



The relationship between social support, perceived health status, and elderly loneliness

Lilis Heri Mis Cicih^{1,2*}, Muhammad Reyhan Emirel Ardh³

¹Faculty of Economic and Business, Universitas Indonesia, Depok, Indonesia

²Faculty of Health, Universitas Mohammad Husni Thamrin, Jakarta, Indonesia

³Faculty of Humanities, Universitas Indonesia, Depok, Indonesia

ABSTRACT

Background: Loneliness is a silent epidemic that is a significant risk factor for mental health and premature death. One of the vulnerable people at higher risk for loneliness is the elderly.

Purpose: This study examines the interplay between social support, perceived health status, and the prevalence of loneliness in older adults.

Method: This is a cross-sectional design with a quantitative approach. Primary data collection was carried out with individuals aged 60+ years. Loneliness was evaluated via the UCLA Loneliness Scale, and the MOSSS for social support. Data analysis was carried out using descriptive and logistic regression.

Findings: The total number of respondents selected was 3,713 elderly. Most of the respondents were aged 60-69 years, female, living in rural areas, with low education, married, and not working. Inferential analysis revealed that social support, perceived health status, ICT usage, community group participation, educational, age group, and residential area were significantly associated with elderly loneliness. The dominant factor of elderly loneliness is social support (Odds Ratio [OR]): 4.5. Elderly who receive sufficient social support are 4.5 times less likely to feel lonely than those who receive less social support.

Implication: The rural elderly require a multi-faceted approach, and stakeholders should focus on enhancing social support, particularly emotional support from families and community.

KEYWORDS

Elderly; emotional support; perceived health status; loneliness; social support

ARTICLE HISTORY

Received 20 November 2025

Revised 3 March 2026

Accepted 10 September 2026

Introduction

In late 2023, the World Health Organization (WHO) Commission on Social Connection officially designated loneliness as a critical global public health issue. Loneliness is increasingly recognized as a serious health concern, often described as a "silent epidemic" due to its widespread impact and potential consequences. Globally, approximately 16% of people experienced loneliness between 2014 and 2023 (World Health Organization [WHO], 2025). It is a widespread issue impacting individuals across all ages and regions.

This demographic transition further intensifies the challenge, with forecasts estimating that the population of isolated older adults aged 50 and above will surge threefold—rising from 104.9 million in 1990 to 333.5 million by the year 2050 (Newmyer et al., 2022). Globally, prevalence rates of loneliness among the elderly range from 10–28% (WHO, nd). With the increase in older population, loneliness imposes high costs on people's health and well-being, thereby straining social care resources and affecting clinical and public health practice (Hussein et al., 2021). Individuals aged 60 years and above are at a relatively high risk of experiencing loneliness later in life. There are 25 to 50 percent of individuals over 65 experience loneliness (Holt-Lunstad et al., 2015), and the prevalence may exceed 70%, especially under certain conditions (Molas-Tuneu et al., 2023).

The concept of loneliness has been distinguished from living alone, solitude, and social isolation (Cornwell & Waite, 2009; Hawkley & Cacioppo, 2010; Wethington, 2016). Social isolation has been defined as an objective state of having minimal social contact with other individuals, whereas loneliness reflects a subjective state of lacking desired affection and closeness to a significant or intimate other (i.e., emotional loneliness) or to close friends and family (i.e., relational loneliness). Loneliness and living alone are related but not overlapping categories. Residing by oneself does not inherently signify loneliness; indeed, numerous individuals living alone maintain robust social networks and participate dynamically in community-based groups (Wenger et al., 1996). Furthermore, a conceptual distinction must be drawn between loneliness and solitude. While loneliness represents an unchosen state precipitated by a perceived lack of meaningful social connection, solitude is characterized by deliberate social detachment, wherein individuals willingly distance themselves from their interpersonal networks (Hawkley & Cacioppo, 2010).

Fundamentally, loneliness manifests as a painful discrepancy between an individual's actual social connections—whether in terms of frequency or depth—and their subjective relational expectations (Perlman & Peplau, 1982). Grounded in this definition, the current investigation introduces a conceptual framework designed to elucidate the dynamics of loneliness and its associated empirical phenomena. Loneliness has significant consequences for physical and mental health, as well as overall development and well-being. These include increased risks of cardiovascular disease, cognitive decline, functional decline, and even premature mortality. Recent meta-analytic evidence indicates that chronic loneliness among older populations elevates the risk of onset dementia by approximately 50% (Wang et al., 2023). The systemic health ramifications of social isolation are remarkably profound, rivaling established cardiovascular risks such as hypertension, cigarette smoking, and clinical obesity; consequently, it significantly heightens vulnerability to neurodegenerative decline, depressive disorders, and cardiovascular pathologies (WHO, 2025).

The aging process is frequently accompanied by distinct psychosocial stressors that predispose individuals to emotional isolation, including bereavement, workforce withdrawal, and physiological decline. Extant literature conceptualizes these determinants by distinguishing between latent vulnerability factors and proximal precipitating events that catalyze the onset of loneliness. Within this framework, individual baseline traits function as critical predisposing elements (Wang et al., 2023). Specifically, empirical evidence indicates that heightened vulnerability to geriatric loneliness is significantly correlated with being female, unmarried, older old, socioeconomically disadvantaged, less educated, residing in single-person households, and experiencing suboptimal health status (Bryan et al., 2024; Hawkley et al., 2022).

A comprehensive meta-analytic review encompassing over 113,000 articles robustly establishes the linkage between social support structures and loneliness (Zhang & Dong, 2022). Extant literature consistently identifies social reinforcement as a premier protective factor capable of mitigating feelings of isolation (Çevik & Yıldız, 2017; Xin & Xin, 2016). Nevertheless, the magnitude and direction of this relationship exhibit substantial empirical variance across studies. While a vast majority of scholars document an inverse correlation (Luo et al., 2020; Suri et al., 2019; Xu et al., 2024; Tan et al., 2016), divergent evidence also points to positive associations under specific conditions (Ni et al., 2015). Furthermore, current evidence highlights that older old—particularly those characterized by constricted social networks and severe functional or physical declines—are uniquely susceptible to severe loneliness (Czaja et al., 2021). This is congruent with earlier foundational work indicating that subjective health evaluations, mental well-being, satisfaction with health, and both objective and subjective social support are significantly and inversely correlated with loneliness (Chang & Yang, 1999). Consequently, optimizing social integration and physical well-being has emerged as a critical imperative to alleviate geriatric loneliness (Baker et al., 2018).

The WHO Commission on Social Connections has elevated loneliness to a global policy imperative spanning all generational cohorts. In alignment with this commitment, the Demographic Change and Healthy Aging Unit has integrated loneliness as a core thematic area intersecting the four structural pillars of the UN Decade of Healthy Aging (2021–2030). Given this international momentum, Indonesia—which is currently navigating a rapid demographic transition toward an aging society—must urgently address elderly loneliness. National data reveal that the segment of the population aged 60 and above reached 12% of the total countrywide population in 2024 (BPS, 2024). Furthermore, a 2022 national evaluation examining the pandemic's long-term impacts on older citizens indicated that the prevalence of loneliness stood at 10.3%, with female older adults exhibiting a disproportionately higher vulnerability than males (Saito & Cicih, 2022).

A different measurement was conducted using the 5th round of the Indonesian Family Life Survey (IFLS) in 2014-2015. The results showed an overall prevalence of loneliness among residents aged 15 years and above of 10.6% (Peltzer & Pengpid, 2019). Furthermore, based on IFLS-5 data, 11.2% of older adults experienced high levels of loneliness, and 88.8% experienced low levels of loneliness. One of this study's recommendations includes providing social support to reduce loneliness in this vulnerable population.

Although various studies on elderly loneliness have been conducted, particularly in other countries, most remain meta-analyses and reviews. In Indonesia, some studies on elderly loneliness have been conducted, not all aspects have been comprehensively covered. At the national level, only one national study specifically measures elderly loneliness, which focused primarily on the impact of the COVID-19 pandemic. Loneliness data is available in the IFLS (Indonesian Family Life Survey), but it is available for the past 10 years. Additionally, the national data from the Indonesian Health Survey (SKI) does not specifically present data on loneliness. Meanwhile, other studies conducted have been largely limited in scope and sample size.

Driven by these considerations, the present inquiry was initiated to explore the multifaceted determinants of loneliness among elderly. Responding to strategic directives from the WHO, there is a critical demand for empirical work that unpacks the socio-cultural and gender-based dimensions of social support networks. Cultivating effective, setting-specific prevention blueprints requires large-scale epidemiological data captured across highly heterogeneous environments. Consequently, this study seeks to dissect how primary social support systems and perceived health status collectively interface with elderly loneliness. A major gap in contemporary literature is the scarcity of models that evaluate social support and perceived health status concurrently as co-primary independent predictors. This study bridges that gap by offering a novel integrated framework that highlights the intersectional impact of these two domains on elderly loneliness. To achieve wider coverage, this study was conducted in the service areas of elderly care workers throughout Indonesia. Therefore, it was expected that the results obtained would come from diverse regions. Ultimately, these findings are projected to enrich the national empirical database, offering a sound diagnostic framework for evidence-based policymaking. By deploying a comprehensive analytical lens that encompasses demographic profiles, social support, and group participation, this paper delivers vital insights for optimizing clinical and community-led interventions.

Method

Studi Design and Respondent

The study used a cross-sectional design, which is a study conducted simultaneously at one time by observing the research subjects at one time (Setia, 2016). This study was conducted from October 25, 2024, to December 24, 2024. The location of study is the region that has cadres of elderly groups based on elderly government program, including the Elderly Family Development (Bina Keluarga Lansia [BKL]) under the Ministry of Population and Family Development

(BKKBN), the Elderly Social Welfare Institution (Lembaga Kesejahteraan Sosial Lanjut Usia [LKSLU]) under the Ministry of Social Affairs, and health cadres in integrated health posts (Pos Pelayanan Terpadu [Posyandu]).

Primary data collection relied on a convenience (accidental) sampling approach, wherein participants from the designated target population were recruited based on their immediate accessibility and proximity to the investigators (Golzar et al., 2022). These methods allow for rapid respondent recruitment, especially in contexts where the population is easily accessible. This approach ensured efficient data collection from older adults who attended the group and were willing to participate as respondents. The target of respondent as those who were aged 60 and above (elderly). Participants were eligible for inclusion if they were aged 60 years and above, who could still communicated, were capable of following instructions, were willing to be a respondent, and provided informed consent. The exclusion criteria included the elderly who experienced cognitive and mental disorders, severe physical conditions (illness), communication disorders, and severe physical disabilities or strokes that affected their ability to participate.

Data were collected using a Google Forms questionnaire and specific guidelines. Elderly respondents completed the questionnaires independently or with the assistance of elderly cadres or family members aged 18 and over. They assisted the elderly respondents solely with technical aspects, such as using a mobile phone, and by reading out the question items. In addition, elderly cadres or family members assisted them in translating the questions into the local language. Generally, the elderly in rural areas lack proficiency in Indonesian and do not possess mobile phones. Although the older adults received technical assistance, the information was still provided directly by the elderly themselves.

We distributed questionnaires assisted by BKKBN elderly cadres and various elderly groups in 24 provinces in Indonesia. Specifically, the BKKBN elderly cadres, some of whom had experience in similar interview training, specifically in the national survey on the impact of the COVID-19 pandemic on the elderly. Ideally, data collection would be conducted by trained interviewers, ensuring they understood the purpose of each question. This study is limited by the lack of specific selection criteria and training for the interviewers. Therefore, in this study, we need to be careful in looking at the results of the elderly respondents' answers.

This questionnaire is also equipped with informed consent, which we provided to the respondents. The aim is to ensure elderly respondent is to protect vulnerable participants, ensure voluntary participation, and respect autonomy despite potential cognitive or physical impairments. In this study, informed consent included the purpose of the study, procedures, risks/benefits, and a guarantee of voluntary consent without coercion. This document ensures that the elderly understand their rights, data confidentiality, and the freedom to withdraw at any time. It also includes consent for a representative if the elderly become incompetent.

According to human subjects, we conducted ethical clearance as a formal approval process for research. The primary goals focus on protecting subjects, maintaining research integrity, and adhering to legal standards. We conducted the ethical clearance in Mohammad Husni Thamrin University, Jakarta, and the number of results at 95/S.Ket/KEPK/LPPM/UMHT/XI/2024.

Dependent Variables

To evaluate the primary outcome, elderly loneliness was quantified using the 20-item University of California, Los Angeles (UCLA) Loneliness Scale (Version 3) (Russell, 1996). Participants rated the frequency of their lonely feelings via a 4-point Likert scale, spanning from 1 (never) to 4 (always). Total scores on this instrument range from 20 to 80, with higher values reflecting more severe levels of subjective isolation. When deployed across diverse Indonesian cohorts, this scale consistently exhibits robust internal consistency. For instance, recent validation work by Harwanto et al. (2025) confirmed its strong psychometric properties in the

local context, reporting an Aiken's $V \geq .91$ and acceptable structural model fit indices (RMSEA = .075, CFI = .923, and TLI = .914). This indicates that the question items are able to measure loneliness well. Whereas, the reliability scale was calculated using Cronbach's Alpha, which was obtained at .950, indicating excellent internal consistency.

Independent Variables

There are two main independent variables, namely social support, and perceived health status. The conceptual framework of this study centers on two primary independent predictors: social support and perceived health status. The construct of social support is operationally defined to encompass the availability of multifaceted resources, specifically comprising emotional, esteem, instrumental, informational, and companionate or network-based support systems. This support provided by friends, family, neighbours, and community programs to foster a sense of community and address loneliness. This can include simple interactions like phone calls and visits, or more structured support such as community centre activities and technology-based tools to help the elderly remain engaged and connected with others. To operationalize the social support construct, the 19-item Medical Outcomes Study Social Support Survey (MOS-SSS) was employed. It consists of 20 questions that were designed by Sherburne & Stewart in 1991. These questions have been tested for reliability, with alpha values greater than .91, and the results have been found to be quite stable over time. Based on the results of validity and reliability measurements from various countries, the use of MOS-SSS is also recommended for use in future research (Dao-Tran et al., 2023).

The perceived health status variable is subjective and measures how elderly individuals perceive their health in general or in comparison to others (Holtfreter et al., 2016). This assessment captures nuanced dimensions of well-being that are frequently omitted by standard clinical instruments, such as subclinical or early-stage pathologies, the progression of disease severity, elements of optimal positive health, bio-psychological reserves, and integrated social-cognitive functioning.

Control Variables

To control for potential confounding, this study adjusted for several socio-demographic covariates, encompassing residential area, age group, gender, marital status, educational level, work status, information and communication technology (ICT) utilization, and community group engagement. ICT construct is operationally defined as the diverse array of technological infrastructure leveraged for information management and communication facilitation. This encompasses a broad spectrum of tools, such as radio, television, cell phones, the internet, and video conferencing.

Data Analysis

The quantitative analysis followed a structured, multi-stage approach, initiating with univariate descriptive metrics to characterize the baseline distribution of each standalone variable. To examine the crude, unadjusted associations between the categorical independent predictors and elderly loneliness, bivariate assessments were conducted using the Chi-Square test of independence. For these preliminary evaluations, the threshold for statistical significance was maintained at a two-tailed alpha level of $\alpha = 0.05$. Subsequently, multivariable logistic regression frameworks were modeled to ascertain whether the core impacts of social support and perceived health status on loneliness remained statistically robust when adjusting for

confounding covariates. All data management and inferential procedures were executed using the SPSS statistical computing package.

Result and Discussion

Respondent Characteristics

A total of 3,713 respondents who met the inclusion and exclusion criteria were willing to complete the questionnaires. Although empirical material was successfully gathered across 24 distinct Indonesian provinces, the sample size exhibited regional dispersion disparities. Nevertheless, the spatial framework of the investigation captured a broad representation of primary island clusters, encompassing Bali and the Javanese territories (Banten, DKI Jakarta, Jawa Barat, Jawa Tengah, and Jawa Timur); Sumatran region (Jambi, Lampung, Riau, Sumatera Barat, Sumatera Selatan, and Sumatera Utara); the Kalimantan region (Kalimantan Barat, Kalimantan Selatan, Kalimantan Tengah, Kalimantan Timur, and Kalimantan Utara); Sulawesi island sectors (Gorontalo, Sulawesi Barat, Sulawesi Selatan, Sulawesi Tenggara, and Sulawesi Utara); as well as eastern archipelago extensions including Maluku Utara and Papua Barat.

Most respondents lived in rural areas (82.9%), aged 60-69 (61.1%), female (70.4%), married (51.9%), with lower education (68.9%), 75.3% not working, and 71.5% using ICT (see Table 1). As many as 68.0% of elderly respondents participated in group activities. The elderly who were recruited as respondents were generally members of an elderly group, considering that the questionnaires were mostly distributed by cadres. The elderly who had participated in the group for more than one year is 45.5%.

Table 1.

Characteristics of Elderly Respondents

Variable	n=3,713	%
Residential Area		
Urban	634	17.1
Rural	3079	82.9
Age Group		
60-69 [young old]	2270	61.1
70-79 [middle old]	1139	30.7
80+ [older old]	304	8.2
Gender		
Female	2614	70.4
Male	1099	29.6
Marital Status		
Not Married	36	1.0
Divorced/not married	1749	47.1
Married	1928	51.9
Education Level		
Lower (elementary)	2558	68.9
Middle (junior and senior high schools)	886	23.9
Higher (university)	269	7.2
Work Status		
Yes	918	24.7
No	2795	75.3
ICT used		

No	1058	28.5
Yes	2655	71.5
Group Participations		
Yes	2525	68.0
No	1188	32.0

Social Support, Perceived Health Status, and Loneliness

Based on the social support variable, the elderly reported that they received high social support (63.8%), moderate (29.7%), and only 6.5% low social support. Most of the elderly received social support from their family members (95.2%), and others from cadres, friends/neighbors /relatives. Therefore, seniors need social support from partners, family, or friends to prevent loneliness. Table 2 presents the domain of social support. The mean score for social support was 64.06, and the standard deviation was 14.05. This demonstrates a high level of perceived social support. Emotional support recorded the highest score among all dimensions with a mean score of 13.49, whereas the lowest score was observed in esteem support with a mean score of 12.49.

Table 2.

Social Support Scores by Domain (n=3,713)

Social Support	Minimum	Maximum	Mean	Std. Deviation
Emotional	4	16	13.49	2.87
Esteem	4	16	12.49	3.48
Instrumental	4	16	12.98	3.36
Informational	4	16	12.51	3.54
Social networking	4	16	12.59	3.05
Total support	20	80	64.06	14.05

Approximately 69.8% of the elderly respondents perceived their health status as healthy and very healthy (Figure 1). The elderly respondent who reported being a bit or unhealthy was 30.2%, which means that 1 out of 3 elderly respondents reported being unhealthy. For the loneliness variable, 59.3% of 3,713 respondents reported feeling lonely, consisting of 51.9% low and 7.4% moderate (Figure 2). The elderly who reported not feeling lonely is 40.6%.

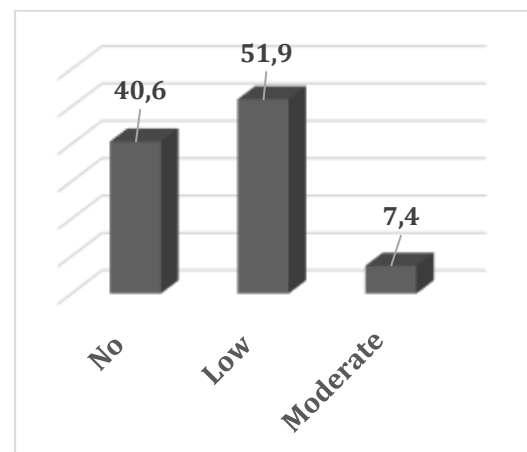
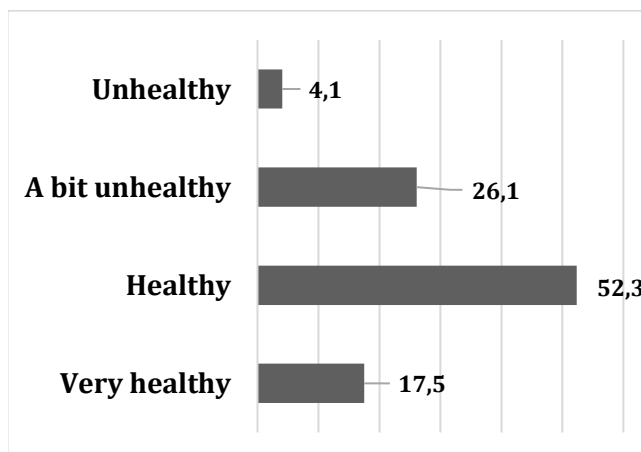


Figure 1.
Percentage of Elderly Perceived Health Status

Figure 2.
Percentage of Elderly Loneliness

Correlation between Variables

Bivariate Analysis

Based on the bivariate analysis, a statistically significant correlation ($p = .005$) was observed between elderly loneliness and residential area. Some of the elderly living in rural areas face isolation due to geographical distance, transportation barriers, and a lack of services. Our study result found that loneliness increases with age, with a positive correlation at a p -value of .05, and a high percentage in those aged 80 and above. Meanwhile, our study indicated that gender, marital status, educational level, and work status were not significantly associated with loneliness in older adults (p -value $> .05$).

The bivariate analysis utilizing Chi-Square tests revealed that the calculated odds ratios were below 1. This means that the factors measured (ICT, group participation, perceived health, and social support) have a protective effect or reduce the possibility of elderly loneliness. The Chi-Square statistical test yielded a p -value of $< .001$ ($p < .05$) across these variables. This means that H_0 is rejected, which can be interpreted as a significant relationship between those variables and elderly loneliness.

Multivariate Analysis

Based on the multivariate analysis, the Hosmer and Lemeshow test presents a significance value of .859 ($> .05$). This means that H_0 was accepted, which indicates that the model can be accepted and hypothesis testing can be carried out. The regression results show that at a p -value of .05, all primary independent variables have a significant correlation with elderly loneliness, namely perceived health status and social support, with p -values of .009 and .000, respectively. Two of the control variables have a significant correlation with elderly loneliness, namely education level and group activities, with a p -value of .000 (see Table 3). In this result, the education variable was significant. This could be due to various factors, including the influence of other variables and unbalanced sample sizes.

Table 3.
Results of Multivariable Logistic Regression

Variables	<i>B</i>	S.E.	Sig.	OR	95% Confidential Interval
Residential Area	.084	.099	.395	1.088	.896-1.321
Age Group	.056	.078	.472	1.058	.907-1.233
Gender	.055	.088	.531	.946	.797-1.124
Education Level	.231	.063	.000*	1.260	1.113-1.427
Work Status	.025	.088	.774	1.026	.863-1.218
Group Activities	.345	.082	.000*	1.412	1.203-1.657
Perceived Health Status	.246	.094	.009*	1.279	1.064-1.538
ICT used	.149	.084	.077	1.161	.984-1.370
Marital Status	.051	.079	.521	1.052	.901-1.229
Social Support	1.510	.082	.000*	4.529	3.860-5.314
Constant	1.959	.116	.000	.141	

Note. SE=standard error; Sig=significancy; OR=Odds Ratio, * p -value=.005

The results of the logistic regression analysis identify the dominant risk factors influencing the loneliness variable after adjusting for the included control variables. The social support variable had the highest odds ratio (OR), meaning this variable had the strongest positive relationship with loneliness in the elderly compared to other variables. In other words, social support was the dominant factor in social support in the elderly. The social support variable had the highest OR, at 4.5, meaning that the elderly who received less social support were 4.5 times more likely to feel lonely than the elderly who received social support.

Discussions

The characteristics of elderly respondent similar to the results of national data, namely the 2024 National Socioeconomic Survey (NSES). Most of the elderly respondents are female (52.2%), aged 60-69 (63.3%), married (66.2%), and have low education (72.5%). In contrast to the work status variable, NSES results show that most elderly people are employed (55.3%) compared to those who are not. But most elderly workers in Indonesia work in the informal sector, which is 84.8%. In this case, a person is considered employed if they have engaged in economic activity for at least one hour in the past week. The sources of financing for the elderly mostly come from pension funds (54.9%), others from working family members, remittances/goods, and investments (BPS, 2024).

According to group activities, elderly respondent indicated that engaging in group activities provided significant benefits, specifically in terms of spiritual worship, health screenings, and knowledge sharing. The main activities most frequently participated in by the elderly are religious/spiritual activities, activities in organizations, including BKL, Posyandu, and elderly organizations, namely the Regional Commission (Komisi Daerah [Komda]) or the Indonesian Elderly Organization (Lembaga Lanjut Usia Indonesia [LLI]).

The social support domain registered the highest baseline score. This finding aligns with prior research indicating that the mean rating for emotional support was the highest among all dimensions of social support (MaloneBeach & Zarit, 1995). In addition, the result of qualitative analysis presents that emotional and tangible support were most frequently identified. The primary components of emotional support encompass opportunities for self-disclosure facilitated by empathetic listening and compassion, which integrate both affectionate and esteem-related support (Thomas & Hodges, 2025). Practical demonstrations of emotional support for older adults include active listening, consistent social engagement, alongside the promotion of autonomy and a sense of purpose. The main elements of emotional support are opportunities for confiding provided by sympathetic listening and caring, which include affectionate support and esteem support (Thomas & Hodges, 2025). There are some examples of emotional support for the elderly, namely active listening, regular social interaction, and encouraging their independence and sense of purpose. In addition, emotional support is needed for the elderly, including providing comfort and reassurance, creating a safe and stable living environment, and encouraging them to engage in hobbies, mental stimulation, and community activities. In the Malaysian context, enhancing the emotional well-being of elderly has been approached through strategies that emphasize social connectedness, personal well-being, and community engagement. These approaches encompass promoting volunteering as a means of maintaining social participation, encouraging self-care and self-compassion, expanding the use of digital technologies for interpersonal communication, facilitating intergenerational engagement, and engaging community organizations in providing social support (Zainudin et al., 2025).

Approximately half of the elderly respondents reported feeling lonely. From a psychological perspective, elderly loneliness is linked to Erik Erikson's psychosocial theory (Orenstein & Kaur, 2026), which posits that old age, a final stage of human development, is a time of conflict between integrity and despair. Furthermore, Erikson also viewed social interactions and relationships as

playing a role in human development and growth. Furthermore, the presence of social support in relation to loneliness can be linked to Activity Theory. Active seniors contribute significantly to successful aging, as they stay active and maintain social, recreational, and productive activities. Furthermore, the Social-Ecological Model evaluates how factors like family, community, and society interact to provide support to the elderly (Bronfenbrenner, 1977).

This is a subjective assessment of the elderly's health, which differs from their objective medical condition or the absence of disease. Based on 2024 national data, 42,8% of the elderly have common health problems. The result of the systematic review shows the factors for elderly loneliness, namely loss of a spouse or friends, retirement, declining health, and shrinking social networks (Hajek & König, 2025). Based on a national study, the overall prevalence of loneliness using the UCLA 3-item loneliness scale, among the elderly was 10.3 (Saito & Cicih, 2022).

Loneliness increases with age, with a high percentage in those aged 80 and above. This result, related to a study in China, showed an inverted U-shaped trend between age and loneliness across all groups (Wang et al., 2023). The analysis revealed no statistically significant relationship between loneliness among elderly and the sociodemographic characteristics examined, namely gender, marital status, educational level, and work status. This contrasts with the results of a study in China, where female respondents reported higher levels of loneliness than male respondents (Wang et al., 2023), and there was a strong association between employment and lower loneliness (Sugiura et al., 2024). Furthermore, at the .05 significance level, a higher percentage of married older adults reported feeling less lonely than unmarried older adults (Saito & Cicih, 2022).

According to the loneliness, from the study we know that the elderly in rural areas need urgent attention because of the prevalence of loneliness. This means that many elderly people feel lonely, especially those living in rural areas (Hussain et al., 2023). Evidence from several studies suggests that the risk of loneliness among elderly may vary according to residential context, with those living in rural areas reporting significantly greater levels of loneliness than their urban counterparts (Zhu & Wu, 2025; Mehra et al., 2024; Wang et al., 2023). However, this pattern is not consistently observed across settings. For example, a study conducted in the United States found no statistically significant association between residential area and loneliness among elderly (OR = 0.63, 95% CI [0.33–1.19]) (Abshire et al., 2020). These contrasting findings suggest that the relationship between place of residence and loneliness may be context-dependent.

The ICT, group participation, perceived health, and social support variables have a relationship with elderly loneliness. Related to the ICT, results of other studies found that the use of ICT can prevent the elderly loneliness, and they really need technical support in its use (Choi & Lee, 2021). Elderly individuals can use ICT to improve their independence, social connection, and well-being by using smartphones, computers, and tablets for communication (video calls, social media), accessing health services (telemedicine), managing daily life (e-government), and pursuing hobbies and learning. Previous research has identified poorer health status as a potential correlate of loneliness among elderly. Nevertheless, the presence of health-related difficulties does not necessarily imply that an older person will experience loneliness, suggesting that other individual and social factors may also shape this experience (Holtfreter et al., 2016).

Meanwhile, a study of 45.1% of elderly people who experienced loneliness found that self-rated health was not a significant predictor of loneliness (Cao et al., 2023). The use of ICT represents a potentially important component of interventions aimed at reducing the risk of loneliness among older adults by facilitating social interaction and maintaining interpersonal connections (Seifert, 2025). It can increase access to information and services, facilitate social connectivity and participation, enable work flexibility and productivity, and provide resources for perceived health and lifestyle changes. This technology is changing the way people interact,

access resources, and even manage their health, making it a powerful force in many aspects of life.

Addressing the digital divide among elderly requires interventions that extend beyond basic ICT instruction. Foundational training in internet use and computer skills can be complemented by technology-based programs specifically tailored to the capabilities and circumstances of older users. Previous research has shown that age-responsive ICT interventions can help reduce technology-related barriers by providing appropriate levels of support and simplifying the process of technology adoption (Li et al., 2017). Designing such interventions around older adults' interests, preferences, and everyday needs may further enhance their relevance and acceptability (D'Onofrio, 2018; Li et al., 2017). The development of ICT interventions has also been widely pursued in recent studies, particularly those following an elder-centered design (Arlati et al., 2019).

According to the 2024 NSES, nearly half (49.27%) of seniors with access to ICT use mobile phones. Furthermore, internet access is also at 26.42%, while computer use remains very low at 1.46% (BPS, 2024). Expanding digital literacy and technology access for the elderly needs to be a priority to address this gap. This effort is aimed not only at the current elderly but also at the future. Raising awareness among the younger generation about preparing for a healthier, more educated, and digitally literate old age is crucial to enabling them to become active, independent elderly who can contribute positively to society. Group activities have a significant association with elderly loneliness. According to a study in Iran, group exercise activities can alleviate feelings of elderly loneliness (Ahn et al., 2024). Evidence from previous research suggests that participation in group-based physical activity may contribute to reducing social isolation and loneliness among elderly. Such activities can provide opportunities for regular interpersonal interaction and strengthen social connectedness, thereby potentially supporting social well-being in later life (Sebastião & Mirda, 2021).

Variable of perceived health status has a significant association with elderly loneliness. This is related to a study that found a significant correlation between Self-rated Health (SRH) and loneliness (Chow et al., 2021). Health perception is significantly correlated with elderly loneliness in Denmark (Jessen et al., 2017). Loneliness has been linked to a substantially higher likelihood of reporting poor self-rated health (OR = 2.58, 95% CI = 1.20–3.35). Self-rated health is a simple yet informative measure that can capture multiple dimensions of well-being, including psychological and physical health as well as functional capacity. Previous evidence has also demonstrated a strong relationship between self-rated health, mental health, and cognitive functioning among elderly (Caramenti, 2022). Taken together, these findings underscore the importance of incorporating psychological well-being into public health and preventive strategies, rather than focusing exclusively on physical health outcomes.

The bivariate analysis identified a significant association between social support and loneliness among elderly. This finding is consistent with previous research demonstrating that the availability and quality of social support are closely related to loneliness in later life (Zhang & Dong, 2022; Wang et al., 2023). Similar evidence has been reported in other studies, further highlighting the relevance of social support as an important factor in understanding loneliness among elderly (Czaja et al., 2021; Xu et al., 2024; Zhang & Dong, 2022). These results indicate that as social support increases, loneliness levels decrease. Based on multivariate analysis, the results indicate that social support is a dominant factor in loneliness among the elderly. This strengthens the theory of loneliness and social support in the elderly, an important aspect of developmental psychology. Furthermore, the results of this study also support the Social Convoy Model, which states that the elderly live surrounded by a "convoy" of social support, whose composition changes but remains vital to protecting against the stresses of life in later life.

For lonely older adults in rural areas, effective social support involves a combination of family engagement, community-based programs, and technology, aimed at promoting social

participation. Key interventions include strengthening family ties, organizing local community activities (e.g., sports, religious activities), and utilizing volunteer cadres to visit elderly, addressing emotional and instrumental needs. To promote active participation in society, the social participation needs of older adults living in rural areas must be addressed, particularly regarding transportation, information, tailored activities, assistance, and accessibility (Levasseur et al., 2020).

The emotional support has a high score, and instrumental support. These two dimensions of support could be provided by household members or loved ones, participation in local activities, and using digital tools to stay connected are all effective strategies. Moreover, the older adults could volunteer for organizations and local government programs that provide befriending services or community events, which also helps. Emotional support for the elderly involves validating their feelings, reducing isolation, and fostering purpose through active listening, regular social interaction, and compassionate care. In addition, instrumental support means tangible, practical, and physical assistance provided to the elderly to help them manage tasks, solve problems, or cope with challenges. Previous evidence indicates that different sources of social support may have distinct associations with dimensions of loneliness in later life. Family support has been identified as a significant predictor of both social and emotional loneliness, whereas support from friends has been associated with social and family-related loneliness among elderly (Hussein et al., 2021). Elderly who receive social support can overcome loneliness through various means such as family, friends, community involvement, and technology.

Implication

The elderly are susceptible to loneliness, necessitating an examination of their environment, social ties, and daily routines. Consistent with the findings of this study, preventive measures against loneliness are urgently required, with a particular focus on rural-dwelling elderly individuals who suffer from a lack of social connection and daily engagement. Several alternative strategies can enhance emotional support for the elderly, particularly those living in rural areas. These include encouraging volunteerism to foster social connectedness, promoting the concepts of self-care and self-love, utilizing technology for communication, implementing intergenerational programs, and collaborating with community organizations. Additionally, effective social support involves a combination of family engagement, community-based programs, and technology designed to enhance social participation. Key interventions include strengthening family ties, organizing local community activities (e.g., sports and religious events), and utilizing volunteer cadres to visit elderly, thereby addressing both emotional and instrumental needs.

Limitations And Future Challenges

This study has several strengths, including its focus on loneliness among elderly, the incorporation of relevant covariates, and the use of a relatively large sample drawn from multiple regions. Nevertheless, several limitations should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish temporal or causal relationships between loneliness and its associated factors. For example, the observed relationship between self-rated health and loneliness may reflect a reciprocal process in which health status influences loneliness while loneliness may, in turn, affect perceived health. In addition, it's possible that feelings of loneliness are more prominent now than in the past. Longitudinal studies and other repeated-measure designs, including diary-based approaches, would therefore be valuable for examining changes in loneliness over time and identifying potential bidirectional relationships. Such designs could also provide greater insight into the temporal development and persistence of loneliness among elderly.

Second, the use of an online questionnaire distributed through Google Forms may have introduced several sources of methodological bias, including common-method variance, same-source bias, and potential recall bias. While this approach is feasible, future research should utilize in-person interviews conducted by specialized interviewers with technical training. This is particularly relevant given that the sample consisted of elderly individuals who may not speak Indonesian and may have difficulty understanding the questions. Furthermore, while we examined a variety of variables, other factors are important in understanding social support for elderly loneliness, including culture and ethnicity.

Third, the classification of residential areas as urban or rural was based on the official government designation of villages. Differences in village classifications across administrative or statistical sources may affect the interpretation of residential context. Future research should provide a more explicit operational definition of urban and rural residence and, where possible, incorporate additional contextual indicators, such as population density, access to services, transportation, and community infrastructure.

The generalizability of the findings is also constrained by the characteristics of the study sample. Most participants lived in private households, limiting the extent to which the findings can be applied to older adults residing in residential care facilities or other institutional settings. Future studies should include more diverse living arrangements to enable comparisons between community-dwelling older adults and those living in care facilities. In addition, participants who completed the questionnaire may have been more likely to engage in group activities and maintain relatively active social networks. This potential selection effect may have resulted in greater reported levels of social support and, consequently, an underestimation of the prevalence or severity of loneliness in the broader older adult population. Future research should therefore make greater efforts to recruit socially isolated and less socially engaged elderly to obtain a more representative assessment of loneliness and its associated factors.

Conclusion

A total of 3,713 elderly respondents successfully completed the questionnaire. The majority of the elderly respondents lived in rural areas, were aged 60–69 years (young-old), and were female. Additionally, most were married, had a low level of education, were unemployed, utilized ICT, and participated in group activities. The majority of elderly respondents (63.8%) reported high social support. This support was predominantly provided by family members, as well as cadres, friends, neighbors, and relatives. Among the dimensions of social support, emotional support received the highest score, whereas esteem support obtained the lowest. Furthermore, approximately 70% of elderly respondents reported being in healthy and very healthy.

Of the 3,713 elderly respondents, 59.3% experienced loneliness, comprising 51.9% with low levels and 7.4% with moderate levels. Loneliness was significantly correlated with residential area, age group, ICT usage, group participation, perceived health, and social support. In contrast, gender, marital status, education level, and employment status showed no significant association with loneliness among older adults. Multivariate analysis revealed that education level, group activities, perceived health status, and social support were significantly associated with loneliness (p -value=.005). Social support exhibited the largest observed effect estimate among the variables assessed (OR = 4.5). Older adults with low levels of social support had 4.5 times the odds of experiencing loneliness compared with those receiving adequate social support.

Credit/Acknowledgement

The authors gratefully acknowledge the Directorate of Elderly Family Defense, Ministry of Population and Family Welfare, and UNFPA for providing financial support for the development

of a policy brief on loneliness among older adults. The authors gratefully acknowledge Mohammad Husni Thamrin University for providing financial support towards the publication of this manuscript. The authors also extend their sincere appreciation to all study participants for their time, cooperation, and valuable contribution to this research.

Author Contribution

LHMC conceived the study, developed the research concept, performed the analyses, verified the analytical methods, supervised the research process, interpreted the findings, and drafted the manuscript. MREA conducted the survey, supervised the data collection process, and contributed to the preparation of the manuscript. Both authors contributed to the critical revision of the manuscript and the interpretation of the study findings. They reviewed and approved the final version of the manuscript and accepted responsibility for the integrity and accountability of all aspects of the work.

Conflict of Interest

The authors declare no conflicts of interest related to this study or its publication.

References

- Abshire, D. A., Graves, J. M., Amiri, S., & Williams-Gilbert, W. (2022). Differences in loneliness across the rural-urban continuum among adults living in Washington state. *The Journal of Rural Health*, 38(1), 187-193. <https://doi.org/10.1111/jrh.12535>
- Ahn, J., Falk, E.B., & Kang, Y. (2024). Relationships between physical activity and loneliness: A systematic review of intervention studies. *Current Research in Behavioral Sciences*, 6, 100141. <https://doi.org/10.1016/j.crbeha.2023.100141>
- Arlati, S., Colombo, V., Spoladore, D., Greci, L., Pedroli, E., Serino, S., Cipresso, P., Goulene, K., Stramba-Badiale, M., Riva, G., Gaggioli, A., Ferrigno, G., & Sacco, M. (2019). A social virtual reality-based application for the physical and cognitive training of the elderly at home. *Sensors*, 19(2), 1-17. <https://doi.org/10.3390/s19020261>
- Baker, S., Warburton, J., Waycott, J., Batchelor, F., Hoang, T., Dow, B., Ozanne, E., & Vetere, F. (2018). Combatting social isolation and increasing social participation of older adults through the use of technology: A systematic review of existing evidence. *Australasian Journal on Ageing*, 37(3), 184-193. <https://doi.org/10.1111/ajag.12572>
- Bryan, B. T., Thompson, K. N., Goldman-Mellor, S., Moffitt, T. E., Odgers, C. L., So, S. L. S., Rahman, M. U., Wertz, J., Matthews, T., & Arseneault, L. (2024). The socioeconomic consequences of loneliness: Evidence from a nationally representative longitudinal study of young adults. *Social Science and Medicine*, 345. <https://doi.org/10.1016/j.socscimed.2024.116697>
- BPS. (2024). *Statistik Penduduk Lanjut Usia 2024* (Vol. 21). Badan Pusat Statistik. <https://www.bps.go.id/id/publication/2024/12/31/a00d4477490caaf0716b711d/statistik-penduduk-lanjut-usia-2024.html>
- Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513-531. <https://doi.org/10.1037/0003-066X.32.7.513>
- Cao, W., Cao, C., Ren, B., Yang, J., Chen, R., Hu, Z., & Bai, Z. (2023). Complex association of self-rated health, depression, functional ability with loneliness in rural community-dwelling older people. *BMC Geriatrics*, 23(267), 1-9. <https://doi.org/10.1186/s12877-023-03965-4>
- Caramenti, M., & Castiglioni, I. (2022). Determinants of self-perceived health: The importance of physical well-being but also of mental health and cognitive functioning. *Behavioral Sciences*, 12(12), 498. <https://doi.org/10.3390/bs12120498>
- Çevik, G. B., & Yıldız, M. A. (2017). The roles of perceived social support, coping, and loneliness in predicting internet addiction in adolescents. *Journal of Education and Practice*, 8(12), 64-73.

- https://www.researchgate.net/publication/316702361_The_Roles_of_Perceived_Social_Support_Coping_and_Loneliness_in_Predicting_Internet_Addiction_in_Adolescents
- Chang, S. H., & Yang, M. S. (1999). The relationships between the elderly loneliness and its factors of personal attributes, perceived health status and social support. *The Kaohsiung Journal of Medical Sciences*, 15(6), 337–347. <https://pubmed.ncbi.nlm.nih.gov/10441941/>
- Choi, H. K., & Lee, S. H. (2021). Trends and effectiveness of ICT interventions for the elderly to reduce loneliness: A systematic review. *Healthcare*, 9(3), 293. <https://doi.org/10.3390/healthcare9030293>
- Chow, S. K. Y., Wong, F. M. F., & Choi, E. K. Y. (2021). Loneliness in old age, the related factors, and its association with demographics and districts of residence. *International Journal of Environmental Research and Public Health*, 18(17), 9398. <https://doi.org/10.3390/ijerph18179398>
- Cornwell, E. Y., & Waite, L. J. (2009). Social disconnectedness, perceived isolation, and health among older adults. *Journal of Health and Social Behavior*, 50(1): 31–48. <https://doi.org/10.1177/002214650905000103>
- Czaja, S. J., Moxley, J. H., & Rogers, W. A. (2021). Social support, isolation, loneliness, and health among older adults in the prism randomized controlled trial. *Frontiers in Psychology*, 12, 1–14. <https://doi.org/10.3389/fpsyg.2021.728658>
- Dao-Tran, T.-H., Lam, L.-T., Balasooriya, N. N., & Comans, T. (2023). The Medical Outcome Study Social Support Survey (MOS-SSS): A psychometric systematic review. *Journal of Advanced Nursing*, 79(12), 4521–4541. <https://doi.org/10.1111/jan.15786>
- D'Onofrio, G., Fiorini, L., de Mul, M., Fabbricotti, I., Okabe, Y., Hoshino, H., Limosani, R., Vitanza, A., Greco, F., Giuliani, F., Guiot, D., Senges, E., Kung, A., Cavallo, F., Sancarlo, D., & Greco, A. (2018). Agile Co-Creation for Robots and Aging (ACCRA) Project: New technological solutions for older people. *Eur Geriatr Med* 9, 795–800. <https://doi.org/10.1007/s41999-018-0106-7>
- Golzar, J., Noor, S., & Tajik, O. (2022). Convenience sampling. *IJELS: International Journal of Education & Language Studies*, 1(2). <https://doi.org/10.22034/ijels.2022.162981>
- Harwanto, A. P., Putri, S. S., Yulingga, S. D., & Asfari, N. A. B. (2025). Validitas dan reliabilitas skala kesepian. *Jurnal Flourishing*, 5(1), 48–57. <https://doi.org/10.17977/um070v5i12025p48-57>
- Hawkley, L. C., Buecker, S., Kaiser, T., & Luhmann, M. (2022). Loneliness from young adulthood to old age: Explaining age differences in loneliness. *International Journal of Behavioral Development*, 46(1), 39–49. <https://doi.org/10.1177/0165025420971048>
- Hawkley, L. C., & Cacioppo, J. T. (2010). Loneliness matters: A theoretical and empirical review of consequences and mechanisms. *Annals of Behavioral Medicine*, 40(2), 218–227. <https://doi.org/10.1007/s12160-010-9210-8>
- Holtfreter, K., Reisig, M. D., & Turanovic, J. J. (2016). Self-rated poor health and loneliness in late adulthood: Testing the moderating role of familial ties. *Advances in Life Course Research*, 27, 61–68. <https://doi.org/10.1016/j.alcr.2015.11.006>
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspectives on psychological science: A journal of the Association for Psychological Science*, 10(2), 227–237. <https://doi.org/10.1177/1745691614568352>
- Hussein, S. Z., Ismail, A. H., Hanim, S., & Abu Bakar, S. H. (2021). Loneliness and health outcomes among Malaysian older adults. *Makara Journal of Health Research*, 25(2). <https://doi.org/10.7454/msk.v25i2.1277>
- Jessen, M. A. B., Palleisen, A. V. J., Kriegbaum, M., & Kristiansen, M. (2017). The association between loneliness and health – a survey-based study among middle-aged and older adults in Denmark. *Aging & Mental Health*, 22(10), 1338–1343. <https://doi.org/10.1080/13607863.2017.1348480>
- Hajek, A., & König, H. H. (2025). Prevalence of loneliness and social isolation among individuals with mild cognitive impairment or dementia: systematic review and meta-analysis. *BJPsych open*, 11(2), e44. <https://doi.org/10.1192/bjo.2024.865>
- Levasseur, M., Routhier, S., Clapperton, I., Doré, C., & Gallagher, F. (2020). Social participation needs of older adults living in a rural regional county municipality: Toward reducing

- situations of isolation and vulnerability. *BMC Geriatr*, 20(1):456. <https://doi.org/10.1186/s12877-020-01849-5>
- Li, J., Xu, X., Pham, T. P., Theng, Y. L., Katajapuu, N., & Luimula, M. (2017). Exergames designed for older adults: a pilot evaluation on psychosocial well-being. *Games for health journal*, 6(6), 371–378. <https://doi.org/10.1089/g4h.2017.0072>
- Luo, S., Liu, Y., & Zhang, D. (2020). Psychological maltreatment and loneliness in Chinese children: The role of perceived social support and self-esteem. *Children and Youth Services Review*, 108, 104573. <https://doi.org/10.1016/j.childyouth.2019.104573>
- MaloneBeach, E. E. & Zarit, S. H. (1995). Dimensions of social support and social conflict as predictors of caregiver depression. *International Psychogeriatrics*, 7(1), 25-38. <https://doi.org/10.1017/S1041610295001827>
- Mehra, A., Agarwal, A., Bashar, M., Avasthi, A., Chakravarty, R., & Grover, S. (2024). Prevalence of Loneliness in Older Adults in Rural Population and Its Association with Depression and Caregiver Abuse. *Indian journal of psychological medicine*, 46(6), 564–569. <https://doi.org/10.1177/02537176241231060>
- Molas-Tuneu, M., Jerez-Roig, J., Minobes-Molina, E., Coll-Planas, L., Escribà-Salvans, A., Farrés-Godayol, P., Yildirim, M., Rierola-Fochs, S., Goutan-Roura, E., de Souza, D. L. B., Skelton, D. A., & Naudó-Molist, J. (2023). Social and emotional loneliness among older people living in Nursing Homes in Spain: A cross-sectional study. *Anales de Psicología*, 39(3), 465–477. <https://doi.org/10.6018/analesps.530641>
- Newmyer, L., Verdery, A. M., Wang, H., & Margolis, R. (2022). population aging, demographic metabolism, and the rising tide of late middle age to older adult loneliness around the world. *Population and Development Review*, 48(3), 829–862. <https://doi.org/10.1111/padr.12506>
- Ni, S., Yang, R., Zhang, Y., & Dong, R. (2015). Effect of gratitude on loneliness of Chinese college students: Social support as a mediator. *Social Behavior and Personality: An International Journal*, 43(4), 559–566. <https://doi.org/10.2224/sbp.2015.43.4.559>
- Orenstein, G.A., & Kaur, J. (2026). Erikson's stages of psychosocial development. [Updated 2026 Feb 26]. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK556096/>
- Peltzer, K., & Pengpid, S. (2019). Loneliness correlates and associations with health variables in the general population in Indonesia. *International Journal of Mental Health Systems*, 13(1), 1-11. <https://doi.org/10.1186/s13033-019-0281-z>
- Perlman, D., & Peplau, L. A. (1982). *Loneliness: A sourcebook of current theory, research and therapy*. Wiley.
- Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. *Journal of personality assessment*, 66(1), 20–40. https://doi.org/10.1207/s15327752jpa6601_2
- Saito, Y., & Cich, L. H. M. (2022). *National study on the impact of COVID-19 pandemic on older persons (including those with disabilities) in Indonesia*. United Nations Population Fund (UNFPA) Indonesia; BKKBN. https://indonesia.unfpa.org/sites/default/files/pub-pdf/eng_studi_lansia_launch_260722_0.pdf
- Sebastião, E., & Mirda, D. (2021). Group-based physical activity as a means to reduce social isolation and loneliness among older adults. *Aging clinical and experimental research*, 33(7), 2003–2006. <https://doi.org/10.1007/s40520-020-01722-w>
- Seifert, A. (2025). Information and communication technologies and the risk to loneliness. In: Aartsen, M., Precupetu, I., Suanet, B. (eds) *Macro Social Influences on Loneliness in Later Life. International Perspectives on Aging*, 47. Springer, Cham. https://doi.org/10.1007/978-3-031-94565-6_8
- Setia, M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology*, 61(3), 261-264. <https://doi.org/10.4103/0019-5154.182410>
- Sugiura, K., Takase, M., Isuzu, N., Watanabe, S., & Murayama, H. (2024). Relationship between employment status, loneliness, and social isolation: A systematic review. *Research Square*. <https://doi.org/10.21203/rs.3.rs-5282848/v1>

- Suri, S., Garg, S., & Tholia, G. (2019). Attachment style, perceived social support and loneliness among college students. *IJISSH: International Journal of Innovative Studies in Sociology and Humanities*, 4(5), 135–142.
- Tan, J., Ai, Y., Wen, X., Wu, Y., & Wang, W. (2016). Relationship between shyness and loneliness among Chinese adolescents: Social support as mediator. *Social Behavior and Personality: An International Journal*, 44(2), 201–208. <https://psycnet.apa.org/doi/10.2224/sbp.2016.44.2.201>
- Thomas, D. R., & Hodges, I. D. (2025). Distinguishing types of social support: A qualitative synthesis. *PsyArXiv*. https://doi.org/10.31234/osf.io/ez29w_v1
- Wang, F., Gao, Y., Han, Z., Yu, Y., Long, Z., Jiang, X., Wu, Y., Pei, B., Cao, Y., Ye, J., Wang, M., & Zhao, Y. (2023). A systematic review and meta-analysis of 90 cohort studies of social isolation, loneliness and mortality. *Nature Human Behavior*, 7(8), 1307–1319. doi: 10.1038/s41562-023-01617-6
- Wenger, G. C., Davies, R., Shahtahmasebi, S., & Scott, A. (1996). Social isolation and loneliness in old age: Review and model refinement. *Ageing and Society*, 16(3), 333–358. <https://doi.org/10.1017/S0144686X00003457>
- Wethington, E. (2016). Life Events Scale. In G. Fink (Ed.), *Stress: Concepts, Cognition, Emotion and Behavior. Handbook of Stress* (Vol. 1, pp. 101–108). Sydney: Elsevier. <https://doi.org/10.1016/B978-0-12-800951-2.00012-1>
- World Health Organization. (2025). *From loneliness to social connection: Charting a path to healthier societies: Report of the WHO Commission on Social Connection*. <https://iris.who.int/items/39134dc6-4753-4900-b942-b7e0e16f5758>
- World Health Organization. (n.d.). *Social isolation and loneliness*. <https://www.who.int/teams/social-determinants-of-health/demographic-change-and-healthy-ageing/social-isolation-and-loneliness> (accessed 6 May 2025).
- Xin, S., & Xin, Z. (2016). Birth cohort changes in Chinese college students' loneliness and social support: One up, as another down. *International Journal of Behavioral Development*, 40(5), 398–407. <https://doi.org/10.1177/0165025415597547>
- Xu, J., Liu, G., Li, H., Jiang, X., Zhou, S., Wang, J., Pang, M., Li, S., & Kong, F. (2024). Association between social integration and loneliness among the female migrant older adults with children: The mediating effect of social support. *BMC Geriatrics*, 24(1), 1–11. <https://doi.org/10.1186/s12877-023-04569-8>
- Zainuddin, F. H., Hamidi, M., Muneem, A., Ismail, M. M., & Zuraiju, S. N. E. N. (2025). A case study of barriers to emotional support towards successful aging in Malaysia. *Sage Open*, 15(1). <https://doi.org/10.1177/21582440251313598>
- Zhang, X., & Dong, S. (2022). The relationships between social support and loneliness: A meta-analysis and review. *Acta psychologica*, 227, 103616. <https://doi.org/10.1016/j.actpsy.2022.103616>
- Zhu, B., & Wu, L. (2025). Urban-rural disparities in the prevalence and trends of loneliness among Chinese older adults and their associated factors: Evidence from machine learning analysis. *Applied psychology. Health and well-being*, 17(1), e70005. <https://doi.org/10.1111/aphw.70005>