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ORIGINAL ARTICLE

Loneliness, living alone and mental well-being: findings from a population-based study in Sweden

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Abstract

Aim: To investigate the association between loneliness, living alone and mental well-being among Swedish adults. *Methods:* The study is based on 6315 men and women aged 18 years or older responding to a population survey in 2022 (overall response rate 45%). A short version of the Warwick Edinburgh Mental Well Being Scale was used to measure mental well-being. The associations between loneliness, living alone and mental well-being were analysed using multiple logistic regression, adjusting for gender, age group, educational level, economic difficulties, social support, risk consumption of alcohol and longstanding illness. *Results:* Overall, the majority of the study population did not feel lonely, with 63.5% living with someone and 16.1% living alone. The proportion reporting loneliness, in total 20.4%, was about the same irrespective of whether the respondent lived with someone (10.7%) or was living alone (9.7%). More women than men reported loneliness, living alone and poor mental well-being. The youngest age group, 18–29 years, reported the highest levels of loneliness and poor mental well-being. Loneliness was independently associated with poor mental well-being, and the association was as strong among those who lived alone as among those who lived with someone. ***Conclusions:*** **Loneliness was associated with poor mental well-being irrespective of living alone or not. Public health actions aiming to reduce loneliness and strengthen mental well-being in the general population need to address all age groups, in particular young adults and those who live with someone but still feel lonely.**

Keywords: *Loneliness, mental well-being, living alone, gender, age, population studies*

Background

Loneliness has emerged as a significant public health issue, being associated with adverse physical and psychological outcomes across the lifespan [1]. It is defined as a subjective feeling of social isolation or a perceived gap between desired and actual social relationships [1,2]. Research indicates that loneliness is widespread in many European countries although the prevalence varies considerably between studies. A large-scale Dutch study including 26,000 adults aged 19–65 years found that 44% of respondents reported feelings of loneliness, with slightly higher prevalence among those aged 50–65 years [3]. In a study from Germany consisting of 15,010 respondents aged 35–74 years, 10.5% of the participants reported some degree of loneliness [4]. In Sweden, the prevalence of perceived loneliness or isolation in adults 16 years or older is 28% among women and 24% among men [5]. An extensive review of more than 100 studies shows that loneliness is shaped by a combination of individual, social and structural factors and manifests differently across age groups [6], which is confirmed in the recent report published by the World Health Organization [1]. Living alone, limited social contact and low perceived social

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support are consistent predictors across populations [6]. Psychological factors such as anxiety, poor emotional well-being and a sense of social exclusion have also been linked to loneliness, highlighting the complex interplay between social and mental health determinants. At the same time, meaningful relationships, community belonging and social participation serve as protective factors that buffer against loneliness and promote mental well-being [6].

Living arrangements have been identified as important factors for loneliness [6]. According to Statistics Sweden, 19% of the total population live alone, with the highest proportions in the oldest age groups [7]. One in three individuals aged 60 or older lives alone—approximately 900,000 people, two-thirds of whom are women. Living alone has been associated with limited social interaction, reduced emotional support and increased vulnerability to loneliness [7,8]. Swedish studies have found that among adolescents and young adults, loneliness often arises during the transition from childhood to adulthood, reflecting uncertainty about identity, belonging and the future—relating to existential questions [9]. Among older adults, loneliness is more often related to loss of close social relationships, widowhood and reduced social participation [10].

The health consequences of loneliness are well documented. It has been linked to increased risks of cardiovascular disease, stroke, dementia, depression and premature mortality [2,11]. Loneliness is associated with several types of mental health issues as well as mental well-being [12]. Mental well-being, in turn, is shaped by both risk and protective factors, including social relationships, physical activity and overall lifestyle [13]. Given the established links between loneliness, living alone and mental health outcomes, further research is warranted to clarify how these factors interrelate in the general adult population. The aim of the present study is to investigate the associations between loneliness, living alone and mental well-being in a Swedish general population aged 18 years or older.

Methods

The study is based on a survey questionnaire sent to a random population sample of 14,144 adults aged 18 years or older in February–May 2022 in Värmland county in Sweden. The questionnaire comprised questions about lifestyle habits, living conditions and health. The sampling frame was the population register at Statistics Sweden, the statistical administrative authority in Sweden. The random sample was stratified by age group, gender and municipality. The questionnaire was sent by mail and could be answered by mail or online. Data collection was discontinued after two postal reminders. Up to three short message service reminders were also sent to persons with a registered mobile phone number. In total, 6315 persons answered the questionnaire, giving an overall response rate of 45%. Värmland county is characterised by a relatively low population density, and a large proportion of the population resides in rural or semi-rural areas. Värmland exhibits an older demographic profile as well as longer average distances to essential services compared with more metropolitan areas in Sweden.

Outcome

Mental well-being is the positive dimension of the concept of mental health and is a condition that encompasses both well-being and functional capacity. To measure mental well-being, a short version of the Warwick Edinburgh Mental Well Being Scale (SWEMWBS) [14] was used. The instrument contains a series of statements that respondents can consider by choosing one of five response alternatives (Always, Often, Sometimes, Rarely, Never) to each of the seven sub-questions a–g indicating how well the statements correspond to the respondent's situation over the past two weeks: a) I have had a positive outlook on the future; b) I have felt that I have been useful; c) I have felt calm; d) I have handled problems well; e) I have thought in a clear way; f) I have felt close to other people; g) I have been able to decide things for myself. The answers are scored from 5 to 1, summed and converted into metric scores. Good mental well-being is defined as those with a metric score above 21 as in the national public health survey at the Public Health Agency of Sweden [5]. The proportion of missing values was 7.7% (n=488) for SWEMWBS.

Main risk factors

Loneliness and isolation were measured with one question: 'Do you struggle with loneliness and isolation?'. The answer options were 'No', 'Yes, mild problems' and 'Yes, severe problems' and were dichotomised into no and yes. For simplicity this variable is hereafter referred to as loneliness.

Family status was based on the question 'With whom do you share a home? That is, who do you live with during most of the week?'. The answer options were 'Nobody', 'Parents/siblings', 'Spouse/partner', 'Children younger than 18 years', 'Children 18 years or older' and 'Other adult' (more than one answer could be given). The answers were dichotomised into living alone or not living alone (living with partner, living with partner and children, single parent, living with parents/siblings or living with another adult).

Covariates

Educational level was obtained from a national education register and categorised into three levels: low (elementary school), medium (upper secondary school) and high (at least three years of university or corresponding education).

Economic difficulties were estimated with the question 'During the last 12 months, have you ever had difficulty in managing the regular expenses for food, rent, bills etc.?' ('No', 'Yes, once', 'Yes, more than once'). The alternatives were dichotomised into no and yes.

Social support was measured with the question 'Do you have anyone you can share your innermost feelings with and confide in?' (yes/no).

Alcohol consumption was measured using Alcohol Use Disorders Identification Test-C. It comprises three questions on the frequency and quantity of alcohol consumption. We used the following cut-offs for risk-drinking: five points for women and six points for men [5].

Longstanding illness was assessed with the question: 'Do you have any long-term illness, discomfort following an accident, any reduced physical function or any other long-term health problem?' (yes/no).

Ethical considerations

The data on gender, age and educational level are based on registry data from Statistics Sweden. By answering the questionnaire, participants gave their informed consent that questionnaire data would be linked to Swedish official registers at Statistics Sweden through personal identification numbers. After the record linkage, all identity information was removed before the material was handed over from Statistics Sweden to Region Värmland for further processing. Authorization from the Swedish Ethical Review Authority has been obtained (Dnr 2021-05814-01). The data material is protected according to the Public and Privacy Act (2009: 400, Chapter 24, Section 8).

Statistical analyses

Chi-squared tests were used to test the statistical significance of the differences between groups in the distribution of mental well-being and combinations of loneliness and living alone by gender and age group. Logistic regression analyses were conducted to assess crude and adjusted associations between the combinations of loneliness and living alone in relation to poor mental well-being in the total sample as well as by gender. The group not living alone and not feeling lonely was used as the reference group. Since loneliness [6] and mental health [15,16] are associated with several demographic, social and behavioural factors as well as physical health we adjusted for gender, age group, educational level, economic difficulties, social support, risk consumption of alcohol and longstanding illness in the multiple logistic regression analyses. To analyse whether the association between loneliness and poor mental well-being differs between those living alone or living with someone an interaction term between loneliness and living alone was tested in a multiple logistic regression model. The results from the logistic regression analyses are presented as unadjusted and adjusted odds ratios (ORs) with 95% confidence intervals (CIs). An additional linear regression analysis was performed to test adjusted differences in mean SWEMWBS scores by the combinations of loneliness and living alone. All analyses were carried out using SPSS, version 28.0.

Results

Background characteristics

The study population consisted of 6315 individuals, where slightly more women (52.9%) than men responded to the survey (Table I). The majority of participants were 50–84 years old, with 29.8% in the 50–69 age group and 29.4% aged 70–84 years. Younger adults aged 18–29 years accounted for 12.1% of the sample and persons 85 years or older for 9.9%. One-quarter of the participants were living alone and 20.3% reported experiences of loneliness. In terms of educational level, 32.5% had high while 20.4% had low education. Most participants reported no economic difficulties (90.4%) and had access to social support (88.3%), whereas 11.3% reported risk consumption of alcohol. Almost half of the participants (45.8%) reported longstanding illness.

Table I shows also the distribution of mental well-being in relation to the background factors. In total, 85.1% had good mental well-being. Women had a higher prevalence of poor mental well-being than men. The prevalence was also higher among those aged 18–29 years compared with older age groups. Living alone and loneliness were statistically significantly associated with poor mental well-being. Respondents who had economic difficulties, who lacked social support, who were risk-consumers of alcohol or had longstanding illness had a higher prevalence of poor mental well-being than others. Educational level was not statistically significantly associated with mental well-being.

Table I Background characteristics of the study population and distribution of mental well-being.

	N	%	Mental well-being		*p*-value
			Good	Poor	
			%	%	
Total	6315	100	85.1	14.9	
Gender					0.007
Women	3342	52.9	83.9	16.1	
Men	2973	47.1	86.4	13.6	
Age group					<0.001
18–29 years	764	12.1	74.6	25.4	
30–49 years	1183	18.7	81.9	18.1	
50–69 years	1885	29.8	88.5	11.5	
70–84 years	1855	29.4	88.9	11.1	
85+ years	628	9.9	81.3	18.7	
Living alone					<0.001
No	4377	74.3	86.5	13.5	
Yes	1517	25.7	80.6	19.4	
Loneliness					<0.001
No	4703	79.7	91.6	8.4	
Yes	1201	20.3	59.4	40.6	
Educational level					0.051
Low	1188	20.4	84.4	15.6	
Medium	2747	47.1	85.6	14.4	
High	1896	32.5	87.9	12.5	
Economic difficulties					<0.001
No	5663	90.4	87.3	12.7	
Yes	603	9.6	63.8	36.2	
Social support					<0.001
Yes	5206	88.3	87.7	12.3	
No	687	11.7	65.5	34.5	
Risk consumption of alcohol					0.009
No	5321	88.7	85.8	14.2	
Yes	679	11.3	81.9	18.1	
Longstanding illness					<0.001
No	3095	54.2	89.8	10.2	
Yes	2613	45.8	79.5	20.5	

Association between living alone and loneliness

When examined within living arrangement groups, the prevalence of loneliness was substantially higher among individuals living alone (37.5%) compared with those not living alone (14.5%), confirming a strong association between living alone and loneliness (Figure 1). Among those not living alone, the majority (89.5%) lived with a spouse/partner (data not shown). In addition, 22.4% lived with children under 18 years, 6.8% lived with children 18 years or older, 5.7% lived with parents/siblings and 2.8% with other adults (several alternatives could be chosen).

Prevalence of loneliness and living alone in the study population

Table II shows the distribution of the different categories of combinations of living alone and loneliness, expressed as proportions of the total study population. The majority lived with someone and did not feel lonely (63.5%). In total, 16.1% of the study population lived alone but did not feel lonely. However, the proportion of respondents with perceived loneliness was about the same irrespective of whether the respondent lived with someone (10.7%) or was living alone (9.7%). A higher proportion of women than men reported loneliness and/or living alone. There were also differences between age groups in the distribution of the different combinations of living alone and loneliness. The youngest age group, 18–29 years, reported the highest levels of loneliness, particularly among those not living alone (22.6%). In the oldest age group, 85 years or older, more than half of the respondents were living alone, with 33% feeling not lonely and 23% lonely.

Association between loneliness and living alone and mental well-being

The prevalence of poor mental well-being was highest among those who lived with someone and felt lonely (42.4%) and those who lived alone and felt lonely (38.7%) (Table III). Both crude (unadjusted)

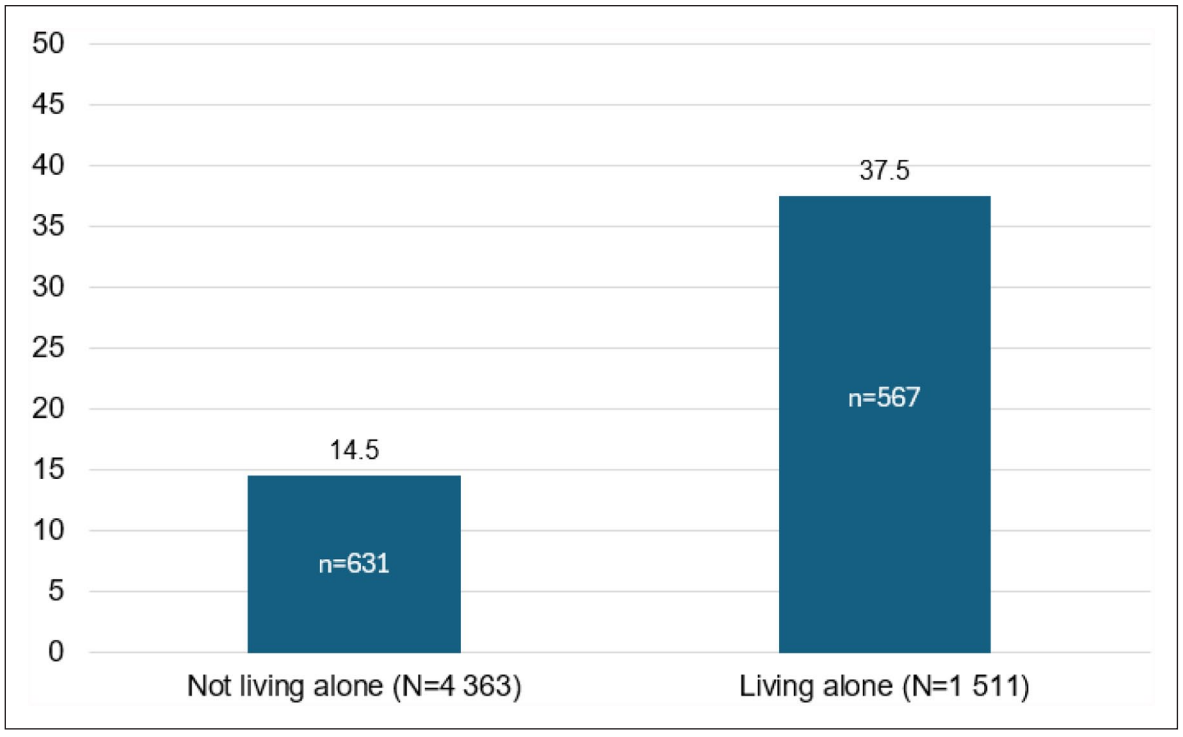

Figure 1. Prevalence (%) of loneliness by living alone.

Table II. Distribution of loneliness and living alone by gender and age group.

	Not lonely		Lonely		
	Not living alone (%) N = 3732	Living alone (%) N = 944	Not living alone (%) N = 631	Living alone (%) N = 567	p-value
Total	63.5	16.1	10.7	9.7	
Gender					<0.001
Women	59.6	17.1	12.9	10.5	
Men	68.1	14.9	8.3	8.7	
Age group					<0.001
18–29 years	56.7	10.5	22.6	10.2	
30–49 years	72.8	7.0	14.3	5.9	
50–69 years	71.0	15.0	7.7	6.3	
70–84 years	62.2	19.3	7.7	10.7	
85+ years	35.5	33.0	8.7	23.0	

and adjusted ORs confirm the association between the categories of living alone, loneliness and mental well-being. The odds for having poor mental well-being for those feeling lonely compared with those not feeling lonely were high among both those who were living with someone (crude OR: 7.9, adjusted OR: 5.4) and those living alone (crude OR: 6.8, adjusted OR: 4.3). Adjustment was made for gender, age group, educational level, economic difficulties, social support, risk consumption of alcohol and long-standing illness. When stratified by sex, the same pattern emerged, indicating that feeling lonely, either when living with someone or living alone, was strongly associated with poor mental well-being. An interaction term between loneliness and living alone was not statistically significant ($p>0.05$, not shown) confirming that the association between loneliness and poor mental well-being did not differ between those living alone and those living with someone.

In linear regression analysis, the adjusted mean SWEMWBS score was 3.0 (95% CI: 2.6, 3.4) higher among those living alone and not feeling lonely and 3.3 (95% CI: 2.9, 3.8) higher among those living with someone and not feeling lonely than among those who lived alone and felt lonely. The difference between those living with someone and feeling lonely

Table III. Distribution of mental well-being and odds ratios (ORs) (95% confidence interval (CI) in parentheses) for poor mental well-being by categories of loneliness and living alone.

		Mental well-being				
		Good	Poor	*p*-value	OR (95% CI)	OR (95% CI)
		%	%		Unadjusted	Adjusted[a]
Loneliness and living alone						
Total				<0.001		
Not lonely	Not living alone	91.5	8.5		1	1
	Living alone	92.1	7.9		0.9 (0.7, 1.2)	0.7 (0.5, 1.0)
Lonely	Not living alone	57.6	42.4		**7.9 (6.5, 9.6)**	**5.4 (4.3, 6.9)**
	Living alone	61.3	38.7		**6.8 (5.5, 8.4)**	**4.3 (3.3, 5.6)**
Women				<0.001		
Not lonely	Not living alone	91.2	8.8		1	1
	Living alone	93.0	7.0		0.8 (0.5, 1.1)	**0.6 (0.4, 0.9)**
Lonely	Not living alone	57.6	42.4		**7.6 (5.9, 9.9)**	**5.4 (3.9, 7.3)**
	Living alone	59.0	41.0		**7.2 (5.5, 9.5)**	**4.9 (3.4, 6.9)**
Men				<0.001		
Not lonely	Not living alone	91.8	8.2		1	1
	Living alone	90.8	9.2		1.1 (0.8, 1.6)	1.0 (0.6, 1.5)
Lonely	Not living alone	57.6	42.4		**8.2 (6.0, 11.2)**	**5.8 (3.9, 8.4)**
	Living alone	64.5	35.5		**6.1 (4.5, 8.4)**	**4.0 (2.7, 5.9)**

Statistically significant ORs are shown in bold.
[a]Adjusted for gender (for total group), age group, educational level, economic difficulties, social support, risk consumption of alcohol and longstanding illness.

compared with those who lived alone and felt lonely was not statistically significant ($p>0.05$). This confirms the differences found in logistic regression analyses.

Discussion

Main results

We aimed to investigate the associations between loneliness, living alone and mental well-being in a Swedish general population aged 18 years or older. The key findings were that (1) the majority of the study population lived with someone and did not feel lonely; (2) the youngest age group (18–29 years) reported the highest level of loneliness, particularly among those living with someone; and (3) loneliness was independently associated with poor mental well-being, notably, both among individuals living alone but also among those living with someone.

Findings in relation to previous studies

The results of the current study are in line with previous studies showing that living alone is most frequent among those in the oldest age group [7,17] and that the prevalence of loneliness is highest in the youngest and oldest age groups [5,18]. The majority of studies on loneliness examine adult populations, aged 60 years and above [19], although more studies on young adults have been published during recent years [20]. In our study, the prevalence of poor mental well-being was highest in the youngest age group, 18–29 years, which corroborates with previous findings [17,21]. In line with previous studies, the results also show that the prevalences of loneliness [8,22] and poor mental well-being [15,17,23] were higher among women than among men.

In the current study, young individuals reported loneliness and poor mental well-being to a higher extent than other age groups. They had also the highest prevalence of feeling lonely when living with someone else, which was contrary to our expectations. This pattern aligns with research showing that loneliness could arise during the transition from childhood to adulthood, reflecting uncertainty about identity, belonging and the future (9).

The findings of our study show that the association between loneliness and poor mental well-being was very strong even when adjusted for several other risk factors. That loneliness has a strong association with poor mental well-being has been reported in previous studies, among adolescents [24], in the general adult population [4,20] and in the older population [8,25]. In our study, although the prevalence of poor mental health was higher among women than among men, no gender differences were observed in the association between loneliness and poor mental well-being.

Even though the correlation between living alone and loneliness is known [6,8], to our best knowledge, no previous studies have investigated the association between loneliness and mental well-being among adults stratified by living alone or not. In line with earlier longitudinal work [26], our results support

the notion that loneliness and living alone capture partially distinct dimensions relevant to health, highlighting the value of accounting for living arrangement in analyses of loneliness. In the current study, the association between loneliness and poor mental well-being was as pronounced among those who lived with someone as among those living alone. This was an unexpected finding and implies that cohabitation and the mere presence of social contacts do not necessarily protect against loneliness or poor mental well-being. Loneliness is a multifaceted phenomenon encompassing existential, emotional and social dimensions [17]. For instance, while social loneliness pertains to a lack of social connections, existential loneliness relates to a deeper sense of meaninglessness and isolation, often experienced during transitional life stages [27]. In our study, we could, however, not distinguish what type of loneliness was reported by the respondents.

Our measure of loneliness combined both loneliness and isolation. In their large review on the health effects of loneliness and isolation, Leigh-Hunt et al. [12] identified 62 different measures of loneliness, isolation and related concepts, which indicate the diversity of the measures used in research. In general, isolation refers to a more objective aspect whereas loneliness refers to a more subjective aspect of social relationships. The associations between social isolation and health, as well as between loneliness and health, were, however, largely similar [12].

Public health perspective

From a public health perspective, our findings suggest that interventions to reduce loneliness and strengthen mental well-being need to reach beyond older adults and explicitly include young adults. Recently, the Swedish government took initiative to develop a national strategy against loneliness [17]. The overall goal of the strategy is to achieve a society with equal opportunities for social relationships.

Moreover, future studies should take into consideration the different dimensions of loneliness—including social, emotional and existential aspects—across different age groups and life situations. This is important in order to generate evidence for interventions aimed at preventing loneliness and alleviating its consequences, which is essential for reducing the risk of poor mental well-being in the general population.

Strengths and limitations

One of the advantages of our study is that it is based on a large sample of the general population aged 18 and over, including those aged 85 years or over. We used SWEMWBS, which is a validated scale [14], to assess mental well-being. In addition to stratifying the analyses by living alone, we could adjust the analyses of the association between loneliness and mental well-being for several potential confounders, such as gender, age group, educational level, economic difficulties, social support, risk consumption of alcohol and longstanding illness. We analysed the association between loneliness, living alone and poor mental well-being by gender. However, analyses stratified by age group were not possible owing to low power.

The main limitation of the current study is the cross-sectional design, which impedes causal inference. It is possible that the association is bi-directional, that is, that loneliness causes poor mental well-being but also that poor mental well-being leads to loneliness [28,29]. However, prospective studies have confirmed that loneliness is an important determinant of poor mental health [20,25].

Previous studies have used different measures of loneliness [3,4,8], which makes it difficult to compare the prevalence of loneliness between studies and across different populations. As indicated previously, in our study, we could not distinguish the existential, emotional and social dimensions of loneliness. In addition, our measure of loneliness combined loneliness and isolation, which are related but not identical concepts [8]. Although not a validated one the question was the same one as used in the national public health study 2022 conducted by the Public Health Agency of Sweden [5].

The response rate in the current study was 45%, which is usual in large population surveys [5]. The response rate was lower among men than among women, among young adults and persons with low educational level, which might have affected the representativeness of the respondents. Non-response is also related to poor mental health [30], which might have led to underestimation of the prevalence of poor mental well-being. Previous research has indicated that low response rates might affect the prevalence of risk factors but have less impact on the associations between risk factors and outcomes [31]. This implies that it is unlikely that non-response would explain the associations found in this study between loneliness, living alone and mental well-being. Our study was limited to one county in Sweden. Whereas Värmland county has low population density and the proportion of rural/semi-rural population is relatively high, the prevalence of loneliness does not differ significantly from the national average [5].

Conclusions

In this population-based study, we found that those who feel lonely have poorer mental well-being

irrespective of living alone or not. Our findings suggest that interventions to reduce loneliness and strengthen mental well-being need to address all age groups, in particular young adults, and those who live with someone but still feel lonely.

Declaration of conflicting interests

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