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The Mediating Role of Loneliness in the Association between Social Isolation and Self-Rated Health in Community-Dwelling Chilean Older Adults

Pedro Olivares-Tirado[1,2]

[1]Mental Health Program, School of Public Health, Faculty of Medicine, University of Chile, Santiago de Chile, Chile
[2]Inter-University Network for Healthy Ageing of Latin America and the Caribbean (RIES-LAC), Talca, Chile
Email: olivarestirado@gmail.com

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Abstract

Aim: Research indicates that social isolation and loneliness among older adults increase the risk of poor self-rated health (SRH) and vice versa. This study examines how loneliness may mediate the relationship between social isolation and health status among older Chilean adults. **Methods:** This cross-sectional study included 6755 participants aged 60 and older. The social isolation concept was operationalised using a 6-item measure adapted from Zavaleta et al.'s approach; loneliness was measured using the Three-Item Lonely Scale; and SRH status was measured with a standardised question from the Chilean Quality of Life and Health Survey. An IRT-1PL model and Confirmatory Factor Analysis were used in combination to validate the psychometric properties of social isolation. A mediation analysis using generalised structural equation modelling (GSEM), adjusted for relevant confounding factors, was conducted. **Results:** 30.4% of participants experienced social isolation, and 23.4% reported feelings of loneliness. Among those with poor SRH, 45% faced social isolation, and 37% experienced loneliness. GSEM indicated that the indirect effect of social isolation on poor SRH via loneliness was significant ($\beta = -0.183$), suggesting that loneliness was an important mediator, and the direct effect of social isolation on poor SRH was also significant ($\beta = -0.324$), indicating partial mediation. **Conclusions:** The association between social isolation and poor health status was significantly mediated by loneliness among Chilean older adults. The findings underscore the importance of social connectivity for the health status and well-being of older adults, and provide guidance for future interventions that promote social engagement and help older adults cope with loneliness to achieve successful ageing.

Keywords

Social Isolation, Loneliness, Self-Rated Health, Mediation Analysis, Older Adults, Chile

1. Introduction

Globally, by 2050, the number of people aged 60 or older is projected to reach 2.1 billion, double the 2020 population. Two-thirds of the world's population aged 60 and over will live in low- and middle-income countries (LMICs), placing these countries at a disadvantage in addressing the challenges of an ageing population, given their limited financial resources and established health and social insurance systems (WHO, 2024; Sorinmade et al., 2025).

In response to this demographic shift, the societal lack of understanding about the complex ageing process and the slow adaptation of states to the ageing of the population often postpones their needs for health and social well-being, the United Nations has declared 2021-2030 as the Decade for Healthy Ageing, urging countries to provide adequate health and social care to address physical, mental and community engagement to contribute to a healthy ageing and wellbeing in older adults (UN, 2020, 2022; WHO, 2020a).

Healthy Ageing means more than merely avoiding illness; it involves maintaining physical, psychological, mental, and social abilities and conditions while ensuring a safe environment, thereby contributing to a better quality of life and well-being among older adults. This plan also tries to protect the rights of older people and combat age discrimination, neglect, abuse, and violence, as well as to reduce social isolation and loneliness and socioeconomic marginalisation among older persons, among other crucial issues (UN, 2020, 2022; WHO, 2020a).

However, it is essential to acknowledge that older adults are a highly heterogeneous population, and the health and social challenges they face vary significantly based on factors such as their health status, socioeconomic background, and cultural context (Sorinmade et al., 2025).

An ageing population is associated with a rise in age-related health issues, such as frailty, cardiovascular, metabolic and mental diseases or disability. Overall, the states face, with varying degrees of success, the increasing demand for healthcare and long-term care required by the older population (Fried et al., 2001; Prince et al., 2015). However, age-related social issues, such as retirement, loss of a life partner, family or close friends, declining health or social discrimination, can affect social connections, contributing to the marginalisation of older adults, and consequently worsen their quality of life and well-being (Pilehvari et al., 2023; Puyané et al., 2025; WHO, 2020a; Kotwal et al., 2021; Sorinmade et al., 2025).

According to the World Health Organisation (WHO, 2025), health implies "a state of complete well-being", highlighting the importance of social connections; its structural, functional and quality dimensions that significantly influence phys-

ical and mental well-being. Solid social connections and community engagements significantly contribute to the health and well-being of older adults (National Academies of Sciences, Engineering, and Medicine, 2020; Kim & Park, 2025).

Positive social connections lead to improved emotional support, increased information sharing, provide a sense of belonging and enhanced opportunities for social participation (National Academies of Sciences, Engineering, and Medicine, 2020; Kim & Park, 2025). Conversely, social disconnection refers to the lack of these connections, manifesting as social isolation, loneliness, inadequate support, low social capital, and negative experiences. Social isolation and loneliness are widespread, with serious but under-recognised impacts on health, well-being, and society. Social disconnection can lead to issues like depression, cognitive decline and premature mortality, posing significant, yet often overlooked, public health threats (Pomeroy et al., 2024; WHO, 2025).

Social isolation refers to an objective lack of roles, relationships, or interactions with others. It involves a limited social support network and infrequent social interactions, regardless of personal feelings about social life. Social isolation explicitly reflects a deficit in the structural dimension of social connection, rather than in the other functional and quality dimensions. It is measured by the absence or weakness of a social support network (Institute of Medicine (US), 1992; WHO, 2025). Loneliness is a subjective, negative emotional state that arises when a person's expectations of social connection differ from their actual experiences of social connection (Russell et al., 1980). It can stem from a lack of friends, support, or poor interactions. Unlike solitude, loneliness is usually involuntary and unwanted (Institute of Medicine (US), 1992). From an evolutionary perspective, loneliness is considered "double-edged": while short-term loneliness can be beneficial, chronic loneliness is harmful, resulting in various health issues and significant social and economic challenges (Institute of Medicine (US), 1992).

Social isolation and loneliness affect health through distinct but overlapping mechanisms: loneliness acts as a subjective, chronic stressor (psychological), while isolation is an objective, behavioural lack of social contact (physiological). Both conditions are linked to adverse mental and physical health outcomes and mortality, particularly in older adults, who often experience reduced social interactions, longer periods of time living alone, and higher prevalence of loneliness (Hansen & Slagsvold, 2016; Rico-Uribe et al., 2016). Notably, social isolation and loneliness frequently act as sources of chronic stress in adults. Several reports indicate that loneliness and social stress are associated with dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system. As a result, repeated and chronic social stress can lead to neuroendocrine changes, immune dysfunction, oxidative stress, sleep disturbances, cognitive decline, cognitive and emotional dysregulation, and maladaptive cognitions (McPherson et al., 2006; Uchino, 2006; Steptoe & Kivimäki, 2013; Cacioppo et al., 2015; Xia & Li, 2018; Cudjoe et al., 2022; Warren, 2025). Despite these associations, the causal role of these mechanisms in the development of harmful physiological and psychological outcomes

associated with chronic social stress remains unclear (Xia & Li, 2018).

Recent meta-analyses across 27 countries indicate that social isolation affects 25.0% to 33.6% of older adults in the community (Teo et al., 2023; Hajek et al., 2023; WHO, 2025). The estimated prevalence of loneliness ranges from 12.0% to 33.0%, with significant differences observed between genders (WHO, 2021; WHO, 2025). Higher rates of loneliness are observed in low-income (24.3%) and lower-middle-income countries (19.3%), compared with 10.6% in high-income countries (Akhter-Khan et al., 2024; WHO, 2025). This disparity is linked to income and cultural differences, with lower income levels correlating with greater loneliness. Cultural factors also play a role; in collectivist societies, social support is greater, but it is diminishing in post-modern society due to rising individualism, changing family structures, socioeconomic inequalities, digital exclusion, and public insecurity (Yildirimer, 2025; WHO, 2025). Marginalised individuals and caregivers also report significant social disconnection, with 21.0% to 52.7% of caregivers for mental health patients experiencing social isolation and loneliness, respectively (Guan et al., 2023; WHO, 2025).

Chile is experiencing a rapid demographic shift, with the proportion of adults aged 60 and over increasing from 16.2% of the population in 2017 to 19.8% in the 2024 Census, and projected to reach 32% by 2050 (INE, 2023; INE, 2024). This change is primarily driven by the Baby Boomer generation, which has undergone significant social, political and economic changes. However, many baby boomers encounter challenges such as loss of identity after retirement, age-related prejudice, and a disconnect from family life due to dispersed families. High divorce rates lead many to live alone, heightening the risk of social disconnection (Leach et al., 2008; Lin & Brown, 2012; Lissitsa et al., 2021). They also face gaps in social protection and leisure services, emphasising the need for targeted public policies to promote healthy ageing.

The prevalence rates of social isolation and loneliness among older adults in Chile vary across studies and samples. Recently, in a nationally representative study, the prevalence of social isolation and loneliness was reported at 30.4% and 23.4%, respectively, with both rates increasing with age and higher among women (Olivares-Tirado, 2026). A study by Herrera et al. (2021) revealed increases in loneliness from 48% to 53% and in social isolation from 39% to 41% during the COVID-19 pandemic (Herrera et al., 2021). A post-pandemic study in Santiago found that 42% of self-sufficient older adults faced social isolation, while 26% felt lonely (Gierke et al., 2024). The 2023 Social Wellbeing Survey indicated a 32% rate of loneliness (Observatorio del Envejecimiento, 2025). Loneliness is particularly high among certain ethnic groups in rural areas, with rates above 55%, except for Rapa Nui (9.0%) and Diaguita (14.0%).

Despite extensive research on social isolation and loneliness, these terms are often used interchangeably and as a proxy for one another in social research; however, they are distinct constructs that denote distinct experiences (WHO, 2025; Nicholson, 2012; Asante & Tuffour, 2022; Barnes et al., 2021). Numerous studies

have examined each construct separately or combined; however, less effort has been dedicated to exploring the mediating role of loneliness, a subjective experience, in the relationship between social isolation and important adverse health outcomes in older adults (Czaja et al., 2021; Belau et al., 2021; Pollak et al., 2025; Hao et al., 2024; Yang et al., 2020; Güler & Yıldırım, 2025).

Social disconnection, both social isolation and loneliness in older adults, is strongly associated with worse self-rated health, and these relationships are likely reciprocal; a worse self-rated health predicts later higher social disconnection, with more potent effects in unmarried women and less-educated older adults (Yu & Cao, 2025; Miao et al., 2025). Understanding the relationships among social isolation, self-rated health, and loneliness is crucial for developing strategies to support social engagement and promote health and well-being, particularly mental well-being, among older adults. Mediation analysis helps examine the explanatory role of loneliness by estimating the magnitude of its mediating effect in the relationship between social isolation and self-rated health. Therefore, this study aims to examine whether loneliness mediates the association between social isolation and self-rated health among community-dwelling Chilean older adults.

2. Method

2.1. Data and Sample Population

This observational cross-sectional study utilises data from the National Quality of Life and Health Survey (NQoLHS-2023/2024), conducted by Chile's Ministry of Health and the Institute of Sociology at the Pontifical Catholic University of Chile. It targets non-institutionalised Chileans and foreign residents aged 15 and older living in private homes for at least six months. The study assesses perceptions of health-related quality of life across all regions of Chile using a stratified sampling method. Personal interviews were conducted between October 2023 and February 2024. The present analysis focuses on a sample of 6755 individuals aged 60 years or older who could answer the questions independently (Ministry of Health, Chile, 2025).

2.2. Measures

2.2.1. Outcome variable

Self-rated health (SRH) reflects an individual's overall perception of their health, providing a holistic overview of both physical and mental health and offering a valuable perspective on quality of life (OECD, 2023). Despite its subjective nature, SRH has proved to be a good predictor of future healthcare needs and mortality (Palladino et al., 2016). SRH was assessed by asking participants, "How is your health in general?" Responses ranged from 1 to 7, where one corresponded to "very bad", 2 to "bad", 3 to "less than fair", 4 to "fair", 5 to "more than fair", 6 to good and 7 to "very good". Responses were grouped into an ordinal variable with three categories: "very bad/bad" (scores 1 - 3), "fair" (score 4), and "good/very good" (scores 5 - 7). The good/very good category was the reference group.

2.2.2. Independent Variable

The social isolation(SI) concept was operationalised using a 6-item measure adapted from the approach of Zavaleta, Samuel, and Mills (2017), which evaluates domains from both external and internal perspectives of social isolation (Zavaleta et al., 2017). External indicators include: a) Current marital or civil status (1 = married, civil partner, or cohabitant; 0 = other statuses), b) Social participation (1 = participates in one or more social organizations, including religious groups; 0 = does not participate), c) Social network support ("If you were in financial trouble, would you have relatives or friends you could count on for help?" 1 = yes; 0 = no), d) Emotional support ("When you have problems, do you have anyone you trust to ask for help or advice?" 1 = yes; 0 = no). Internal indicators include: a) Level of satisfaction with time shared with family ("Are you satisfied with how you and your close family share time together?" 1 = yes; 0 = no), and b) Sense of belonging to the community ("How often do you feel like you belong to your neighbourhood, a social group, or similar?" 1 = always/often; 0 = never/rarely). Because the SI is a negative construct, the indicator values were reversed before calculating the total score. The total score ranges from 0 to 6, with higher scores indicating greater social isolation. Because the distribution of total scores was positively skewed, and to avoid overrepresentation of the variable due to the non-structured questions about social isolation and potential bias from participants' educational and cognitive characteristics, the cut-off score was set at the 67th percentile. A score of 3 or more indicates social isolation. With these criteria, 2222 individuals were identified as socially isolated. SI was categorised as a binary variable (1 = socially isolated; 0 = not socially isolated).

2.2.3. Mediator Variable

Loneliness was measured using the Three-Item Lonely Scale (TILS) from Hughes et al. (2004). It includes questions about lack of companionship, feeling left out, and feeling isolated. Responses are scored on a 1 - 3 scale, where 1 corresponds to "hardly ever", 2 to "sometimes", and 3 to "often". The total scores range from 3 to 9, with higher scores indicating greater loneliness. Because the score distribution was positively skewed, the cutoff score was set at the 75th percentile to better capture loneliness. However, those who scored 5 points were classified as lonely only if they answered "often" (score = 3) to the question "feel a lack of companionship," underscoring the item's representation as a social component of loneliness, to improve the accuracy of loneliness measurement and build reliable models. This method identified 1785 individuals experiencing loneliness. Loneliness was categorised as a binary variable (1 = feeling alone; 0 = no feeling alone). Cronbach's alpha of TILS in this study was 0.8045.

2.2.4. Other Covariates

Socio-demographic and economic factors, as well as health and lifestyle issues, were included to adjust the models. Gender was a binary variable, with men as the reference group. Participants were categorised by age into the following groups:

60 - 64 years (reference group), 65 - 69 years, 70 - 74 years, 75 - 79 years and 80 years and older. Having sons/daughters was treated as a binary variable, and individuals without children served as the reference group.

Education level was categorised into four groups: illiterate/elementary, high school, technical, and graduate, with the latter used as the reference group. Household income was categorised into quintiles, with the fifth quintile as the reference. Working status and retirement status were treated as binary variables, with individuals who were neither employed nor retired as the reference group.

Caregivers were identified with the question: "Apart from your usual activities, are you responsible for caring for children, elderly individuals with moderate to severe dependency, or chronically ill individuals?" Response options were: "Yes, as the sole caregiver," "Yes, shared with another person," and "No, I am not in charge of anyone," with the last option as the reference category. Safety perception in the neighbourhood was assessed with the question: "How safe do you feel walking alone in your neighbourhood after dark?" The response options were: very unsafe, somewhat unsafe, moderately safe, and very safe. For analysis, these were grouped into a dichotomous variable: 0 for "very unsafe/somewhat unsafe" and 1 for "moderately safe/very safe", as the reference group.

Multimorbidity was assessed by the number of self-reported physician diagnoses of 14 chronic diseases. These conditions include hypertension, diabetes mellitus, acute myocardial infarction, heart failure/arrhythmias, stroke, arthritis/osteoarthritis, depression, anxiety or other mental health disorders, chronic obstructive pulmonary disease (COPD), liver cirrhosis/chronic liver damage, cataracts/glaucoma, chronic pain (lasting more than 3 months), urinary incontinence, chronic kidney failure and other chronic diseases. Multimorbidity was defined as having at least two of the fourteen selected conditions mentioned above, and was categorised as a binary variable (1 = multimorbidity; 0 = none or one chronic disease).

Depression/anxiety or other mental health disorders were included as a binary variable (1 = yes; 0 = no). Sensory deficiency, including blindness and/or deafness, was treated as a binary variable, with individuals without sensory deficits serving as the reference group. The disability level was a binary variable, with those with moderate or severe disability as the group of interest, and those with mild or no disability as the reference group. Discrimination was measured with the question, "Have you felt discriminated against in the last year?" Response options were yes or no. The no option was the reference group.

According to WHO guidelines, older adults should engage in 150 to 300 minutes of moderate-intensity or 75 to 150 minutes of vigorous-intensity aerobic activity, or an equivalent combination of both, throughout the week (WHO, 2020b). Physical activity was included as a binary variable: individuals who met the WHO recommendations were classified as physically active, whereas those with no activity or lower levels of activity were classified as the reference group.

2.3. Statistical Analysis

Descriptive statistics were used to analyse participants' baseline characteristics by

Self-Rated Health status. The chi-square test was conducted to assess the significance of the associations between covariates and the dependent variable. The sample design was incorporated into the analysis, enabling valid inferences for the population. The analysis employed the *svyset* and *svy* commands to incorporate the primary sampling unit, individual weights, and strata. Multicollinearity was examined using correlation matrices and variance inflation factors (VIFs).

Additionally, the One-Parameter Logistic Item Response Theory (IRT) Model (1PL) and Confirmatory Factor Analysis (CFA) were used in combination to validate the psychometric properties of the latent variable representing social isolation. Given the binary nature of the data, the CFA was estimated using the *gsem* command and average marginal effects (AMEs) were calculated. To ensure identification of the CFA model, the variance of the latent variable was constrained to 1. Note that the absolute metric (e.g., root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) SEM model goodness-of-fit statistics are not supported by the *gsem* command for binary indicators in Stata 14.0.

A pathway diagram was created to illustrate the mediation analysis, specifically the potential mediating effect of loneliness on the relationship between social isolation and self-rated health (see Figure 1).

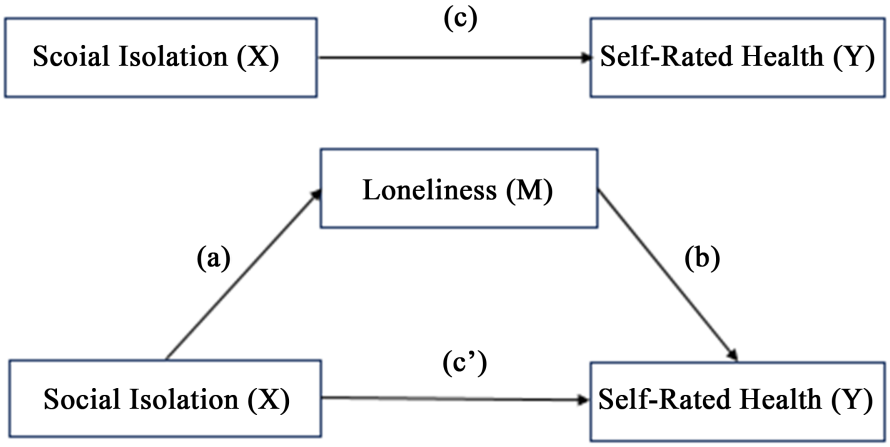

Figure 1. Pathway diagram of the mediating effect of Loneliness on the association between Social Isolation and Self-Rated Health.

The mediation analysis was conducted with structural equation modelling (SEM) according to the following equations:

$$Y = i_1 + cX + \varepsilon_1 \quad \text{(Ep. 1)}$$

$$M = i_2 + aX + \varepsilon_2 \quad \text{(Ep. 2)}$$

$$Y = i_3 + c'X + bM + \varepsilon_3 \quad \text{(Ep. 3)}$$

Because SRH is ordinal and categorical, Equation (1) was estimated using an ordered logistic regression (*ologit*). The *linktest* checked model specification errors, and *gologit2* with *autofit* tested the proportional odds assumption. In this

model, the null hypothesis (H0: c ≠ 0) is rejected. Therefore, it is important to assess partial mediation through direct, indirect, and total effects. Using a generalised structural equation modelling (*gsem*), models for Equations (2) and (3) were combined into a single model, and their inference parameters were estimated concurrently using the *boot*1 *r class* user-written program. This approach estimated direct, indirect, and total effects. The *bootstrap* command with 1000 replications produced robust standard errors (SE) and 95% confidence intervals (CI). Finally, global macro variables (the *nlcom* command) were used to compute the ratio of indirect to direct effects and the proportion of the total effect mediated by loneliness. All three models were adjusted by demographic, economic, health and social variables. Statistical significance was assessed using t-tests and z-tests at a 5% significance level. Analyses were conducted in Stata 14.0.

3. Results

Table 1 summarises the sample characteristics and the relationships among the outcome, dependent, and mediator variables. A sample of 6,755 individuals aged 60 and over corresponds to 3,718,439 individuals after accounting for the analysis's sample design. Among this population, 16.2%, 32.1%, and 51.7% reported SRH as bad/very bad, fair, and good/very good, respectively. The average participant age was 70.6 years (SD = 7.65), with 60% being women and 50% aged 70 or older.

The 30.4% and 23.4% of participants were socially isolated and felt alone, respectively. Social isolation was more frequent among men (34.1%), whereas feeling alone was more frequent among women (27.4%). Among participants with bad/very bad SRH, 45% and 37% reported social isolation and loneliness, respectively. On the other hand, participants with good/very good SRH shows 25% and 17% of social isolation and loneliness, respectively.

Table 1. Sample characteristics according to self-rated health in older adults. NQoLHS-2023/2024.

Characteristics	Self-rated Health		
	bad/very bad (n: 1162)	**fair** (n: 2217)	**good/very good** (n: 3369)
Social isolation* **	44.8%	31.5%	25.4%
Loneliness* **	36.5%	27.3%	16.9%
Women^{ns}	56.0%	55.9%	54.8%
Having children^{ns}	91.5%	92.9%	91.4%
Education levels* **			
Illiterate/elementary school	59.6%	53.6%	36.9%
high school	27.4%	26.5%	30.7%
technical school	10.0%	15.6%	19.4%
graduated (ref.)	3.0%	4.3%	13.0%

Continued

Household income quintiles* **			
1st quintile	31.4%	25.6%	15.6%
2nd quintile	43.5%	36.0%	29.0%
3rd quintile	7.6%	12.8%	11.3%
4th quintile	14.4%	19.2%	30.1%
5th quintile (ref.)	3.0%	6.4%	14.1%
Working* **	10.5%	16.3%	25.3%
Retiree[ns]	57.4%	56.6%	54.4%
Caregiver activity[ns]			
sole caregiver	13.6%	15.1%	12.7%
shared care	10.2%	11.0%	12.0%
does not care (ref.)	76.2%	73.9%	75.3%
Multimorbidity* **	89.9%	78.7%	53.9%
Depression/anxiety* **	40.1%	21.6%	12.7%
Disability(moderate/severe)* **	90.4%	79.6%	58.4%
Sensory deficiency * **	44.1%	32.9%	23.0%
Discrimination* **	11.8%	7.3%	3.6%
Physically active* **	10.6%	16.7%	23.0%
Live in an unsafe neighborhood**	58.6%	52.1%	48.6%

: $p < 0.05$; ***: $p < 0.0001$; **ns: no significant.

Lifestyle factors, alcohol consumption, and sleep duration were examined but excluded from the models due to high rates of missing data; smoking was not significantly associated and thus did not affect the robustness or simplicity of the models.

The multicollinearity diagnostic showed that most variables had low correlations (rho < 0.30), except for a few pairs with moderate correlations, including retirement status and working status, retirement status and age groups, and multimorbidity with self-rated health, disability and depression. The mean variance inflation factor (VIF) was 1.22, indicating no multicollinearity.

Psychometric validation of the social isolation variable using the IRT-1PL model indicates that factors such as a lack of emotional support, dissatisfaction with family time, and a lack of social network support are associated with greater difficulty with social isolation ($\beta > 1$). In contrast, not having a partner, limited social activities, and not belonging to a community are associated with lower difficulty ($\beta < 1$). Higher difficulty indicates a greater degree of social isolation re-

quired for correct responses, whereas lower difficulty suggests that average or below-average individuals are more likely to respond correctly. CFA assesses the extent to which observed indicators reflect social isolation, with older adults without a partner, limited social participation, and a lack of a sense of belonging to a community experiencing higher probabilities of social isolation. However, excluding the lack-of-emotional-support indicator, the CFA model's robustness improved. The goodness-of-fit for the ordered logistic regression model for equation (1) indicates adequate specification and does not violate the proportional odds assumption (hatsq: $p > 0.05$). The model indicates a significant association between social isolation and SRH status. Socially isolated individuals (21.0%) have a significant 5.8% higher probability of experiencing bad/very bad SRH than non-isolated individuals (15.2%), whereas non-isolated individuals (52.1%) have a 6.1% higher likelihood of reporting good/very good SRH than isolated individuals (46.0%).

Table 2 summarises the results of the generalised structural equation modelling, assessing the partial mediation through the estimated direct, indirect, and total effects. The estimated effect of social isolation on loneliness (*a*-path) is 0.82973 (95% CI: 0.70740 to 0.95206), indicating a positive and significant association. Loneliness also significantly predicts SRH status (*b*-path), with an estimated adverse effect of −0.23083 (95% C.I.: −0.35228 to −0.10937). This suggests that the indirect effect of social isolation on SRH status through loneliness is significant. This implies that the influence of social isolation on feeling loneliness partially explains the adverse effect of social isolation on SRH status.

Table 2. Result of the generalized structural equation model of loneliness on the relationship between social isolation and self-rated health status.

	Coef.	Std. Err.	[95% C. I.]	*p*-value
Direct effects (c' path)				
SI > SRH (adj. by L)	**−0.32377**	0.057044	(−0.43558 - −0.21197)	<0.0001
a path				
SI > L	**0.82973**	0.062413	(0.70740 - 0.95206)	<0.0001
b path				
L > SRH	**−0.23083**	0.061969	(−0.35228 - −0.10937)	<0.0001
Indirect effects (a*b path)				
SI > L > SRH	**−0.18344**	0.049394	(−0.28025 - −0.08663)	<0.0001
Total effects (c path)				
SI > SRH	**−0.50721**	0.069887	(−0.64419 - −0.37023)	<0.0001

SI: Social Isolation; **SRH**: Self-rated Health; **L**: Loneliness; **adj.**: Adjusted; **Coef.**: coefficient; **Std. Err.**: Standard error; **C. I.**: Confidence Interval.

The estimated indirect effect (*a***b*-path) of social isolation on SRH status via

loneliness is −0.18344 (95% CI: −0.28025 to −0.8663), indicating that social isolation significantly and indirectly influences SRH status by increasing loneliness. Finally, the estimated total effect of social isolation on SRH status (*c*-path) via loneliness is −0.50721 (95% C.I.: −0.64419 to −0.37023). This represents the overall direct (*c'*-path) and indirect effects(*a*b*-path) combined. Overall, these results highlight the significant mediating role of loneliness in the relationship between social isolation and SRH status in older adults. The ratio of indirect to total effect indicates that approximately 36.0% of the effect of social isolation on SRH status in older adults is mediated by loneliness, and the ratio of indirect to direct effect indicates that the mediated effect of loneliness is 57.0% of the direct effect of social isolation on SRH status in older adults.

Conceptually and empirically, isolation and loneliness are moderately correlated but largely non-overlapping experiences in older adults (Kotwal et al., 2021; Svensson et al., 2022; Pollak et al., 2025). These constructs show a low correlation (rho= 0.222) and an overlap of 11.3% in the survey sample analysed. Moreover, social isolation and loneliness are often confused and used interchangeably in social research (WHO, 2025; Nicholson, 2012; Asante & Tuffour, 2022; Holt-Lunstad et al., 2017; National Academies of Sciences, Engineering, and Medicine, 2020; WHO, 2025; Hajek et al., 2023), then, the mediating role of social isolation in the relationship between loneliness and SRH status in older people was also examined (data not shown). In summary, the estimated direct effect of loneliness (−0.2308; 95%CI: −0.34627 to −0.11538) and the indirect effect of loneliness (−0.2577; 95%CI: −0,35727 to −0.15826) on SRH status via social isolation is greater than that of social isolation. In contrast, the total effect of loneliness (−0.48859; 95% CI: −0.62972 to −0.34746) on SRH status via social isolation is slightly lower than that of social isolation alone. The ratio of indirect to total effect indicates that approximately 53.0% of the effect of loneliness on SRH status in older adults is mediated by social isolation, and the ratio of indirect to direct effect indicates that the mediated effect of social isolation is 112.0% of the direct effect of loneliness on SRH status in older adults. This result indicates that social isolation explains most of the relationship between loneliness and SRH status, suggesting full mediation.

4. Discussion

Due to changes in life circumstances, many older adults are socially isolated and experience loneliness, posing significant challenges to community engagement. These social disconnections are considered serious public health issues given their association with adverse health outcomes and declines in quality of life and well-being (Czaja et al., 2021). In consequence, this situation creates a pressing need to develop strategies to ensure that older people can live socially integrated lives within effective families and social networks.

This study indicates that 52%, 32%, and 16% of older adults reported SRH as good/very good, fair, and bad/very bad, respectively. Additionally, the prevalence

of social isolation and loneliness in this population was 30.4% and 23.4%, respectively. Social isolation was more frequent among men, whereas feeling alone was more frequent among women. The risk of both social disconnections increases with age, lower levels of education, and lower economic positions. These findings align with global research, indicating that social isolation among community-dwelling older adults ranges from 25% to 34%, while loneliness ranges from 12% to 33%. Both also tend to increase with age and show significant gender differences (Hajek et al., 2023; Teo et al., 2023; WHO, 2021, 2025). However, these results are lower than those reported in previous Chilean studies, possibly due to differences in sample characteristics and methodological approaches (Gierke et al., 2024; Observatorio del Envejecimiento, 2025; Carrasco et al., 2021; Herrera et al., 2021).

The results also show a consistent and reciprocal relationship between social disconnection and worse SRH status among older adults. As social isolation score increases, they experience a worse SRH, and vice versa; a worse health status reported, they are more likely to feel socially isolated. A similar situation was observed with loneliness. This finding aligns with previous studies demonstrating a reciprocal link between social disconnections and poorer self-rated health among older adults. A recent Chinese longitudinal study shows that higher baseline social isolation predicted subsequent declines in SRH, and poorer SRH predicted increased later isolation among women and less-educated older adults. SI and SRH are reciprocally linked in older adults, with meaningful variation across demographic strata (Yu & Cao, 2025). Another study using structured questionnaires conducted in Hong Kong reported a significant, reciprocal association between social isolation and poorer overall health status among community-dwelling Chinese older adults receiving home care services (Wong et al., 2023). Another Chinese longitudinal study shows that both social isolation and loneliness among people aged 65 and older predict poor SRH and functional decline (Zhang et al., 2021). Moreover, some studies reported that loneliness is strongly associated with poorer self-rated health, particularly among women (Deshmukh & Martin, 2024; Freak-Poli et al., 2021).

To my knowledge, no other studies have directly examined the mediating role of loneliness in the relationship between social isolation and SRH among Chilean older adults. The mediation analysis confirmed the hypothesis that the effect of social isolation directly affects SRH status in older adults and indirectly influences SRH status mediated by loneliness experiences. From structural equation modelling, about 36% of the effect of social isolation on SRH status is indirect via loneliness, and the mediated effect of loneliness accounts for about 57% of the direct effect of social isolation on SRH status in older adults. This finding aligns with previous studies demonstrating that among community-dwelling older adults, loneliness consistently emerges as a key pathway linking social isolation to poorer self-rated health and other adverse related outcomes such as cognitive functioning, depression or overall life satisfaction (Czaja et al., 2021; Pollak et al., 2025;

Hao et al., 2024; Yang et al., 2020; Güler & Yıldırım, 2025).

Given that isolation and loneliness are often used interchangeably in social research, the mediating role of social isolation in the relationship between loneliness and SRH status in older people was sketchily investigated. The mediation analysis indicates that 53.0% of the effect of loneliness on SRH status is indirectly mediated by social isolation. Furthermore, the mediated effect of social isolation accounts for approximately 112.0% of the direct effect of loneliness on SRH status in older adults. There is strong evidence that loneliness and social isolation both predict poorer self-rated health, but reviews note a lack of studies directly testing social isolation as a mediator between loneliness and self-rated health (Mehrabi & Béland, 2020; Czaja et al., 2021; Santini et al., 2020). Future research, particularly longitudinal studies that account for cultural and socioeconomic contexts, is needed to test whether social isolation mediates the relationship between loneliness and SRH among community-dwelling older adults. Also, it seems necessary to account for a short, user-friendly scale with adequate psychometric properties and validated for use in population surveys in Chile to confirm or refute these results.

This study had several limitations. First, self-reported measures may introduce recall bias, particularly among older adults and individuals with lower educational attainment. Secondly, although the operational definition of social isolation is theoretically well-founded, goodness-of-fit statistics for the CFA model in the psychometric validation, such as RMSEA, CFI, and TLI, could not be estimated using the *gsem* command in Stata 14.0. It seems necessary to confirm the model's reliability through a more specific and comprehensive study. Thirdly, reverse causality between health status and social disconnection—where poor health reduces the ability to maintain social connections rather than the other way around—is a critical, bidirectional issue that could involve endogeneity, overestimate the mediation effect, or reduce the model's predictive power. To address this bidirectional link, longitudinal studies and advanced analytical methods are required. Finally, as an observational study, the findings may be influenced by unmeasured confounding variables; therefore, caution is advised when interpreting them in light of these limitations.

Despite its limitations, the study has several strengths. The use of nationally representative data enables generalisation of findings, and a larger sample size enhances the accuracy of the results. The broad, well-validated nature of the SRH outcome variable as a health-status indicator across socioeconomic and cultural strata enables reliable examination of the mediating effect of loneliness in the relationship between social isolation and health status. By employing parsimonious models that account for relevant confounding variables, the study provides reliable estimates. Furthermore, the use of structural equation modelling provides an appropriate framework for inference in mediation analysis, thereby enabling a better understanding of the causal relationships among variables. These findings support the implementation of effective social strategies to address social disconnections. It is important to identify community-dwelling older adults at risk of

loneliness and/or social isolation, and to implement strategies that emphasise peer support, group activities, and low-cost technologies.

5. Conclusion

Both loneliness and social isolation are associated with poorer perceived health; however, it is a complex issue, as the relationship between social disconnections and SRH is consistently bidirectional among older adults. Mediation analyzes show that loneliness significantly mediates the impact of social isolation on health status. When the mediating variable is reverted to social isolation, the model results suggest full mediation. More refined research is needed to confirm or rule out whether social isolation mediates the relationship between loneliness and self-rated health among community-dwelling older adults. The findings underscore the importance of social connectivity to health status and well-being of older adults, and provide guidance for future interventions that promote social engagement to achieve successful ageing.

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Data Availability

Data supporting this research is available at https://datos.gob.cl/dataset/encavi-2023-24.

Conflicts of Interest

The author declares that he has no conflicts of interest.

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