Loneliness and Health in Older Adults: a Multivariate Analysis of Spanish Red Cross Users Living Alone

Objectives: This study investigated the relationships between loneliness, social relations (family and non-family), and perceived health in older people living alone in Spain. **Methods:** The sample included 306 Spanish older adults aged 65-95 (M = 78.08, SD = 6.95) who lived alone and were Red Cross users. Bivariate relationships were tested before conducting a Stepwise Multiple Regression Analysis to examine the impact of both objective and subjective components of loneliness on perceived health. **Results:** Older participants showed worse health status, less frequent and less close relationships with their family and friends, and a higher risk of non-family isolation. Additionally, participants with lower perceived health were found to have both less frequent and closer family and non-family relations, a higher sense of loneliness, and were older. Multivariate analysis revealed that non-family relations, feelings of loneliness, and age significantly predicted 17.9% of the explained variance in perceived health (adjusted R^2 = .18, p < .001). **Conclusions:** This research highlights the importance of non-family relations in preventing and mitigating feelings of loneliness and improving older people's health. These findings are particularly important as they inform the development of effective interventions and strategies to manage loneliness, ultimately enhancing the quality of care for older individuals living alone. Such strategies should be designed to increase opportunities to expand the non-family networks.

Keywords: Older adults; loneliness; social isolation; Red Cross; living alone; health

Key points

What is already known about this topic:

(1) Loneliness is a multidimensional and complex construct with both objective and subjective indicators.

(2) Loneliness has a cultural component. In Mediterranean countries such as Spain, expectations regarding family relationships are higher and can be difficult to meet, increasing the risk of loneliness.

(3) Loneliness significantly impacts health in older adults, increasing the risk of both physical and mental health issues.

What this topic adds:

(1) The inclusion of subjective health measures, as recommended by the World Health Organization due to their strong correlation with objective health indicators.

(2) The higher risk of non-family isolation emphasises the role of friendship networks in preventing loneliness beyond family ties.

(3) The important role of friends in determining perceived health status highlights the importance of expanding and diversifying non-family networks.

Introduction

The growing proportion of older adults in the population constitutes one of the most striking sociodemographic phenomena of recent decades worldwide. Global projections suggest that the population aged 65 and older will increase from 10% in 2022 to 16% by 2050, potentially doubling the number of children aged under five (United Nations [UN], 2022). According to Eurostat's (2023) estimates for the European Union, the proportion of the population aged 65 and over is projected to increase from 21.5% in 2022 to 45.29% by 2050. In Spain (the focus of the present study), people aged 65 or older will represent 30.39% of the population by 2050, compared to 20.1% in 2022 (Eurostat, 2023).

These shifting global demographics are resulting in older societies, impacting sectors such as healthcare, employment, and law. These demographic changes pose a significant challenge for authorities, who must adapt to the diverse needs of a growing elderly population with unique characteristics compared to previous generations (Baarck et al., 2021; Gajardo, 2015; Newmyer et al., 2022). To effectively address this public health challenge, it is essential to thoroughly understand the various implications of population aging to implement evidence-based interventions.

One of the phenomena associated with the changes noted above is the rise of loneliness among older adults. Although loneliness can occur at any age, many indicators suggest that it is especially common in old age, with its prevalence increasing among the oldest members of society (Dahlberg et al., 2015; Domènech-Abella et al., 2017; Dykstra et al., 2005; Heikkinen & Kauppinen, 2011; Nicolaisen & Thorsen, 2017). Explanations for this trend are linked to certain changes typically experienced during this life stage rather than age *per se* (Chawla et al., 2021; de Jong Gierveld et al., 2015). These include shifts in family and social structures (particularly the death of a

partner or friends), functional limitations that hinder autonomy, and a decline in economic resources (Bermeja & Ausín, 2018; Hajek & König, 2020; Sims et al., 2015; Yanguas, 2018).

Loneliness is a multidimensional and complex construct, characterised by various components. Traditionally, it has been considered an unpleasant and negative experience resulting from the imbalance between the relationships one has (in terms of quantity, quality, and type) and the relationships one wishes to have (de Jong Gierveld, 1989; Perlman & Peplau, 1981; Weiss, 1973). Thus, part of the complexity of studying loneliness lies in the fact that its analysis requires considering various components, such as the type of support that is lacking (emotional vs. social loneliness) or the type of social networks with which there is little contact (family vs. non-family networks) (Bermeja & Ausín, 2018; Yanguas, 2018). Specifically, a commonly used classification distinguishes between the objective (living alone and/or isolated) and subjective (feeling alone) components of loneliness (Bermeja & Ausín, 2018; Celdrán & Martínez, 2020). These are independent but related elements: although living alone is not synonymous with social isolation or feeling lonely, both indicators are more common among older people who live alone (Yanguas, 2018).

Considering the current study's location in Southern Spain, it is important to contextualise loneliness and its indicators within this region. In terms of objective loneliness, it is worth noting that 43.6% of the 4,889,900 single-person households registered in Spain in 2020 were composed of individuals aged 65 or older, with the majority (70.89%) being women (INE, 2021). Regarding social isolation, older Spanish people tend to maintain more stable contact with family, but friendships often decline, especially after retirement (Yanguas et al., 2019). Family-network isolation affects 9.7% of individuals aged 65-79 and 15.2% of those aged 80 or older, while non-family

isolation affects 27.7% of people aged 65-79 and 45.5% of those aged 80 and above (Yanguas, 2018). Subjective feelings of loneliness vary depending on the study and geographical location. Reports indicate that loneliness is experienced by 68.4% of older adults attending senior centres in Spain (Yanguas, 2020), and, 47% of individuals aged 55 or older in Southern Spain (García et al., 2021).

Cultural values are also a relevant factor for understanding loneliness. Significant cultural differences exist the prevalence of loneliness, with higher levels in Mediterranean and Eastern European cultures than in Nordic countries (Del Barrio et al., 2010; López Doblas et al., 2020; Lykes & Kemmelmeier, 2014; Nyqvist et al., 2019; Surkalim et al., 2022; Yang & Victor, 2011). These differences are most likely linked to expectations around social relationships and prevailing cultural norms. Higher levels of loneliness are observed in countries where social relationship expectations are more demanding and, thus, more difficult to fulfill (Sancho et al., 2020). In Mediterranean countries, the emphasis on family ties is associated with more frequent and stable contact with family members over time, and the absence of such connections can contribute to feelings of loneliness (Lykes & Kemmelmeier, 2014).

In addition to being a common experience in old age, loneliness is a major health risk factor, although the exact relationship between loneliness and health remains unclear (Masi et al., 2011). Nonetheless, loneliness significantly increases the risk of both physical and mental health problems, including morbidity and mortality (Cohen-Mansfield et al., 2016; Donovan & Blazer, 2020; Holt-Lunstad et al., 2015; Rico-Uribe et al., 2018). Among the reported consequences of loneliness are elevated cardiovascular risk, migraines, malnutrition, impaired immune function, physical frailty, heightened stress levels, depressive and anxiety symptoms, low self-esteem, emotional instability, sleep disturbances, impaired cognitive functioning, and an increased risk of

developing dementia and Alzheimer's disease (Cacioppo et al., 2010; Losada et al., 2012; Ožić et al., 2020; Valtorta et al., 2016; Yanguas et al., 2018; Zakizadeh et al., 2022).

The complexity of loneliness and its links to physical and mental health are widely acknowledged in theory and research. However, two key gaps persist in empirical studies. First, subjective measures recommended by the World Health Organization (WHO) are often overlooked (Machón et al., 2016; Paúl et al., 2012), despite their significant correlation with objective health indicators (Carreras et al., 2021; Fernández-Ballesteros et al., 2009; Machón et al., 2016). Second, while theoretical complexity is recognised, empirical research often lacks methodological sophistication, relying primarily on bivariate analyses. Few studies have comprehensively explored the various dimensions of loneliness and their associations with health indicators. Recent studies by Martín-María et al. (2020), Moshtagh et al. (2022), and Zakizadeh et al. (2022) are notable for their multifaceted approach, exploring the relationships between social support (family/non-family), loneliness, and mental health (objective/subjective) using regression analysis. Such studies are crucial not only because they address loneliness and its relationships with health from a complex perspective but also because they provide insights that go beyond simple bivariate relationships. These findings contribute to a deeper understanding of the overall profile of older adults who are particularly susceptible to experiencing unwanted loneliness and are critical for designing efficient and effective interventions to address loneliness in this vulnerable population.

In summary, more comprehensive and targeted research is needed to address the complexity of loneliness, particularly among vulnerable older populations. This group

includes individuals who live alone and are isolated or at risk of isolation from their social network (family and/or non-family). Identifying and applying interventions for these individuals should thus be a priority.

In Spain, addressing loneliness among older adults involves collaboration with various organizations, including the Red Cross XXX, which runs 52 programs targeting vulnerable groups. In 2021, approximately 15% of the 12027 people assisted by the organization were older adults. The Red Cross XXX recognises loneliness among older adults, especially those living alone, as a significant area of concern, exacerbated by the challenges of the COVID-19 pandemic.

Given the complex and multifaceted nature of loneliness, particularly among the elderly population in Southern Spain, it is imperative to conduct comprehensive research that examine both the objective and subjective aspects of this phenomenon. Therefore, the present study aims to achieve the following objectives. First, we aimed to describe both the objective (extent and type of social relationships) and subjective (feeling alone) components of loneliness and the perceived health of older people living alone who are Red Cross XXX users. Second, we wanted to analyse the relationships between objective and subjective loneliness. Finally, our third objective was to explore the combined influence of sociodemographic factors and both objective and subjective loneliness on perceived health.

Materials and Methods

Participants

The sample consisted of 306 individuals aged 65 to 95 years living in XXX (Spain) who met the two study inclusion criteria of the present study: being Red Cross

XXX users and living alone[1]. Most participants were female, widowed, and had either no formal education or had completed only basic primary education (see Table 1).

INSERT TABLE 1 HERE

Measures

Data were collected using a structured questionnaire that included items related to demographic information (i.e., age, gender, partner status, educational level) and the following dimensions:

Objective loneliness

The adapted Spanish version (Menéndez & Pérez-Padilla, 2021) of the *Lubben Social Network Scale-6* (LSNS-6; Lubben et al., 2006) was employed. This short instrument is specifically designed for older adults to briefly assess the size, closeness, and frequency of contacts within a social network, as well as the risk of social isolation. The LSNS-6 comprised six items, with three assessing family social networks (FSN) and three assesing non-family social networks (NFSN). Each subscale provides a score ranging from 0 to 15, with higher scores indicating a wider and closer social network. For both FSN and NFSN, a score ≤ 6 indicates a significant risk of isolation. In this study, the internal consistency of these scores was Cronbach´s alpha (α) = .91 for the FSN subscale and α = .89 for the NFSN.

Subjective loneliness

[1] Throughout 2021, RCX assisted 686 people aged 65 or above living alone in XXX (Spain). Given this population, with 5% as a margin of error and 95% as a confidence level, 247 can be considered an adequate sample size.

The Spanish adaptation (Sancho et al., 2020) of the short version of the *Revised University of California at Los Angeles Loneliness Scale* (R-UCLA) was used. This brief scale was specifically designed for telephone surveys (Hughes et al., 2004). The R-UCLA consists of three items that assess the frequency of feelings related to a lack of companionship, being left out, and isolation from others, with three available responses: hardly ever or never, some of the time, and often. Higher final scores (range 3-9) indicate greater the feelings of loneliness. Internal consistency of R-UCLA in this study was $\alpha = .84$.

Perceived health

The Spanish adaptation of*Self-Assessment of Health Status Scale* (SAHS; Fernández-Ballesteros et al., 2009) was used. This short instrument is based on the three indicators recommended by the World Health Organization to ensure international consistency across health studies. The SAHS evaluates perceived health at a general level, as well as at intra-individual (the individual's perception of their health compared with the previous year) and interpersonal (the individual's perception of their health in compared to peers) levels. A higher final score (ranging from 3 to 14) indicates a more positive perception of health status. The internal consistency of the SAHS in this study was $\alpha = .77$.

Procedure

The study was approved by XXX, the official organization responsible for the ethical assessment of research involving human subjects in XXX (Spain). Data collection was conducted between May and November 2021. Due to the restrictions on personal contact caused by the COVID-19 pandemic, and given the vulnerability of the participants (older adults), data were gathered through telephone interviews conducted

by members of Red Cross XXX. All interviews began with obtaining explicit verbal informed consent, in line with the ethical principles of the Declaration of Helsinki (www.wma.net/es/policies-post/declaracion-de-helsinki-de-la-amm-principios-eticos-para-las-investigaciones-medicas-en-seres-humanos/): Each participant was informed about the objectives of the study, the institutions involved (Red Cross XXX and the University of XXX), the voluntary and non-binding nature of their participation (which in no case affected their relationship with Red Cross XXX), and the anonymity of the information provided. The descriptive nature of the study was emphasised, and it was made clear that there were no correct or incorrect answers, as the questions aimed solely to describe the participants´ situation. Participation required both understanding and explicit consent to proceed with the interview.

Statistical Analysis

Analyses were conducted using IBM SPSS 25.0 for Windows. Bivariate relationships were tested using Pearson's *r* (for continuous scores), $\chi 2$ with V_{Cramer} was used to estimate effect size, and corrected standardised residuals (z) were employed with ±1.96 as the criterion (for categorical variables), and Student's *t*-test with Cohen's *d* as effect size was used to compare two independent samples. A Stepwise Multiple Regression Analysis (using the Forward method to enter variables) was computed to explore the influence of significant continuous scores (from the bivariate tests) on the dependent variable after checking the assumptions of non-multicollinearity, independence, normality, and the absence of outliers. The goodness-of-fit for this multivariate analysis was determined using Snedecor's *F* (with $p \leq .05$) for the final model, the adjusted R^2 for the percentage of explained variance in the dependent variable, and the β coefficient (with a *t*-test and $p \leq .05$) to assess the specific weight of each independent score. Regarding effect size, the following levels were considered: small (< .10), medium (< .30 - .50), and large (> .50) for *r*; small (< .30), medium (.30 - .60), and large (> .60) for

V_{Cramer}; and very small (< .20), small (.20 - .50), medium (.50 - .80) and large (> .80) for *d* (Cohen, 1998).

Results

Perceived health and objective, and subjective loneliness

Table 2 summarises descriptive results on perceived health status and the objective and subjective components of loneliness considered in this study. Concerning social isolation, 55.45% (*n* = 168) of participants were not isolated from their family but 57.71% (n = 176) were isolated from their non-family social network. Significant associations were found between these scores and age: older participants had poorer perceived health status, as well as less frequent and close relationships with both their family and non-family networks. Additionally, older individuals were at a higher risk of non-family isolation ($t(303) = 2.992$, $p = .003$, $d = .342$).

INSERT TABLE 2 HERE

(1) Analysing objective and subjective loneliness

All objective and subjective components of loneliness showed significant relationships with one another. Specifically, the scores for the frequency and closeness of family and non-family social relationships were positively and significantly correlated (Table 2), indicating that participants with stronger contact with their family tended to have stronger non-family relationships. Additionally, family, and non-family isolation scores were significantly correlated (Table 3; $\chi^2(3,302) = 28.544$, $p < .001$, $V_{Cramer} = .307$). Specifically, 33.11% of the participants were isolated from both family and non-family networks, while 31.13% had frequent and close relationships with family and non-family members. However, 35.76% exhibited a mixed profile: 24.50% were not family-isolated but had limited relationships with their non-family network, while 11.26% were

isolated from family but had frequent and close relationships with their non-family network.

INSERT TABLE 3 HERE

The feeling of loneliness was significantly correlated with both family and non-family relationships (Table 2) and was higher among participants who were isolated from family ($t(291) = 3.36$, $p = .001$, $d = .394$) and non-family networks ($t(294) = 5.65$, $p < .001$, $d = .599$).

(2) Exploring the combined influence of age and objective and subjective loneliness on perceived health status

Table 4 shows the bivariate relationships between perceived health, age (the only sociodemographic variable significantly associated with the dependent variable), and objective and subjective loneliness. According to these results, participants with lower perceived health tended to have less frequent and closer relationships with both family and non-family networks, experienced greater feelings of loneliness, and were older.

INSERT TABLE 4 HERE

Considering the relationships described above, a Stepwise Multiple Regression Analysis was conducted to explore the influence of age, loneliness, and family and non-family relationships on perceived health status (Table 5). As shown in the results, in Model 1, more frequent and closer non-family relationships were significantly related to better-perceived health (accounting for 9.8% of the explained variance). In Model 2, the variable “feelings of loneliness” was introduced, increasing the explained variance to 14.7%. Finally, Model 3 offered the best goodness-of-fit, with 17.9% of the variance in perceived health significantly explained by non-family relationships, feelings of loneliness, and age. Participants with poorer perceived health tended to have less

frequent and close non-family relationships, had higher feelings of loneliness, and were older (see Table 5).

INSERT TABLE 5 HERE

Discussion

This study aimed to gain a deeper understanding of loneliness among older individuals living alone in Southern Spain and who are Red Cross users. The focus was on examining the relationships between loneliness and perceived health status using a complex and multivariate approach. The analyses and results presented in this study provide comprehensive insights into the components of loneliness and their associations with perceived health status.

The first aim was to describe both the objective and subjective components of loneliness and perceived health among older adults living alone who are Red Cross XXX users. The study found that older adults had more contact with family than non-family networks, consistent with previous research (Pahl & Pevalin, 2005; Yanguas, 2018; Zakizadeh et al., 2022). Further, the results indicate a higher risk of non-family isolation compared to family isolation. This reflects older individuals' tendency to prioritise relationships with family members over superficial connections, aligning with previous research and highlighting the importance of family ties in later life stages (Sims et al., 2015). This selective emphasis on family relationships is influenced alongside age by various factors (Yanguas, 2018), such as health issues, retirement, the death of a partner (and the loss of contacts associated with living as a couple). Additionally, the loss of friends, due to death or living alone, can further constrain social relationships since the opportunities for social integration primarily arise outside the confines of an individual's home.

Participants reported relatively low levels of subjective loneliness, though with high variability. This could be possibly influenced, among other factors, by their non-community sample status (recipients of Red Cross XXX assistance), suggesting that Red Cross XXX interventions may have mitigated loneliness. These findings align with those reported by Chawla et al. (2021), indicating that while loneliness is prevalent in old age, it is generally not severe. Additionally, these findings are consistent with Spanish data showing lower levels of loneliness among women living alone (predominant in our sample) (López Doblas et al., 2020). Further in-depth analyses and longitudinal studies are needed to better understand the impact of Red Cross XXX interventions.

Concerning perceived health, most participants rated their health as fair. However, this sample showed poorer health compared to previous studies on independent older adults in Spain using the same scale (Fernández-Ballesteros et al., 2009; Menéndez & Pérez-Padilla, 2021). This is likely due to the non-normative nature of the sample and the higher risk of illness and mortality associated with living alone (Cohen-Mansfield et al., 2016; Donovan & Blazer, 2020; Holt-Lunstad et al., 2015; López Doblas et al., 2020; Rico-Uribe et al., 2018).

The second aim of the present study was to analyse the relationships between indicators of objective and subjective loneliness. These analyses confirm loneliness as a complex construct with independent and related components. It should be noted that the participants in our study had more contact with their family network. In this regard, around half of the sample was at risk of family isolation, with an even higher risk of non-family isolation. In addition, both types of isolation tend to be related: an important percentage of people who are not isolated from their families are also not isolated from friends. In contrast, around one-third of participants are isolated from both family and

non-family networks. The connection between these two types of isolation suggests two possibilities. First, family and non-family isolation may be shaped by common factor (i.e., age), or second, both types of isolation could mutually influence one another. This underscores the importance of maintaining some form of social contact during old age to reduce the risk of isolation. It is worth noting that, regarding the subjective component of loneliness, participants who felt the loneliest tended to have limited connections with their two primary social support networks, —family and friends. Specifically, those isolated from both networks experienced the most intense feelings of loneliness (lonely people who feel lonely), consistent with other research highlighting the importance of strong, high-quality social networks (rather than sheer quantity) in preventing loneliness among older adults (Cohen-Mansfield et al., 2016; Domènech-Abella et al., 2017; Losada et al., 2012).

Concerning sociodemographic variables, the results reveal that age was the only indicator significantly correlated with perceived health and both objective and subjective loneliness. As observed in other studies, older participants in this research reported poorer perceived health, greater feelings of loneliness, and less frequent and lower-quality relationships with their family and non-family networks (de Jong Gierveld et al., 2015; Hajek & König, 2020; Heikkinen & Kauppinen, 2011; Losada et al., 2012). These findings highlight age as a relevant risk factor for experiencing loneliness and poor health status. As individuals age, they often encounter functional limitations that hinder their ability to maintain an active social life. At the same time, their closest social networks —family and friends— may also experience other changes, such as declining health, reduced mobility, relocation, or death (Bermeja & Ausín, 2018; Hajek & König, 2020; Sims et al., 2015; Yanguas et al., 2018). All these factors could lead to less contact with both networks, increasing the likelihood of feeling

lonely. However, it should be noted that participants in our study were more isolated from non-family networks, possibly due to the greater difficulty of maintaining relationships outside the family, given the limitations and challenges associated with aging. Thus, psychosocial interventions targeting loneliness in older adults should prioritise strengthening non-family social networks.

Finally, this study explored the relationships between perceived health, age, and both objective and subjective loneliness through a multivariate approach. While previous studies have consistently found an association between health and loneliness, the direction of this relationship remains unclear (Masi et al., 2011). Bivariate analyses indicated that perceived health was associated with all dimensions studied, including family and non-family relationships, loneliness, and age. However, multivariate analyses identified loneliness and non-family relationships as key factors affecting health status, alongside age. Consistent with previous studies (Cohen-Mansfield et al., 2016; Nyqvist et al., 2019; Sancho et al., 2020), participants with poorer health reported higher levels of loneliness, likely due to reduced social engagement (especially with friends) resulting from health issues. Since health often determines the extent to which a person can participate in social activities and form connections, an increase in health problems could reduce social contact —especially with friends—, contributing to heightened loneliness and isolation (Sancho et al., 2020).

The results of the multivariate analysis particularly highlight the importance of non-family relationships in explaining perceived health. Although the older adults in this study had more frequent and closer contact with their family, friendships emerged as more influential in determining health status. This finding is particularly striking in a collectivist society and culture like Spain, where family relationships are a central aspect of people's lives (Del Barrio et al., 2010; Lykes & Kemmelmeier, 2014; Yang &

Victor, 2011). In our view, this result may be attributed to the distinct functions fulfilled by different types of social networks. While the family primarily fulfils instrumental roles, friends often serve as a source of emotional support. According to Zakizadeh et al. (2022), social support positively affects health when intimacy is established through emotional connection. For older adults, cultivating intimate relationships is often easier with peers who share similar life experiences and goals. This bond is more easily formed with friends, contributing to greater satisfaction and reduced stress.

However, this study has certain limitations. It was conducted in a specific region (Southern Spain), and therefore caution should be taken when generalising the findings to other societies and cultures. The participants were older individuals living alone, and Red Cross XXX users. However, as emphasised by some authors (Gajardo, 2015; Newmyer et al., 2022), localised samples are crucial for understanding the nuances of loneliness in specific settings, which is essential for designing effective interventions. Finally, the sample was predominantly composed of women which limited the ability to explores gender differences. The over-representation of women in this study may be attributed to several factors. First, women tend to have a longer life expectancy than men. Second, it is generally more culturally acceptable for women to express their emotions and admit feeling lonely. Finally, women are more likely to seek help, which could explain their higher presence among users of red Cross XXX services.

Accordingly, future research should aim to increase sample diversity to analyse gender differences and verify if the same results are obtained. Additionally, it would be interesting to use a community sample to explore whether the relationships among the studied variables are consistent with those found in the of the current study.

Despite its limitations, this study offers valuable insights. It distinguishes between family and non-family support, highlighting the importance of friendship

networks in mitigating loneliness and improving the health of older adults. This is especially important for organizations addressing the challenges of an aging population. The findings can inform the design of interventions to enhance care for older individuals living alone, particularly by emphasizing the need to enrich and diversify non-family social networks.

Acknowledgments

We thank Red Cross XXX volunteers, professionals, and over 300 older participants for sharing valuable insights.

Disclosure statement

The authors reported no potential conflict of interest.

Funding

The authors received no financial support for the research, authorship, and publication of this article.

Data Availability Statement

The data are available from the corresponding author upon reasonable request.

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