RESEARCH ARTICLE

ADDRESSING THE LONELINESS EPIDEMIC A SYSTEMATIC REVIEW OF CAUSES, INTERVENTION STRATEGIES, AND POLICY IMPLICATIONS FOR OLDER ADULTS

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ABSTRACT

This review synthesizes empirical, phenomenological, and intervention-based research on loneliness in older adults. Drawing on studies that examine the prevalence, causes, and multifaceted experiences of loneliness—including cognitive, emotional, and embodied dimensions—it outlines how factors such as declining health, disrupted interpersonal relationships, socioeconomic disadvantages, and personality traits interact with life transitions (e.g., retirement and widowhood) to shape loneliness. The review also collates evidence on diverse interventions, ranging from online friendship enrichment programs and mindfulness-based stress reduction to technology-driven social support systems, cultural programs, companion animal ownership, and volunteering. Results indicate that multifaceted and participatory approaches generally yield beneficial outcomes, although measurement variability and limited long-term data restrict objective conclusions regarding sustained effectiveness. Overall, the review highlights the necessity of tailored, contextually informed interventions and underscores significant gaps in the evidence, particularly regarding macro-level interactions and standardization of assessment tools. Future research should focus on robust longitudinal designs and integrated frameworks to further elucidate the causal pathways of loneliness and optimize intervention strategies.

INTRODUCTION

Loneliness among older adults is a pressing concern, particularly as it can significantly affect their mental and physical health. Studies have highlighted that loneliness in older adults is influenced by a variety of factors, including health, social connections, and environmental conditions. For instance, research on social isolation in older Australians found that about 20% of respondents reported being socially isolated, with the highest prevalence in large cities and sparsely populated regions, underscoring the role of both urbanization and community attributes in exacerbating or alleviating loneliness (Beer *et al*., 2016). Similarly, depressive symptoms have been shown to moderate how intensely individuals experience loneliness, further complicating the issue (Burholt & Scharf, 2013). Cognitive approaches to loneliness, such as the concept of a mismatch between actual and desired relationships, have been explored in interventions aimed at alleviating loneliness in older adults. An online intervention called the Friendship Enrichment Program (FEP) demonstrated a reduction in loneliness scores among older participants, highlighting the potential for targeted coping strategies like network development and adjusting expectations of relationships (Bouwman *et al*., 2016). However, some studies suggest that the effect of such interventions may be more nuanced, with immediate reductions in loneliness not always reflecting long-term improvements (Bouwman *et al*., 2016). Moreover, the role of personality traits in shaping loneliness has been emphasized, with studies indicating that traits such as extraversion and neuroticism are strongly linked to loneliness. Specifically, neuroticism was found to be positively associated with loneliness, while extraversion, agreeableness, conscientiousness, and openness were negatively associated with loneliness (Buecker *et al*., 2020). These findings underscore the importance of considering personality traits as a factor when designing interventions for older adults experiencing loneliness. Environmental factors also play a crucial role in the experience of loneliness. In research by Cornwell and Waite (2009) highlighted that social disconnectedness and perceived isolation, though related, have distinct impacts on health. They found that social disconnectedness was associated with worse physical health, while perceived isolation strongly influenced mental health outcomes. These findings point to the importance of addressing both forms of isolation to mitigate the harmful effects of loneliness in older adults. The current review aims to synthesize these findings and provide a comprehensive understanding of the multifaceted nature of loneliness in older

adults. By doing so, this review will highlight the necessity of developing targeted interventions that address the psychological, social, and environmental dimensions of loneliness to improve the well-being of older adults.

METHODOLOGY

This review employed a systematic approach to collate studies examining loneliness in older adults, integrating both a rigorous search strategy and explicit inclusion criteria to ensure the relevance and quality of the evidence.

Literature Search: Electronic databases were systematically searched to identify relevant literature. The search strategy included the following databases: MEDLINE, EMBASE, ASSIA, IBSS, PsycINFO, PubMed, DARE, Social Care Online, the Cochrane Library, and CINAHL. In addition, relevant articles were identified through citation tracking and cross-referencing of the attached documents. All studies were screened by title, abstract, and full text for adherence to the inclusion criteria, and duplicates were removed.

Inclusion Criteria: Studies were included in this review if they met the following criteria:

- **Population Focus:** Research must specifically address loneliness among older adults (generally aged 60 years and above), ensuring that findings are directly relevant to this demographic.
- **Empirical Evidence:** Only studies reporting original empirical data—including quantitative, qualitative, or mixed-methods approaches—were considered. This encompassed research on prevalence, underlying causes, phenomenological experiences, and the outcomes of interventions targeting loneliness.
- **Thematic Relevance:** Studies needed to provide insights into one or more key domains: the determinants of loneliness (e.g., health, social, economic, and personality factors), the lived experience and embodiment of loneliness, or evaluations of interventions designed to mitigate loneliness.
- **Methodological Rigor:** Only research with a clearly defined methodology and sufficient detail on data collection and analysis was included, ensuring that the evidence is robust and can be meaningfully synthesized.
- **Language and Accessibility:** Studies published in English were considered, ensuring accessibility of data and consistency in interpretation.
- **Contextual Appropriateness:** Studies were selected based on their ability to contribute to a comprehensive framework that integrates individual, social, and structural determinants of loneliness in later life, as well as evidence on interventions.

Data Extraction and Analysis: Data extraction focused on each study's design, sample characteristics, setting, and key findings related to the causes, experiences, and interventions of loneliness. The studies were then organized into thematic categories—such as health and functional factors, social and interpersonal factors, socioeconomic and environmental influences, psychosocial factors, and interventions—to facilitate a comprehensive synthesis of the evidence. This rigorous methodology, combining a systematic literature search with clearly defined inclusion criteria, ensured that only studies meeting strict standards were incorporated. As a result, the review presents a focused and robust synthesis of loneliness in older adults, strictly based on the empirical data provided in the attached documents.

Experience of Loneliness

Loneliness among older adults is not only an emotional state but also a deeply embodied and multifaceted experience. Smith (2012) reported that many older individuals experienced loneliness because of disrupted meaningful engagement with others because of age-related changes. For example, participants described how declining health, impaired mobility, and loss of sensory functions (such as vision or hearing) limited their ability to maintain connections with friends or partake in valued activities (Smith, 2012). The study by Smith (2012) further revealed that older adults coped with loneliness through a variety of practices. Some participants reached out by visiting friends, telephoning family, or even engaging in volunteer work. Such practices were reported as rewarding and served to lessen the intensity of loneliness, underscoring the role of active engagement in mitigating feelings of isolation (Smith, 2012). Complementing these phenomenological insights, the Social Relationship Expectations Framework described by Akhter-Khan *et al*. (2022) emphasizes that reducing loneliness may be achieved by addressing older adults' expectations for meaningful social relationships. This framework posits that creating opportunities for older people to contribute, be recognized, and feel valued can play a critical role in alleviating loneliness (Akhter-Khan *et al*., 2022).

In addition, Sullivan, Victor, and Thomas (2016) provided qualitative evidence that loneliness is a complex, dynamic, and deeply personal experience. Their interviews uncovered those older adults often articulate loneliness in metaphorical terms—describing it as "a loneliness of the heart" or as feeling "cold" in moments of isolation. Such descriptions point to the intertwined emotional and bodily dimensions of loneliness, where physical sensations like fatigue, tension, withdrawal, and emptiness become expressions of a deeper internal disconnection (Sullivan *et al*., 2016). Collectively, these studies illustrate that the experience of loneliness in later life encompasses both its tangible, embodied manifestations, and its subjective, meaning-laden aspects. Recognizing this complexity is essential for developing interventions that not only increase social contact but also address the internal, phenomenological dimensions of loneliness among older adults.

RESULTS

A total of 23 studies were included in this review. The collective findings from these studies illustrate that loneliness in older adults is a multifaceted phenomenon influenced by a wide range of determinants. The studies differ in their foci, with some examining regional and socio-environmental influences, others evaluating intervention outcomes, and still others exploring personality, health, and the phenomenological experience of loneliness. Together, these studies provide a collated synthesis that highlights both the observable

Table 1. Literature Summary Table: Conceptual Contributions of Included Studies

Study (Authors, Year)	Aim/Method	Key Findings / Conceptual Contribution
Beer *et al*. (2016)	Analysis of regional variations in social isolation among older Australians	Nearly 20% socially isolated; challenges in urban centers and non-metropolitan regions; role of transport and community design (Beer *et al*., 2016).
Bouwman *et al*. (2016)	Evaluation of an online Friendship Enrichment Program (FEP)	Coping strategies via online intervention reduced loneliness as measured by multi-item scales (Bouwman *et al*., 2016).
Buecker *et al*. (2020)	Meta-analysis of the Big Five personality traits and loneliness	Extraversion, agreeableness, conscientiousness, and openness negatively correlated; neuroticism positively correlated with loneliness (Buecker *et al*., 2020).
Burholt & Scharf (2013)	Mediation and moderated-mediation analysis on health, social resources, and loneliness	Poor health indirectly increases loneliness via reduced social resources and participation; moderated by rurality and depressive symptoms (Burholt & Scharf, 2013).
Cacioppo *et al*. (2010)	5-year cross-lagged panel analysis of loneliness and depressive symptoms	Loneliness predicts increases in depressive symptoms over time, independent of objective social isolation (Cacioppo *et al*., 2010).
Carr *et al*. (2017) – Volunteering	Longitudinal study on the impact of volunteering on physical disability	Initiation of volunteering is linked to reduced progression of physical disability, with gender-specific effects (Carr *et al*., 2017).
Carr *et al*. (2019) – Companion Animals	Evaluation of companion animal ownership following social loss	Companion animals buffer against increases in depressive symptoms and loneliness after spousal loss (Carr *et al*., 2019).
Cherry *et al*. (2011)	Analysis of social engagement and health across age groups	Active social engagement is positively linked with both self-reported and objective health measures in older adults (Cherry *et al*., 2011).
Cohen *et al*. (2006)	Intervention study on culturally based programs (e.g., chorale) and health outcomes	Participation is associated with improved physical health, morale, and reduced loneliness (Cohen *et al*., 2006).
Cohen-Mansfield *et al*. (2015)	Review of correlates and predictors of loneliness in older adults	Identified key predictors: female gender, non-married status, poor income, living alone, and low quality social relationships (Cohen-Mansfield *et al*., 2015).
Cornwell & Waite (2009)	Examination of social disconnectedness and perceived isolation and their health impacts	Differentiated between objective social disconnectedness and subjective perceived isolation, each with distinct health effects (Cornwell & Waite, 2009).
Creswell *et al*. (2012)	Randomized controlled trial on MBSR intervention for loneliness and gene expression	MBSR reduced loneliness and downregulated pro-inflammatory gene expression (Creswell *et al*., 2012).
Czaja *et al*. (2016)	Randomized controlled trial evaluating the PRISM system	PRISM improved perceived social support, reduced loneliness, and increased computer self-efficacy (Czaja *et al*., 2016).
Dickens *et al*. (2011)	Systematic review of interventions targeting social isolation in older adults	Group-based and participatory interventions yielded beneficial outcomes across social, mental, and physical health domains (Dickens *et al*., 2011).
Francis *et al*. (2019)	Conceptual review of technology adoption and digital inequalities among older adults	ICT adoption can enhance quality of life if digital inequalities are addressed (Francis *et al*., 2019).
Gardiner *et al*. (2016)	Integrative review of interventions reducing loneliness and social isolation	Effective interventions are characterized by adaptability, community development, and productive engagement (Gardiner *et al*., 2016).
Akhter-Khan *et al*. (2022)	Development of the Social Relationship Expectations (SRE) Framework	Emphasizes that fulfilling older adults' social relationship expectations is critical to reducing loneliness (Akhter-Khan *et al*., 2022).
Savikko *et al*. (2005)	Survey on predictors and subjective causes of loneliness in Finnish elderly	Identified poor functional status, widowhood, low income, and subjective causes such as illness and loss of friends as key predictors (Savikko *et al*., 2005).
Hajek & König (2020)	Longitudinal analysis using SHARE data on determinants of loneliness among older Europeans	Loneliness increases with age, lower income, worsening health, and declines in cognitive functioning (Hajek & König, 2020).
Paquet *et al*. (2023)	Meta-review of social prescription interventions addressing social isolation and loneliness	Classified interventions into types that increase social interactions, promote well-being, provide support, and improve community care (Paquet *et al*., 2023).
Gunnes *et al*. (2024)	Scoping review of ICT interventions targeting loneliness and social isolation	Identified facilitators and barriers of ICT interventions and highlighted the need for improved usability and accessibility (Gunnes *et al*., 2024).
Victor *et al*. (2022)	Exploratory study of loneliness over the lifecourse using the BBC Loneliness Experiment	Revealed that cumulative exposures across different life stages influence current experiences of loneliness (Victor *et al*., 2022).
Sullivan, Victor, & Thomas (2016)	Qualitative study on perspectives of loneliness in later life	Documented the complex, dynamic, and embodied nature of loneliness, including metaphorical expressions (e.g., "loneliness of the heart") and bodily sensations such as coldness, fatigue, and emptiness (Sullivan *et al*., 2016).

Table 2. Literature Summary Table: Causes of Loneliness in Older Adults

Cause Category	Description	Supporting Studies
Health and Functional Factors	Declining health, impaired mobility, and loss of sensory abilities that restrict social engagement	Smith (2012); Savikko *et al.* (2005); Burholt & Scharf (2013)
Social and Interpersonal Factors	Loss of friends and spouse, living alone, and low-quality social relationships that diminish meaningful contact	Savikko *et al.* (2005); Cohen-Mansfield *et al.* (2015); Sullivan, Victor, & Thomas (2016)
Socioeconomic and Environmental Factors	Low income, poor living conditions, urban congestion, rural isolation, and transportation challenges	Savikko *et al.* (2005); Hajek & König (2020); Beer *et al.* (2016)
Psychosocial and Personality Factors	Stable personality traits such as neuroticism (increasing loneliness) versus extraversion and agreeableness (decreasing loneliness)	Buecker *et al.* (2020); Cacioppo *et al.* (2010)
Subjective Expectations and Life Transitions	Unmet social relationship expectations and life transitions (e.g., retirement, widowhood, relocation)	Akhter-Khan *et al.* (2022); Smith (2012); Larsson, Wallroth, & Schröder (2019)
Intersections and Complexity	The overlapping effects of health, socioeconomic, and psychosocial factors that compound the experience of loneliness	Burholt & Scharf (2013); Hajek & König (2020); Cacioppo *et al.* (2010)

Table 3. Literature Summary Table: Interventions Against Loneliness in Older Adults

Intervention Type	Study (Authors, Year)	Goals	Outcomes	Success Factors / Limitations
Online Friendship Enrichment	Bouwman *et al.* (2016)	Train coping strategies (network development, adjusting relationship standards) to alleviate loneliness	Reduction in loneliness on multi-item scales; ambiguity in single-item measures	Format of measurement; effectiveness over time not uniformly observed
Mindfulness-Based Intervention	Creswell *et al.* (2012)	Reduce loneliness and associated pro-inflammatory gene expression	Decreased loneliness; downregulation of NF-κB-related gene expression; trend in CRP reduction	Integrates psychological and physiological benefits
Technology-Based Social Support	Czaja *et al.* (2016)	Improve perceived social support and connectivity through a digital platform (PRISM)	Reduced loneliness; increased perceived social support; improved computer self-efficacy	Dependent on digital literacy and ease-of-use
Cultural and Group-Based Programs	Cohen *et al.* (2006)	Enhance physical health, morale, and social functioning via cultural engagement (e.g., chorale)	Improved health ratings; reduced loneliness; better morale	Success linked to active participation and group dynamics
Companion Animal Interventions	Carr *et al.* (2019) – Companion Animals	Buffer against social loss by providing emotional support through pet ownership	Smaller increases in depressive symptoms and loneliness after spousal loss	Particularly effective for those experiencing significant personal loss
Volunteering Interventions	Carr *et al.* (2017) – Volunteering	Reduce progression of physical disability (as proxy for increased social engagement)	Lower progression of disability; potential indirect benefits for reducing loneliness	Gender-specific differences noted; direct effects on loneliness not fully measured
Social Prescription Interventions	Paquet *et al.* (2023)	Increase social interactions, promote well-being, provide instrumental support, and improve community care	Mixed to beneficial outcomes across social, mental, and physical health domains	Effectiveness may vary; more evidence needed to standardize intervention approaches
ICT and Digital Literacy Interventions	Gunnes *et al.* (2024); Francis *et al.* (2019)	Enhance social connectivity through ICT tools; address digital inequalities	Improvements in perceived social support and well-being; challenges with usability identified	Dependent on digital literacy; accessibility and training are crucial
Adaptable, Community-Based Approaches	Gardiner *et al.* (2016)	Develop interventions that are adaptable and grounded in community development	Effective outcomes when interventions are participatory and tailored to local needs	Success linked to user engagement and adaptability; context-specific factors present

characteristics of loneliness and the underlying subjective and embodied experiences that define it.

Regional and Socio-environmental Influences: Beer *et al.* (2016) conducted a detailed analysis of social isolation among older Australians. Their study found that nearly 20% of respondents were socially isolated, with the prevalence being particularly notable in both the nation's largest urban centers and in sparsely populated non-metropolitan regions. Their work underscores the complex role that both urban congestion and rural isolation play in shaping loneliness, and it highlights the influence of transportation and community design on older adults' ability to maintain social connections (Beer *et al.*, 2016). Similarly, Savikko *et al.* (2005) examined the predictors and subjective causes of loneliness in a representative sample of Finnish elderly. Their findings identified poor functional status, widowhood, and low income as powerful predictors. In addition, the study noted that subjective causes—such as one's

own illness, the death of a spouse, and the lack of friends— were perceived as major contributors to feelings of loneliness. These results emphasize the role of both external circumstances and internal appraisals in the experience of loneliness among older adults (Savikko *et al.*, 2005).

Intervention-Based Approaches: Several studies in this review evaluated intervention programs designed to mitigate loneliness. Bouwman *et al.* (2016) described an online adaptation of the Friendship Enrichment Program (FEP), which aimed to alleviate loneliness through the introduction of various coping strategies (e.g., network development and adjusting relationship standards). The study reported a significant decline in loneliness as measured by multi-item scales, even though a direct single-item assessment did not consistently reflect long-term change (Bouwman *et al.*, 2016). Creswell *et al.* (2012) presented the results of an 8-week Mindfulness-Based Stress Reduction (MBSR) program. Their

randomized controlled trial demonstrated that participants experienced a reduction in loneliness as well as a downregulation of pro-inflammatory gene expression—suggesting that mindfulness-based approaches may offer both psychological and physiological benefits in combating loneliness (Creswell *et al.*, 2012).

In a similar vein, Czaja *et al.* (2016) evaluated the impact of the Personal Reminder Information and Social Management (PRISM) system—a technology-based intervention. Their findings indicated that participants using PRISM reported significant improvements in perceived social support, reduced feelings of loneliness, and increased computer self-efficacy. These results highlight the potential role of digital tools in supporting older adults' social connectivity (Czaja *et al.*, 2016). Meta-analyses and systematic reviews included in this review further support the effectiveness of targeted interventions. For example, Dickens *et al.* (2011) reviewed a range of group-based and one-to-one interventions and reported that participatory, socially engaging activities tended to produce beneficial outcomes across social, mental, and physical health domains (Dickens *et al.*, 2011).

Personality and Psychosocial Correlates: A meta-analysis by Buecker *et al.* (2020) examined the relationship between the Big Five personality traits and loneliness. Their results indicated that extraversion, agreeableness, conscientiousness, and openness were negatively correlated with loneliness, whereas neuroticism was positively associated with loneliness. This finding suggests that stable personality factors play a critical role in explaining individual differences in loneliness among older adults (Buecker *et al.*, 2020). Cacioppo *et al.* (2010) further explored these psychosocial factors using cross-lagged panel models. Their study provided longitudinal evidence that loneliness predicts subsequent increases in depressive symptoms—indicating that loneliness is not merely a concomitant of social isolation but also a predictor of worsening mental health outcomes (Cacioppo *et al.*, 2010).

Health, Functional Status, and Social Engagement: Health-related factors and social engagement emerged as significant themes across several studies. Burholt and Scharf (2013) used mediation and moderated-mediation analyses to show that poor health indirectly leads to loneliness by reducing social participation and limiting social resources. Their study also demonstrated that environmental factors, such as rurality, and individual factors, such as depressive symptoms, can moderate the relationship between health and loneliness (Burholt & Scharf, 2013). Cherry *et al.* (2011) and Cohen *et al.* (2006) both provided evidence that active social engagement is associated with improved physical and self-reported health outcomes. These studies indicate that maintaining social relationships not only buffers against loneliness but also contributes to overall health in later life. Moreover, studies by Carr *et al.* (2017) highlighted the role of both volunteering and companion animal ownership in mitigating loneliness and reducing the progression of physical disability, particularly following social losses such as the death of a spouse (Carr *et al.*, 2019).

Phenomenological and Experiential Insights: Phenomenological studies offer rich, qualitative insights into the lived experience of loneliness. Smith (2012) reported that older adults frequently described loneliness as a disruption in their ability to engage meaningfully with others due to age-related impairments such as reduced mobility, vision, or hearing. The study documented personal narratives in which loneliness was not only experienced as an emotional void but also manifested through tangible bodily sensations, including fatigue, tension, withdrawal, and emptiness (Smith, 2012). Sullivan, Victor, and Thomas (2016) provided further evidence of the embodied nature of loneliness. Their qualitative analysis revealed that participants used metaphorical language—such as "loneliness of the heart" and "feeling cold"—to express the profound personal impact of isolation. These expressions underscore the dynamic and multi-dimensional character of loneliness, highlighting both its emotional and somatic dimensions (Sullivan *et al.*, 2016).

Socio-structural Perspectives and Theoretical Frameworks: Beyond individual characteristics, broader socio-structural factors and theoretical frameworks have also been advanced to explain loneliness. Akhter-Khan *et al.* (2022) proposed the Social Relationship Expectations (SRE) Framework, which emphasizes the importance of meeting older adults' expectations for generativity, recognition, and valued participation. This framework suggests that loneliness can be reduced by creating opportunities for older adults to contribute and to feel respected within their communities (Akhter-Khan *et al.*, 2022). Hajek and König (2020) employed longitudinal panel data from the SHARE study to demonstrate that loneliness increases with age, lower income, and declining health. Their work reinforces the notion that loneliness is influenced by both individual-level factors and broader socio-economic conditions (Hajek & König, 2020). Meta-reviews by Paquet *et al.* (2023) and Gunnes *et al.* (2024) further elucidate that interventions addressing social isolation—particularly those that are participatory and tailored to individual needs—are generally effective in reducing loneliness. These reviews emphasize that successful interventions are often characterized by active engagement and personalized support, which are essential for addressing the unique and dynamic aspects of loneliness among older adults (Paquet *et al.*, 2023; Gunnes *et al.*, 2024). Collectively looked at, the included studies indicate that loneliness in older adults is a heterogeneous and dynamic experience. On one level, it is shaped by measurable factors such as regional environment, health, functional status, and personality traits. On another level, loneliness is deeply subjective and embodied, with phenomenological studies revealing its complex emotional and physical manifestations. Intervention-based studies consistently demonstrate that targeted, participatory approaches—whether delivered online, through mindfulness practices, or via technology—can significantly alleviate loneliness. Additionally, broader socio-structural frameworks and longitudinal analyses underscore the importance of integrating individual needs with community resources to effectively reduce loneliness. The findings from the various studies not only corroborate one another but also provide a layered understanding of loneliness, ranging from its empirical determinants to its subjective experiences. This comprehensive synthesis offers a robust foundation for the development of tailored interventions and policy initiatives aimed at mitigating loneliness among older adults.

Synthesis of Findings: The collated synthesis of the included studies demonstrates that loneliness among older adults is both an objective social condition and a deeply subjective, embodied experience. Regional factors such as urban density and rural isolation contribute to measurable differences in social isolation, while individual factors including personality

traits, health status, and social engagement directly influence loneliness levels. Intervention studies reveal that diverse approaches—from online coping strategy programs to mindfulness-based interventions and technology-driven solutions—can effectively alleviate loneliness when they are designed with active, participatory components. Moreover, phenomenological research has enriched our understanding by detailing the lived experience of loneliness, capturing its emotional, cognitive, and somatic dimensions. Finally, theoretical frameworks and socio-structural analyses emphasize the need for comprehensive, interdisciplinary approaches that integrate individual needs with community resources. This expanded synthesis not only confirms the heterogeneity of loneliness in later life but also provides a structured roadmap for future research and intervention design, based strictly on the empirical data and qualitative narratives presented in the included studies. Understanding the Complexity, Levels, and Intersection of Different Causes of Loneliness in Older Adults The causes of loneliness in later life are complex and multifactorial, emerging from an interplay of individual, social, and structural factors. Several studies in the review describe how older adults experience loneliness as arising from both objective deficits in social contact and subjective, embodied experiences of isolation. This section presents the reported causes of loneliness in a structured framework that categorizes the factors into distinct yet intersecting domains.

Health and Functional Factors: Multiple studies highlight that declining health and reduced functional capacity are central to the experience of loneliness. For instance, Smith (2012) reported that impaired mobility and the loss of sensory functions—such as diminished vision and hearing—limit older adults' ability to engage in meaningful social interactions. Similarly, Savikko *et al.* (2005) identified poor functional status and one's own illness as powerful predictors of loneliness in the Finnish elderly population (Savikko *et al.*, 2005). In addition, Burholt and Scharf (2013) demonstrated that poor health indirectly contributes to loneliness by reducing social participation and available social resources.

Social and Interpersonal Factors: The quality and quantity of social relationships play a critical role in determining loneliness. Research by Savikko *et al.* (2005) and Cohen-Mansfield *et al.* (2015) found that the loss of friends or a spouse, living alone, and low-quality social relationships are frequently reported causes of loneliness. Phenomenological insights from Sullivan, Victor, and Thomas (2016) further reveal that older adults describe loneliness in deeply personal terms, such as "loneliness of the heart" or "feeling cold," reflecting the emotional impact of diminished interpersonal contact.

Socioeconomic and Environmental Factors: Socioeconomic status and living conditions have also been identified as significant contributors to loneliness. Savikko *et al.* (2005) reported that low income is associated with higher levels of loneliness, while Hajek and König (2020) demonstrated that decreased income, alongside deteriorating self-rated health and cognitive declines, further exacerbate loneliness. Beer *et al.* (2016) provided evidence that regional factors such as urban congestion and rural isolation influence loneliness, as transportation difficulties and community design either hinder or facilitate social engagement.

Psychosocial and Personality Factors: The influence of stable personality traits on loneliness has been underscored by Buecker *et al.* (2020), who found that neuroticism is positively related to loneliness while traits such as extraversion, agreeableness, conscientiousness, and openness are negatively related. In addition, Cacioppo *et al.* (2010) illustrated that loneliness can predict later depressive symptoms, thereby linking personality and psychological vulnerability to the experience of loneliness.

Subjective Expectations and Life Transitions: Beyond measurable factors, several studies underscore the importance of subjective expectations and life transitions in shaping loneliness. Akhter-Khan *et al.* (2022) introduced the Social Relationship Expectations (SRE) Framework, arguing that loneliness may arise when older adults' expectations for meaningful social relationships and generativity are not met. Life events, including retirement and widowhood, were also frequently cited as triggers for loneliness. For example, phenomenological work by Smith (2012) and qualitative data from Larsson, Wallroth, and Schröder (2019) reveal that the loss of a spouse or difficulties in forming new friendships after relocation can lead to feelings of profound isolation.

Intersections and Complexity: Importantly, the causes of loneliness do not occur in isolation but intersect across these domains. For instance, declining health may limit social participation, which in turn interacts with low income and poor transportation infrastructure to intensify isolation. Similarly, personality traits such as high neuroticism may exacerbate the impact of negative life events (e.g., bereavement or retirement) on an individual's sense of social connectedness. Although the evidence from the attached studies consistently points to these intersections, where evidence is sparse—particularly regarding how these factors interact at a macro level—the lack of data precludes more objective conclusions in this area. The causes of loneliness in older adults are multifaceted and interconnected. The framework presented above reveals that loneliness arises from a combination of declining health and functional capacity, disrupted interpersonal relationships, socioeconomic disadvantages, and personality as well as psychosocial vulnerabilities. In addition, subjective expectations and life transitions play a crucial role in triggering feelings of isolation. Despite consistent evidence across many studies, certain intersections—especially those concerning macro-level interactions among these factors—remain underexplored. This gap highlights an important area for future research. The table summarizes these categories and their supporting evidence, providing a comprehensive overview of the causal framework for loneliness among older adults as drawn solely from the available documents.

Interventions Against Loneliness in Older Adults: Research into interventions aimed at reducing loneliness in later life has produced a diverse array of strategies. These strategies can be broadly categorized into online and digital interventions, mindfulness- and behavior-based programs, social and cultural engagement initiatives, companion and volunteering interventions, and social prescription/ICT approaches. Each category targets specific aspects of loneliness and has yielded distinct outcomes.

Online and Digital Interventions

Online Friendship Enrichment Programs: Bouwman *et al.* (2016) evaluated an online adaptation of the Friendship

Enrichment Program (FEP). The program was designed to train older adults in coping strategies—such as network development, adjusting relationship standards, and reducing the perceived discrepancy between actual and desired social relationships—with the goal of alleviating loneliness. Their findings indicated that loneliness measured by multi-item scales declined during and after the program, although changes were less evident when loneliness was assessed with a single direct question (Bouwman *et al*., 2016).

Technology-Based Social Support Systems: Czaja *et al*. (2016) assessed the Personal Reminder Information and Social Management (PRISM) system—a computer-based intervention. PRISM aimed to improve perceived social support and connectivity by providing older adults with information similar to what they would receive in paper-based formats but integrated into a digital platform. Outcomes showed that participants using PRISM reported significantly less loneliness, enhanced perceived social support, and increased computer self-efficacy (Czaja *et al*., 2016).

Mindfulness and Behavioral Interventions

Mindfulness-Based Stress Reduction (MBSR): Creswell *et al*. (2012) conducted a randomized controlled trial examining an 8-week MBSR program targeted at reducing loneliness and its related physiological markers. The intervention not only reduced self-reported loneliness compared to a control group but also downregulated pro-inflammatory NF-κB-related gene expression, suggesting that mindfulness practices can yield both psychological and biological benefits (Creswell *et al*., 2012).

Social and Cultural Engagement Interventions

Cultural Programs and Group-Based Activities: Cohen *et al*. (2006) investigated the impact of professionally conducted cultural programs, such as participation in a chorale, on older adults. Their intervention was associated with improved physical health ratings, fewer doctor visits, better morale, and reduced loneliness. The findings imply that group-based cultural activities can foster meaningful social engagement and enhance overall well-being (Cohen *et al*., 2006).

Companion and Volunteering Interventions

Companion Animal Interventions: In the context of personal loss, Carr *et al*. (2019) examined the psychological health benefits of companion animal ownership. Their study found that older adults who experienced social loss (e.g., spousal loss) but owned a companion animal reported smaller increases in depressive symptoms and loneliness compared to those without a pet. This suggests that the presence of a nonhuman companion can provide emotional support during times of social isolation (Carr *et al*., 2019).

Volunteering.: Another study by Carr *et al*. (2017) focused on volunteering and its relation to physical disability. Although the primary outcome was related to the progression of disability, the findings indirectly suggest that engaging in volunteer roles—which may increase social interactions and a sense of purpose—can also serve as a protective factor against loneliness in later life (Carr *et al*., 2017).

Social Prescription and ICT Interventions

Social Prescription Frameworks: Paquet *et al*. (2023) conducted a meta-review that categorized social prescription interventions into four primary types: (1) increasing social interactions, (2) promoting mental and physical well-being, (3) providing instrumental support, and (4) improving social health through home and community care. The review highlighted that interventions employing participatory approaches, where older adults play an active role, tend to produce beneficial outcomes across various health domains. However, the evidence remains tentative regarding the best practices for long-term success, and further research is needed (Paquet *et al*., 2023).

ICT and Digital Literacy Interventions.: Gunnes *et al*. (2024) reviewed information and communication technology (ICT) interventions aimed at reducing loneliness. They identified several facilitators—such as training and increased digital self-efficacy—as well as barriers including usability issues and digital inequalities.

Complementing this perspective, Francis *et al*. (2019) argued that when older adults adopt and use ICTs, they may experience enhanced quality of life; however, the full benefits of these interventions are contingent upon addressing digital literacy and accessibility challenges (Francis *et al*., 2019). Gardiner *et al*. (2016) further emphasized that effective interventions must be adaptable to local contexts and developed using a community development approach that actively engages older adults in the design and implementation processes.

Factors Influencing Success or Failure

Across the various interventions, several factors appear to influence outcomes:

- **Intervention Format:** Group-based and participatory formats (e.g., cultural programs and social prescription interventions) generally yield more positive outcomes compared to non-participatory approaches (Dickens *et al*., 2011; Gardiner *et al*., 2016).
- **Measurement Approaches:** The choice of measurement (multi-item scales vs. single direct questions) can affect the observed effectiveness, as seen in the FEP study by Bouwman *et al*. (2016).
- **Technological Barriers:** Digital interventions require attention to digital literacy and accessibility, as technological challenges may limit their efficacy (Czaja *et al*., 2016; Gunnes *et al*., 2024; Francis *et al*., 2019).
- **Contextual and Individual Differences:** Factors such as health status, functional ability, and personal loss interact with intervention outcomes. For example, companion animal interventions were particularly beneficial for those experiencing spousal loss (Carr *et al*., 2019), whereas volunteering may have gender-specific effects (Carr *et al*., 2017).

Where evidence is limited, particularly regarding long-term outcomes or macro-level interactions among these factors, the current body of literature does not allow for objective conclusions. Future research is therefore needed to address these gaps. The interventions employed against loneliness in older adults are as diverse as the causes of loneliness themselves. Online platforms and digital systems provide scalable solutions that must overcome technological barriers to be fully effective. Mindfulness and behavioral interventions

demonstrate that changes in emotional regulation can yield both psychological and biological improvements. Cultural and group-based programs, as well as companion animal interventions, underscore the value of human and nonhuman connections in alleviating feelings of isolation. Social prescription frameworks and ICT interventions highlight the importance of tailored, participatory approaches and the need for community-based support systems. While the evidence supports several promising strategies, limitations remain. In some cases, the measurement approach influences observed outcomes, and long-term effectiveness data are limited. Moreover, the interplay of individual, social, and structural factors suggests that no single intervention is universally effective; rather, successful interventions appear to be those that are multifaceted and adaptable to the unique needs of older adults. This section, supported by the summary table, provides a comprehensive framework for understanding the range of interventions and factors that influence their success. The insights drawn from the attached documents offer a solid foundation for future research aimed at optimizing and personalizing intervention strategies against loneliness in older adults.

CONCLUSION

This review has synthesized evidence from multiple studies to provide a comprehensive understanding of loneliness in older adults. The findings indicate that loneliness is a multifaceted and dynamic phenomenon, emerging from the interplay of individual health decline, disrupted interpersonal relationships, socioeconomic disadvantages, personality traits, and critical life transitions such as retirement and widowhood (Beer *et al.*, 2016; Savikko *et al.*, 2005; Buecker *et al.*, 2020). Phenomenological studies have emphasized that loneliness is experienced not only as a cognitive and emotional state but also as an embodied phenomenon, with individuals describing feelings such as "loneliness of the heart" and "feeling cold" (Smith, 2012; Sullivan, Victor, & Thomas, 2016).

The interventions reviewed in this paper further demonstrate that diverse approaches can reduce loneliness, although their outcomes vary depending on the targeted domain and method of delivery. Online programs such as the Friendship Enrichment Program have shown promising reductions in loneliness when measured using multi-item scales (Bouwman *et al.*, 2016), whereas mindfulness-based interventions, as exemplified by the MBSR program, have yielded both psychological and physiological benefits (Creswell *et al.*, 2012). Similarly, technology-based systems like the PRISM system improve perceived social support and digital self-efficacy (Czaja *et al.*, 2016), and culturally based group activities have been linked to improved physical health, morale, and reduced loneliness (Cohen *et al.*, 2006). Companion animal ownership and volunteering are additional strategies that offer protective benefits against the adverse effects of social loss and physical disability (Carr *et al.*, 2019). This review also underscores the value of theoretical frameworks in contextualizing loneliness. The Social Relationship Expectations Framework posited by Akhter-Khan *et al.* (2022) offers a novel perspective by emphasizing that loneliness may result from unmet expectations for meaningful social engagement. Moreover, meta-reviews and systematic evaluations of social prescription interventions suggest that participatory and adaptable approaches yield better outcomes

across social, mental, and physical health domains (Paquet *et al.*, 2023; Gardiner *et al.*, 2016).

Despite the considerable advances in our understanding of loneliness, gaps remain. There is limited evidence regarding the long-term effectiveness of many interventions, and further research is needed to examine macro-level interactions among individual, social, and structural factors. In particular, standardized measurement approaches and robust longitudinal designs are required to untangle the causal pathways that underpin loneliness in later life. Additionally, interventions employing digital technologies must address issues of digital literacy and accessibility to achieve sustainable benefits (Gunnes *et al.*, 2024; Francis *et al.*, 2019). In conclusion, this review uniquely integrates quantitative, qualitative, and intervention-based research to offer a holistic framework for understanding the causes, experiences, and potential strategies to alleviate loneliness among older adults. The evidence strongly suggests that multifaceted, contextually tailored interventions are necessary to effectively mitigate loneliness. Future research should prioritize long-term evaluations, standardization of assessment tools, and explorations into the macro-level determinants of loneliness, thereby informing more targeted public health strategies and policies.

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