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Loneliness as an interface between Alzheimer's disease and suicide: A systematic review, meta-analysis, and factor analysis

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We use this protocol and it's working

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Abstract

Following the PRISMA methodology(1), the defined papers' titles and abstracts are eligible and non-restricted languages without time limits. Furthermore, it was systematically identified by searching electronic databases Embase [Emtree - Major Focus Exp.], Pubmed [Mesh Terms], Lilacs - Complete collection of the Virtual Health Library [Title/abstracts], 医中誌 (Ichushi) Web, 知网 (CNKI), 万方 (Wanfang Data) and 维普 (VIP)

Protocol of the Systematic Review

- 1 This work follows this protocol.

Loneliness as an interface between Alzheimer's disease and suicide: A systematic review and meta-analysis

2 1. Introduction:

In today's rapidly advancing and intricately interconnected world, the pervasive issue of loneliness has come to the forefront, casting a daunting shadow over the overall well-being of countless individuals. This deep-rooted sense of isolation not only manifests as an alarming feeling of despair but is also intricately intertwined with a broad spectrum of mental health disorders, creating a complex web of emotional distress (1). The staggering surge in suicide rates serves as a poignant reminder of the severe repercussions of loneliness, emphasizing the urgent need for compassionate and effective supportive measures (2).

Furthermore, the unsettling uptick in neurodegenerative conditions, including Alzheimer's disease, adds another layer of complexity to this troubling landscape. It starkly illustrates how intricately connected our emotional well-being is to our cognitive health, underscoring the importance of addressing these challenges holistically (3). To navigate this intricate and multifaceted problem effectively, it is essential to dive deep into the nuanced relationship between loneliness and various mental health challenges. This in-depth exploration will enable the development of more precise interventions and comprehensive support systems that are thoughtfully tailored to meet the diverse needs of those grappling with these issues. By uncovering the underlying factors and connections, we can cultivate environments that foster genuine connections, empathy, and support, ultimately guiding individuals toward a path of healing and resilience amidst the challenges of modern life (4).

3 2. Objectives:

This study aims to search for the commonalities between Alzheimer's disease and suicide. Specifically, the objectives are:

- 3.1 To systematically review and synthesize the evidence on the association between loneliness and suicidal behavior in adult populations.
 - To systematically review and synthesize the evidence on the association between loneliness and Alzheimer's disease in adult populations.

- To identify common factors associated with loneliness in both suicidal behavior and Alzheimer's disease through exploratory factor analysis of extracted data.
- To conduct meta-analyses, where feasible, to quantify the overall effect sizes of the associations between loneliness and suicidal behavior and insomnia and Alzheimer's disease, separately.

To explore potential shared mechanisms and pathways through which loneliness may contribute to both suicidal behavior and Alzheimer's disease, based on the synthesized evidence.

4

3. Methods:

3.1. Study design

This study proposes to investigate the loneliness associated with suicide or Alzheimer's disease. This systematic review follows the PRISMA methodology (5).

3.2. Selection criteria

This review was systematized in a dichotomous manner. Therefore, two systematic reviews were initially carried out. In one, the search terms to Embase, Lilacs and Pubmed included "suicide" OR "suicidal behavior" OR "suicidal ideation" OR "suicide attempt" AND "loneliness". In Ichushi Web the following descriptor were uses: "自殺" OR "自殺未遂" OR "自殺念慮" OR "自殺既遂" OR "自殺行動" AND "孤独" OR "社会的孤立". For Chinese databases the following descriptors were used: "自杀" OR "自杀行为" OR "自杀意念" OR "自杀未遂" AND "孤独" OR "孤独感". In the CNKI database, logical operators such as "", "+", and "-" are used in place of "AND", "OR", and "NOT". Consequently, the search query was modified to: (自杀 + 自杀行为 + 自杀意念 + 自杀未遂) * (孤独 + 孤独感). For Wanfang Data and VIP databases, the query used was "M=(自杀 OR 自杀行为 OR 自杀意念 OR 自杀未遂) AND M=(孤独 OR 孤独感)" where "M" specifies a search within titles and keywords. The PECOS strategy was specified with the following terms: Population (P) = individuals; exposure (E) = loneliness; comparison (C) = without loneliness; outcome (O) = suicide; and study design(S) = all kinds of studies with an association between loneliness and suicide.

In the second group to review, the search terms to Embase, Lilacs and Pubmed included "alzheimer" OR "alzheimer's" OR "alzheimer's disease" AND "loneliness" (Embase Emtree - Major Focus Exp. "alzheimer" AND 'loneliness'). In Ichushi Web the following descriptor were uses: "Alzheimer病" OR "アルツハイマー" OR "認知症" AND "孤独" OR "社会的孤立". For Chinese databases the following descriptors were used: In the CNKI database, the query used was (阿尔兹海默症 + 阿尔兹海默病 + 阿尔茨海默氏症 + Alzheimer + 老年痴呆症 + 痴呆症) * (孤独 + 孤独感). For Wanfang Data and VIP databases, the query used was "M=(阿尔兹海默症 OR 阿尔兹海默病 OR 阿尔茨海默氏症 OR Alzheimer OR 老年痴

呆症 OR 痴呆症) AND M=(孤独 OR 孤独感)".The PECOS strategy was specified with the following terms: Population (P) = individuals; exposure (E) = loneliness; comparison (C) = without loneliness; outcome (O) = Alzheimer's disease; and study design(S) = all kinds of studies with an association between loneliness and suicide.

3.3. Search Strategy

Following the PRISMA methodology the defined papers' titles and abstracts are eligible and non-restricted languages without time limits. Furthermore, it was systematically identified by searching electronic databases Embase [Emtree - Major Focus Exp.], Pubmed [Mesh Terms], Lilacs - Complete collection of the Virtual Health Library [Title/abstracts], 医中誌 (Ichushi) Web, 知网 (CNKI), 万方 (Wanfang Data) and 维普 (VIP) in November 2024.

3.4. Data extraction

The data will be extracted into two tables describing loneliness-related factors. Factors associated with insomnia in the two parallel reviews will be compared through exploratory factor analysis to identify and extract commonalities.

Data extraction will be performed independently by two reviewers using a pre-piloted, standardized data extraction form. Discrepancies will be resolved through discussion and consensus or with arbitration by a third reviewer.

3.6. Analysis

After a systematic review of the two groups, it was made a factor analysis to understand better how loneliness could be understood with the interface between suicide and Alzheimer's Disease.

The data was entered into Excel tables to observe its distribution and similarity. Those that demonstrate the possibility of comparison were separated to perform meta-analysis. Statistical calculations were performed using IBM Corp. Released 2023, Version 29 Armonk, NY: IBM Corp.

5 4. Dissemination

The findings of this systematic review will be disseminated through:

6 . Publication in a peer-reviewed, internationally recognized journal indexed in PUBMED. We will target journals with a focus on loneliness, psychiatry, neurology, or public health.

- **Preprint server deposition.** We will consider posting a preprint of the manuscript on a recognized preprint server (e.g., medRxiv, bioRxiv) to facilitate rapid dissemination of findings.

- **Conference presentations.** We will present the findings at relevant national and international conferences.

7

Project Timeline

This systematic review started in October 2024 and will be finished in July 2025.

8

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