirect

Archives of Gerontology and Geriatrics

journal homepage: www.elsevier.com/locate/archger

Loneliness among older adults in the Czech Republic: A socio-demographic, health, and psychosocial profile

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ARTICLE INFO

Keywords:
Czech elderly
Loneliness
Health
Social relations
Subjective well-being
SHARE study

ABSTRACT

Objectives: This study sought to examine demographic, health, and psychosocial correlates of loneliness in Czech older adults using Survey of Health, Ageing and Retirement in Europe (SHARE) data.

Method: Study builds on secondary data analysis. Nationally representative sample of 2129 Czech older adults, aged 65 and over, were drawn from the SHARE wave 6.0. Factors included socio-demographic variables, physical health, psycho-social and subjective well-being. Descriptive statistics and ANOVA provided information about prevalence and demographic correlates of loneliness. Regression analysis was performed to examine hypothesized relationships between loneliness and health, social network measures, subjective and psychological well-being.

Results: Demographic variation was substantial with the sample of the Czech elderly. The widowed, divorced, and young-old were significantly related to higher loneliness. A U-shaped association was identified between household size and loneliness. Loneliness was also significantly related to education levels and types of living area, but in a complex non-linear way. In contrast, there was no gender difference. Regression results indicated that poor health conditions and social environment were significantly associated with Czech elderly's loneliness. Loneliness appeared to be linked to subjective and psychological well-being among Czech older adults.

Conclusions: Findings provide greater information about loneliness in population aging in the Czech society. Political and cultural initiative to promote protection against loneliness and social isolation should put forward aimed at high-risk groups of loneliness.

1. Introduction

Studies show that there is a high variation in older adults' loneliness across different European countries (Hansen & Slagsvold, 2016; Sundström, Fransson, Malmberg, & Davey, 2009; Vozikaki, Papadaki, Linardakis, & Philalithis, 2018; Yang & Victor, 2011). According to Sundström et al. (2009), for example, 5 % of European population aged 65 or older experienced loneliness *almost all the time* in the previous week, but the score ranged from 1 % in Switzerland to 10 % in Greece. Similarly, 7 % reported feeling loneliness *most of the time* on average, but the score ranged between 3 % in Switzerland and 12 % in Italy. Arsenijevic and Groot (2018) also suggested a cross national trend while examining the prevalence of older adults' loneliness in 10 European countries; for example in 2013, 33 % of Italian older adults reported they often to sometimes felt lonely in the past 12 months, but only 10 % of Danes reported the same experience. According to the data released from the Survey of Health, Ageing and Retirement in Europe (SHARE), older adults in central and southern European nations (e.g., Czech Republic and Italy) appeared to be the loneliest among Europeans when controlled socio-economic variables (Shiovitz-Ezra, 2015). Literature provides consistent evidence that older adults from southern and eastern European countries demonstrate higher level of loneliness than their peers from the west and north.

In consideration of a high volume of literature that loneliness is significantly associated with older adults' health and quality of life (e.g., Cacioppo & Cacioppo, 2014a; Cohen-Mansfield, Hazan, Lerman, & Shalom, 2016; Pinquart & Sorensen, 2001; Victor & Sullivan, 2015; Yang, 2019), health professionals and public health in southern and eastern European countries should pay more attention to loneliness, and incorporate this understanding into the development of applicable social care policy and practice. However, political provision and social initiative to prevent or mitigate a sense of loneliness in aging populations in the Czech society are still at meager stage. Also, there is nearly no empirical study published regarding the Czech elderly's loneliness. As a preliminary loneliness research aimed at Czech elderly, the current study intends to gain more understanding about Czech elderly's loneliness in order to identify potential risks and protective factors linked to loneliness in population aging in the Czech Republic. A formulation of

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https://doi.org/10.1016/j.archger.2020.104068
Received 5 August 2019; Received in revised form 30 March 2020; Accepted 1 April 2020
Available online 29 April 2020

the prevalence and correlates of loneliness will serve as a platform for future loneliness research aimed at Czech elderly that provides a rationale for political and cultural initiative to promote protection against loneliness and social isolation in later life.

Socio-demographic variables are greatly highlighted in the literature as associated factors of loneliness (Kamiya, Doyle, Henretta, & Timonen, 2013; Pinquart & Sorensen, 2001; Pinquart, 2003; Savikko, Routasalo, Tilvis, Strandberg, & Pitkälä, 2005; Victor, Scambler, Bond, & Bowling, 2000). It can be summarized that those who are females, with low socioeconomic status, older, living alone, and deprived neighborhood environment are much vulnerable to loneliness (e.g., Ausín, Muñoz, & Castellanos, 2017; Cohen-Mansfield et al., 2016; Dahlberg & McKee, 2014; Shovestul, Han, Germine, & Dodell-Feder, 2020; Štípková, 2019; Theeke, 2009). This led to hypothesize that there would be a significant difference in loneliness among Czech elderly across socio-demographic variables.

Studies show that loneliness is associated with negative health outcomes, increased mortality, and varying risk behaviors (e.g., Abdellaoui et al., 2018; Cacioppo & Cacioppo, 2014b; Goossens et al., 2015; Luo, Hawkley, Waite, & Cacioppo, 2012; Savikko et al., 2005; Shankar, McMunn, Banks, & Steptoe, 2011; Smith & Victor, 2018; Sutin, Stephan, Luchetti, & Terracciano, 2018). Smith and Victor (2018), for example, found that stroke and diabetes significantly contributed to loneliness among the older adults in England, and suggested that cardiometabolic health conditions can cause loneliness. Theeke (2009) examined two groups of older adults and showed that the group with presence of loneliness indicated more chronic illness, fine to gross motor impartments, and more frequent doctor visits compared to no-loneliness group. Building on this, the current study examines if poor health conditions and limitation of daily activities influence Czech elderly's loneliness.

Loneliness literature also stresses that interpersonal relationship plays a key role in facilitating or mitigating older adults' loneliness (Domènech-Abella et al., 2017; Kang, Park, & Wallace, 2018; Litwin & Shiovitz-Ezra, 2010; Poey, Burr, & Roberts, 2017; Shiovitz-Ezra & Leitsch, 2010; Taylor, 2020). According to Litwin and Shiovitz-Ezra (2010), different types of social network appeared to be linked to loneliness, anxiety, and happiness: the greater social capital, the better well-being the study participants reported. Recent studies show that number of children can diminish loneliness in later life among European men and women aged 65 and older (van den Broek, Tosi, & Grundy, 2019; van den Broek & Tosi, 2020). Shiovitz-Ezra and Leitsch (2010) found that frequent contact with social network, perceived social support, and quality of marriage significantly contributed to diminished loneliness. All of this led to hypothesize that the measures of social relationship – quantity and quality – are significantly associated with Czech elderly's loneliness.

Although the sequential relationship between loneliness and subjective and psychological well-being is still unclear, the importance of loneliness should be amplified by its impact on subjective well-being and quality of life outcomes. Literature has reinforced that those chronic or frequent loneliness is negatively associated with life satisfaction, purpose in life, and quality of life among older adults (e.g., Ausín et al., 2017; Jakobsson & Hallberg, 2005; Litwin & Shiovitz-Ezra, 2010; Shankar, Rafnsson, & Steptoe, 2015; Wang, 2016). Also, loneliness is often linked to psychological instability and decreased cognitive function including mild to severe depressive symptom (Ayalon, & Shiovitz-Ezra, 2011; Aylaz, Aktürk, Erci, Öztürk, & Aslan, 2012; Cacioppo, Hughes, Waite, Hawkley, & Thisted, 2006; Domènech-Abella et al., 2017; Donovan et al., 2017; Holvast et al., 2015; Luo et al., 2012; Singh & Misra, 2009). Aylaz et al. (2012), for example, reported a significant correlation between geriatric depression and loneliness in elderly people aged 60+; while the mean scores of depression and loneliness were significantly lower in the elderly who living in a community, presence of social security and relatively higher income. According to Ayalon and Shiovitz-Ezra, (2011), loneliness is a risk factor for passive death wishes in those aged between 50 and 75 years when controlled for the effect of demographic, health, and various social indicators. The current study thus examines if loneliness is related to subjective and psychological well-being in Czech older adults.

2. Material and method

2.1. Study design and sample data recruitment

Study builds on secondary data analysis using data sampled from the Survey of Health, Ageing and Retirement in Europe (SHARE) (Börsch-Supan, 2018; Malter, Schuller, & Börsch-Supan, 2016). Based on standardized questionnaire and fieldwork procedures, SHARE provides longitudinal and cross-national panel database including those individuals aged 50 or over across Europe. Data collection has been conducted employing interviewer-administrated structured survey. SHARE wave 6.0, data collected in 2015 and publicly released in 2018, contains a wide range of study variables such as physical and mental health, behavioral risks, activities, social networks, and cognitive functions among population aged 50+ in 18 EU countries (Malter et al., 2016; Malter & Börsch-Supan, 2017). The raw database included a total number of 4856 Czech sample aged between 46 and 98 who completed survey interview. For the current study, Czech sample aged 65 years or older (N = 2129) were retained.

2.2. Measurement

A multiple questionnaire items were used to measure predicting and outcome variables. Loneliness was measured using UCLA-Loneliness scale short version (Hughes, Waite, Hawkley, & Cacioppo, 2004) that consists of four indicators of survey questionnaire items (e.g., "feeling lonely and isolated") using three-point Likert-scale, 1 (hardly or never) to 3 (often) – a higher score signifies higher loneliness. The resulting four-item loneliness scale found to be internally consistent (Cronbach's alpha = .805). Multi-item index of loneliness was created by summing responses to individual items. Z-score was calculated for individual responses to measures of loneliness.

Health variables included presence of chronic diseases, Body Max Index (BMI), pain perception, self-rated health, Activities of Daily Living (ADL) index, and physical activity engagement. Body Max Index (BMI) was estimated based on two questionnaire items, respondent's weight and height. Four BMI categories indicated underweight, normal, overweight, and obese (WHO, 1995). Pain perception was measured using a single yes/no question. Respondents were asked to indicate 'yes' if they were troubled with any pain. Regarding activities of daily living, respondents were asked to indicate number of limitations with their daily living activities (e.g., dressing and walking) – a higher index indicates more difficulties with activities for daily living (Katz, Ford, Moskowitz, Jackson, & Jaffe, 1963). Self-rated health (Ware & Gandek, 1998) was measured using a five-point Likert scale, ranging from 1 (poor) to 5 (excellent). Respondents were also asked to indicate if their health was "less than very good health" using a yes/no question. Two questions were used to measure intensity of physical activity participation—sport or activities that are vigorous and activities requiring a moderate level of energy—using four-point Likert scale, ranging from 1 (hardly ever or never) to 5 (more than once a week).

Five social network indicators were used to assess both quantity and quality of the respondents' social network: a number of social network, social network satisfaction, average proximity of social network, average contact with social network, and emotional closeness to their social network. Social network involved partner/spouse, children, parents, siblings, friends, neighbors, formal helpers or others. The resulting score of social network size raged from 0 and 7 (Mean = 2.14, SD = 2.37). Respondents were also asked to indicate their level of satisfaction with social network between 0 (completely dissatisfied) and 10 (completely satisfied). Average proximity of social network ranged

from 1 (same household) to 8 (500 km or further). Average contact frequency with social network was assessed using seven-point Likert scale, ranged from 1 (never) to 7 (daily contact). Emotional closeness of social network members was assessed using a four-point Likert scale between 1 (not very close) and 4 (extremely close).

The measure of subjective well-being involved two index, quality of life (CASP-12 scale) and life satisfaction. SHARE questionnaire uses CASP-12 scale to measure quality of life that is composed of four underlying domains, control (e.g., "My age prevents me from doing the things I would like to"), autonomy (e.g., I can do things that I want to do"), self-realization (e.g., "I feel that life is full of opportunities"), and pleasure (e.g., "I feel that my life has meaning"). The resulting score of CASP ranged from 12 to 48 – a high score is high quality of life (Hyde, Wiggins, Higgs, & Blane, 2003). Life satisfaction was measured using a single questionnaire item with a 10-point Likert scale, ranging from 1 (least satisfied) to 10 (most satisfied) (Cheung & Lucas, 2014).

EURO-D scale was used in order to assess mental and emotional health of the respondents (Prince et al., 1999). Three items, which reflect late-life depressive symptoms, were included in the current study: depression ("being sad or depressed in the last month"), pessimism ("no hopes mentioned"), and suicidality ("any mention of suicidal feelings or wishing to be dead in the last month"). It is important to note that the three items indicate a possible case of depression rather than a diagnosed depression.

2.3. Data analysis

Descriptive statistics and Analysis of variance (ANOVA) test provided detailed information of prevalence of loneliness and its association with demographic variables such as gender, age categories (young-old, old-old, oldest-old), education level, marital status, household size and geographic location of living. A series of regression analyses were performed to examine how loneliness linked to a wide range of health and subjective well-being indicators among Czech older adults. Supplied country-specific weights were used to adjust for selective nonresponse. Data process and analysis were implemented using statistical software, STATA 15.0 and IBM SPSS Statistics 20.

3. Results

3.1. Sample frame

Final study sample comprised 2129 individuals (age range = 65–96; M = 69.62 years, SD = 9.93; 46 % men and 54 % women). With regard to marital status, 59 % were married and living with partner, 15 % were separated or divorced, 19 % were widowed, and 7% reported that they were never married. Respondents' education level was recorded using International Standard Classification of Education 1997 (ISCED 97): ISCED 1- Primary level of education (11.4 %), ISCED 2 - Lower secondary level of education (13.4 %), ISCED 3 - Upper secondary level of education (45.3 %), ISCED 4 - Post-secondary, non-tertiary education (4.8 %); ISCED 5 - First stage of tertiary education (22.1 %); and ISCED 6 - Second stage of tertiary education (3.0 %). Far more than half of sample indicated two households (65.8 %), single household size accounted for 27.2 %. Dwelling area of the sample was diverse indicating big city (12.2 %), suburbs/outskirts of a big city (10.4 %), large town (19.7 %), small town (27.6 %) and rural area or village (30.1 %).

3.2. Demographic correlates of loneliness

Table 1 provides detailed information about prevalence of loneliness across different socio-demographic characteristics. Of respondents, only 5 % of older adults reported they often experienced loneliness – use of composite score of four indicators; while 71 % reported they hardly or never experience loneliness. Results also indicated that demographic variables were significantly associated with loneliness among Czech older adults including marital status, age, education level, household size, and living area. For example, there was a significant effect of marital status and age on loneliness measure; the widowed (8 %) and young-old (7 %) were more likely to report they often experienced loneliness. Older adults with secondary (6 %) or post-secondary (7 %) level of education were more likely report frequent loneliness. However, according to the linearity test, it is not decisive that there is a non-linear relationship between education and loneliness, the deviation from linearity of $p = .193$. In relation to household size, there was a non-linear relationship, the deviation from linearity of $p = .015$. Single household (6 %) and households with more than five (16 %) indicated higher score on loneliness, compared to households with two or three. Regarding geographic location, interestingly those who live in rural area or village scored least on loneliness. In relation to gender, there was no significant difference found in loneliness between males and females.

3.3. Health and loneliness

Regression results indicated that the measure of loneliness was significantly related to various health aspects in Czech elderly. Table 2 provides the summary of standardized significant path coefficient between health/health behavior indicators and loneliness. Czech older adults who reported poor health status were more likely to report they felt loneliness ($\beta = -.254$, $p < .001$). Other health indicators were also significantly related to loneliness, number of chronic diseases ($\beta = .013$, $p < .001$), higher BMI ($\beta = .031$, $p < .001$), and being troubled with pain ($\beta = .005$, $p < .001$). Regarding the limitations of daily activities, those who reported more limitations with daily living activities were more likely to score high on loneliness ($\beta = .118$, $p < .001$). Lower level of engagement in sports or activities either at vigorous ($\beta = -.183$, $p < .001$) or moderate level ($\beta = -.119$, $p < .001$) also explained a significant proportion of variance in loneliness.

3.4. Social network and loneliness

Results indicated that social environments did account for additional variance in loneliness measure. Social network satisfaction ($\beta = -.173$, $p < .001$), emotional closeness ($\beta = -.510$, $p < .001$) and frequent contact with social network ($\beta = -.453$, $p < .001$) were significantly associated with loneliness among Czech older adults. Proximity of social network also explained a significant proportion of variance in loneliness ($\beta = .107$, $p < .001$). It was an interesting finding that the volume of social network was positively associated with loneliness ($\beta = .109$, $p < .001$). That is, the greater social network, the higher the loneliness expressed. This will be further discussed in the section follows.

3.5. Loneliness and subjective and psychological well-being

According to the results, loneliness was significantly and negatively related to subjective and psychological well-being among Czech older adults. In specific, loneliness appeared to diminish quality of life ($\beta = -.298$, $p < .001$) and life satisfaction ($\beta = -.021$, $p < .001$), but also explained a significant proportion of variance in depression ($\beta = .378$, $p < .001$), pessimism ($\beta = .121$, $p < .001$) and suicidality ($\beta = .015$, $p < .001$). Table 3 provides standardized significant path coefficient between loneliness and subjective and psychological well-being indicators.

4. Discussions

The current study aimed at providing an overview of demographic, health, and psychosocial correlates of loneliness among Czech older adults to establish a groundwork for a subsequent loneliness research in

Table 1
Demographic profiling of Czech elderly's loneliness with unweighted sample data (N = 2129).

	Respondents (%)	Hardly or never (%)	Some of the time (%)	Often (%)	*Mean* (SD)	*Sig.*	*Linearity*
		71	24	5	1.34 (.57)		
Gender							
Males	46.0	70	25	6	1.34 (.58)		
Females	54.0	71	23	5	1.35 (.56)	.054	–
Marital status							
Married (living together)	59.0	70	26	4	1.35 (.56)		
Married (not living together)	1.6	85	14	1	1.17 (.32)		
Widowed	18.7	74	18	8	1.61 (.44)		
Divorced	13.4	68	25	6	1.38 (.45)		
Never married	7.3	70	26	5	1.36 (.56)	.000	.732
Age							
Young-old (65 − 74)	53.6	71	22	7	1.36 (.51)		
Old-old (75 − 84)	33.3	69	28	4	1.35 (.44)		
Oldest-old (84 +)	13.0	76	21	4	1.28 (.42)	.000	.673
Education							
ISCED-97 code 1	11.4	74	23	3	1.28 (.41)		
ISCED-97 code 2	13.4	69	25	6	1.37 (.51)		
ISCED-97 code 3	45.3	68	25	7	1.38 (.51)		
ISCED-97 code 4	4.8	58	40	2	1.44 (.42)		
ISCED-97 code 5	22.1	77	19	5	1.28 (.43)		
ISCED-97 code 6	3.0	76	16	8	1.31 (.51)	.000	.193
Household size							
1	27.2	65	29	6	1.42 (.50)		
2	65.8	74	22	5	1.31 (.46)		
3	5.4	72	24	4	1.32 (.47)		
4	1.2	66	24	10	1.44 (.64)		
5 or more	.3	40	44	16	1.76 (.54)	.000	.015
Area of building							
Big city	12.2	71	22	7	1.32 (.48)		
Suburbs/outskirts of a big city	10.4	65	31	4	1.33 (.47)		
Large town	19.7	70	24	6	1.34 (.48)		
Small town	27.6	64	29	7	1.40 (.54)		
Rural area or village	30.1	82	16	2	1.19 (.37)	.001	.002

Note. International Standard Classification of Education 1997 (ISCED 97): ISCED 1- Primary level of education; ISCED 2 - Lower secondary level of education; ISCED 3 - Upper secondary level of education; ISCED 4 - Post-secondary, non-tertiary education; ISCED 5 - First stage of tertiary education; and ISCED 6 - Second stage of tertiary education (leading to an advanced research qualification).

Table 2
Summary of regression analyses for variables associated with loneliness (N = 2129).

	B	SE	*β*	t-value	Sig.
Physical health/health behaviors					
Self-perceived health	−.341	.002	−.254	−191.225	.000
less than very good health	.156	.004	.045	40.483	.000
# of chronic diseases	.010	.001	.013	13.536	.000
Body Max Index (BMI)	.053	.001	.031	40.478	.000
Troubled with pain	.004	.001	.005	6.388	.000
# of limitations with activities of daily living	.193	.002	.118	109.184	.000
Sports or activities that are vigorous	−.194	.001	−.183	−229.593	.000
Activities requiring a moderate level of energy	−.175	.001	−.119	−149.103	.000
Social network indicator					
# of Social Network (SN)	.067	.001	.109	79.312	.000
SN satisfaction	−.077	.001	−.173	−128.518	.000
Emotional closeness to SN	−.212	.001	−.510	−222.527	.000
SN - average proximity	.026	.001	.107	35.595	.000
SN - average contact	−.214	.001	−.453	−167.584	.000

Note. Sample data was appropriately weighted. Demographic variables were controlled.

Table 3
Summary of regression analyses for the loneliness associated with subjective and psychological well-being (N = 2129).

	B	SE	β	t-value	Sig.
Subjective well-being					
CASP-quality of life index	−.076	.000	−.298	−379.629	.000
Life satisfaction	−.018	.001	−.021	−31.974	.000
Psychological well-being					
Depression	.235	.001	.378	408.548	.000
Pessimism	.450	.003	.121	169.577	.000
Suicidality	.078	.004	.015	18.483	.000

Note. Sample data was appropriately weighted. Demographic variables were controlled.

the Czech Republic. Study findings well-correspond to existent literature which shows that loneliness is significantly related to aging adversities and quality of later life. However, the findings on Czech elderly' loneliness also contradict universal assumptions regarding loneliness. First, it was hypothesized that Czech elderly would demonstrate higher level of frequent loneliness. However, only 5 % of Czech sample reported they often felt loneliness which is similar to or even lower than European average of 5 %–7 % of frequent loneliness. Further, Czech elderly's loneliness highly diverges across socio-demographic attributes. Although literature has reinforced that being female and older are the key risk factors of loneliness, Czech sample data did not support this hypothesis that need to be carefully appraised.

Relatively low proportion of frequent loneliness in current sample data was a surprising result compared to the highest proportions of loneliness often observed in central and eastern European nations (e.g., Arsenijevic & Groot, 2018; Shiovitz-Ezra, 2015). Studies have reported between 5 % and 15 % of frequent loneliness among older adults aged 65 years and over (Pinquart & Sorensen, 2001). This might suggest that we should be cautious to presume that loneliness among older adults is severely epidemic in the Czech Republic. Rather, high mean score of loneliness in Czech older adults in existent studies (e.g., Shiovitz-Ezra, 2015) may imply that a fast-growing number of elderly seniors already experienced loneliness to some extent so there is a strong likelihood to

develop chronic loneliness. The prevalence of Czech elderly's loneliness should be further examined using longitudinal data if the loneliness would progress over time with age.

Demographic variation was substantial with the sample of Czech elderly. Although there have been greater studies that being a woman and oldest-old are more likely to experience elevated loneliness (e.g., Ayalon, & Shiovitz-Ezra, 2011; Pinquart & Sorensen, 2001; Vozikaki et al., 2018), there was no significant gender difference found in the Czech sample data. Also, contrary to the literature, relatively younger elderly were more likely to score high on loneliness among Czech older adults. Among the young-old (aged between 65 and 74 years), 7 % reported frequent loneliness which is slightly above the average (5 %). This might be because many older adults in this period appear to confront discontinued social engagement due to empty-nest and retirement (Crisp, Windsor, Butterworth, & Anstey, 2015; Mount & Moas, 2015; Yang & Victor, 2011). Relatively low loneliness score among oldest cohort needs more qualitative explanation to clarify whether Czech older adults less frequently experience loneliness as they get older or they better cope with loneliness or loneliness could be mitigated by other factors. This cross-sectional finding should be further reiterated to determine if Czech elderly demonstrates different form and pattern of loneliness or this observation was made on one occasion in our sample data.

Results show that the widowed were significantly related to the highest degree of loneliness as investigated in the previous studies (Lykes & Kemmelmeier, 2014; Savikko et al., 2005; Victor & Yang, 2012). Bereavement is one of the most traumatic life experiences that affects intense feelings of sadness, emptiness, severe loneliness, and suicidal ideation (Fried et al., 2015). Community and social care should provide supporting intervention, such as bereavement counseling and home visit programs for bereaved elderly, in order to promote positive affect and social support. Regarding to the relationship between loneliness and household size, a U-shaped association was identified. A review of literature suggests that a larger household size can be a protective factor of loneliness in later life (e.g., Victor & Yang, 2012). However, our sample data showed that those with single-person households and more than four in a household were more likely to score high on loneliness compared to household size between two and three. Regarding the residential area of the respondents, Czech elderly were more likely to score high on loneliness as the area gets downsized from big city to small town. However, for those who living in rural area or village, loneliness score was significantly lower. This might be because rural area or village in the Czech Republic is typically thinly populated and many rural elderly have rooted in the region for lifetime. Therefore, their social contacts and bond with other neighbors remain potent, which, in turn, contributes to lowered loneliness.

As hypothesized, Czech elderly's loneliness was significantly related to their health and daily activity engagement. Those older adults who indicated poor health conditions including higher BMI index, presence of chronic illness, and experience of pain, were more likely to report high on loneliness. Likely, negative health perception was significantly associated with loneliness. Limitations of daily activities and lower level of physical activity were also positively and significantly related to Czech elderly's loneliness (Hacihasanoğlu, Yildirim, & Karakurt, 2012). Poor health conditions might play in weakening older adults' functional capacity and mobility which, in turn, limit their engagement in activities and social well-being over time (Smith & Victor, 2018; Theeke, 2009).

Study findings reinforce that social environment plays an important role in elderly's loneliness (Burholt, Windle, Morgan, & CFAS Wales team, 2016; Holt-Lunstad, Robles, & Sbarra, 2017; Litwin & Shiovitz-Ezra, 2010; Pinquart & Sorensen, 2001). Quantity and quality of social network were significantly associated with loneliness when controlling socio-demographic variables. Specifically, satisfaction with social relationships, emotional closeness to social network, and frequent contact were negatively associated with loneliness; while geographical distance positively associated with the loneliness. As many older adults experience limited mobility with age or a lack of resources (e.g., access to transportation), dwelling remote might be one of the critical constraints for in person interaction with family and friends. More transportive amenities and service should be guaranteed to facilitate easy accessibility between elderly and their social network. A positive relationship between social network size and loneliness led us to reconsider older adults' social role and responsibility expected from their social network such as grandparenting and caregiving to elderly parents or partner (Krause, 2004). Although older adults may indicate greater social network, this also allows for social demands and stress that can increase negative emotions in a relationship (Hubatková, 2017). This finding also corresponds to the U-shaped association between household size and loneliness found in the current study. The relationship between social network and loneliness investigated in our study supports the contention that elderly person's loneliness strongly depends on the meaning formed in a relationship rather than social network size.

Findings show that loneliness did account additional variance for the measures of subjective and psychological well-being in Czech seniors. Those older adults who scored higher on loneliness were less likely to satisfy with life and scored lower on quality of life index (Cacioppo & Cacioppo, 2014a; Cohen-Mansfield et al., 2016; Victor & Sullivan, 2015). Older adults with frequent loneliness also appeared to be much vulnerable to other diagnoseable mental problem including depression with a greater magnitude, pessimism, and even suicidality (Domènech-Abella et al., 2017; Donovan et al., 2017; Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). This result suggests that older adults' loneliness is significantly related to their cognitive and affective functions (Cacioppo & Cacioppo, 2014a, 2014b; Erzen & Çikrikci, 2018). Loneliness or feeling isolated might hinder coping with other negative thoughts that causes emotional dysregulation among older adults. However, interpretation of this result is limited with our study sample data because there was no structured diagnostic examination of depression or longitudinal follow-up.

With respect to policy implications, public health leaders ought to take the elderly at-risk group for loneliness (e.g., living alone) into account when promoting social care policy in order to protect elderly against loneliness and social isolation at local and national levels. Community and social service should be designed to facilitate social cohesion in a community for those older adults who lack individual level of social interactions. Health education ought to nurture more qualified social workers with social-emotional skills so that the elderly patients or care receivers can experience a positive and enduring social interaction. Also, proactive care and support services for the high-risk group such as the widowed will reduce the likelihood to develop chronic loneliness.

Although we explored the prevalence and correlates of loneliness using nationally representative sample data, we acknowledge that understanding of the relationship between the study variables and inference of age-related variance using cross-sectional data is limited. Building on this baseline study, the sequential relationship between variables - antecedents and consequence of loneliness - should be further examined. In doing so, a companion study develops a longitudinal path model in order to more precisely examine the underlying mechanism of Czech elderly's loneliness over time. Existent loneliness models, for example, social resources-loneliness model (Burholt et al., 2016) and loneliness-cognitive function model (Cacioppo & Cacioppo, 2014b), help examine causal paths and different moderators and mediators that would better explain underlying mechanism of loneliness in Czech elderly. Examining applicability of the existent loneliness theories to Czech aging population will allow to determine the most preferable empirical model of loneliness in Czech elderly.

Loneliness in later life links to various life trajectory—childhood environment (e.g., single parenthood), personal (e.g., retirement, disability, and loss of spouse or peers), societal (e.g., increased nuclearized structure of the family), and even historical events (Kamiya et al.,

2013). Czech older adults underwent remarkable societal changes from the beginning of communist era of Czechoslovakia in 1938 to the dissolution of Czechoslovakia in 1992, including normalization due to Russian Invasion in 1968, and transition from communism to democracy through the Velvet Revolution in 1989. This unique historical trajectory of Czech older adults might significantly shape the way of how the older cohort perceive and experience social isolation within their social network and in a community and country. This suggests that socio-cultural interpretation should be made to better understand Czech elderly loneliness. Therefore, we ought to improve our understanding of individual and contextual-level antecedents associated with Czech older adults' loneliness employing different study designs such as multilevel analysis or qualitative approach. A cross-cultural comparative study with neighboring countries (e.g., Poland and Slovakia) will also help us determine if cultural and historical peculiarity would be substantial to understand loneliness in the Czech society.

Lastly but also importantly, prevention-intervention research should be designed to help diminish frequent loneliness among aging population in the Czech Republic in a long-term perspective. Loneliness research in the Czech Republic is still meager. However, if the aforementioned studies were done, we could predict the antecedents of loneliness more precisely, as well as better understand the processes that govern loneliness experience in Czech elderly. Building on this, evidence-based and explicit policy provision for Czech elderly's loneliness can put forward.

5. Conclusions

The current study shows that prevalence and correlates of Czech elderly's loneliness well-cohabit with existent literature, but some inconsistent results were also observed. In order to develop adequate social policy for elderly in need at the local and national level, more precise estimation and prediction should be provided aimed at Czech seniors.

CRediT authorship contribution statement

Sunwoo Lee: Conceptualization, Methodology, Formal analysis, Visualization, Writing - original draft, Writing - review & editing.

Declaration of Competing Interest

No author declares that there is conflict of interest.

Acknowledgements

This paper uses data from SHARE Waves 6 (DOIs: 10.6103/SHARE.w6.611), see Börsch-Supan et al. (2013) for methodological details. (1)

The SHARE data collection has been primarily funded by the European Commission through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812) and FP7 (SHARE-PREP: N°211909, SHARE-LEAP: N°227822, SHARE M4: N°261982). Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C) and from various national funding sources is gratefully acknowledged (see www.share-project.org).

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