

## REVIEW

# A systematic review of psychosocial protective factors against suicide and suicidality among older adults

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## ABSTRACT

**Background:** Research on suicide rarely focuses on protective factors. The goal of this systematic review was to assess the evidence of the associations between protective factors and reduced suicidality among older adults.

**Method:** First, a scoping review was conducted to identify pertinent terms that refer to various protective factors against suicidality. A systematic review, following the PRISMA guidelines, was then conducted on a selection of 15 protective factors (e.g., perceived control, well-being and quality of life, life satisfaction, purpose-in-life, resilience, coping, religiosity, hope, self-regulation, sense of belonging, mattering, positive relationship, social support, social connectedness, and social participation), with separate searches performed on each factor in five databases. Empirical studies were eligible if participants were adults aged 60 years and over, and if the studies reported predictive statistical analysis.

**Results:** A total of 70 studies were retained for the review. Suicidal ideation was the main outcome measure (91%). Significant associations were consistently observed between all protective factors and reduced suicidal ideations or behaviors, particularly for purpose-in-life, resilience, and positive relationships, indicating that these are solid components for suicide prevention. Using scales, instead of a single item, to measure protective factors (e.g. life satisfaction) was more efficient to capture the associations. On the other hand, results were similar whether studies used subjective (e.g., sense of belonging) or objective (e.g., social connectedness) measures.

**Conclusion:** Protective factors were inversely associated with suicidal ideation. Improving protective factors is essential for the development of late-life suicide prevention and interventions, instead of merely focusing on risk factors.

**Key words:** protective factors, suicidal behavior, suicidal ideation, purpose-in-life, resilience, social support, interpersonal relationships, coping

## Introduction

Global suicide rates are highest among older people (De Leo, 2022; The Institute for Health Metrics and Evaluation, 2019). In 2019, the suicide rate for people aged 70 and over was 24.5 per 100,000 inhabitants and 14.25 for people aged 50–69 (The Institute for Health Metrics and Evaluation, 2019),

while it was 9.4 per 100,000 inhabitants, all ages combined. Moreover, suicide rates in older adults increase in each of the 5-year age-bands between the ages of 60–64 years and 90–94 years, for both men and women (Shah *et al.*, 2016). For example, data available from 25 countries showed that the rates of suicide in men increased from 34.7 in the 60–64 age-band to 68.6 in the 90–94 age-band, while in women they increased from 9.8 to 14.8 in the respective age-band (Shah *et al.*, 2016). With the aging of the population, research on suicide in older adults should be the subject of numerous studies, yet this topic is strongly neglected (Okolie *et al.*, 2017). In addition, the suicide of a senior has significant

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repercussions on relatives, who may come to consider death as a possible solution when they have to face the hardships or challenges associated with their own aging (Michaud-Dumont *et al.*, 2020). Therefore, it is important to examine factors that could help prevent suicide in older adults. Three systematic reviews were published recently on risk factors associated to suicide in old age (Barker *et al.*, 2022; Beghi *et al.*, 2021; Fernandez-Rodrigues *et al.*, 2022). However, to our knowledge, there are no reviews examining protective factors of suicide among the older population.

For older adults, talking about death may be part of their preparation for the end of their life (Tjernberg and Bökberg, 2020). Therefore, in research on suicide, it is necessary to distinguish between normal thoughts about death, and “suicidality” (Jonson *et al.*, 2023; Keefner and Stenvig, 2021). Suicidality refers to a broad scope of concepts that extend from suicidal ideation to suicidal behaviors (planning, suicidal attempt, or suicide). Suicidal ideation (SI) is conceptualized as varying along a continuum from passive suicide ideation (PSI), including life-weariness (feeling that life is not worth living) and wish to die (would rather be dead/be better off dead), to active suicide ideation (ASI), which refers to thoughts of and intention to end one’s life (Harmer *et al.*, 2023; Jonson *et al.*, 2023). Unfortunately, SI has no consistent operational definition which is often mentioned as a limitation in meta-analyses associated with suicidality (Berman and Silverman, 2017; Harmer *et al.*, 2023). Nonetheless, in older adults, PSI usually appears in conjunction with psychological distress and is associated with an increased risk of suicide, even in the absence of depression (Van Orden *et al.*, 2015). Since older adults are less inclined to express ASI and to seek mental health services, and that the majority of them die on their initial attempt, PSI deserves special attention (Harmer *et al.*, 2023).

Research on suicide in older adults report many risk factors (Conejero *et al.*, 2018), but the complex interactions between factors make it difficult to predict suicidal behaviors in a given person. Depression is clearly the major risk factor for suicidal behavior as well as social disconnection and interpersonal difficulties (Bernier *et al.*, 2020; Fässberg *et al.*, 2012) or chronic diseases, pain, and functional limitations (Fässberg *et al.*, 2016). The effect of ageism should not be overlooked; indeed, results show that elderly people who experienced discrimination because of their age were 2.26 times more at risk of having ASI than those who had not experienced it, even after controlling for socio-demographic characteristics, health status, and the presence of depressive symptoms (Kim and Lee,

2020; Ko *et al.*, 2021). Nonetheless, Hawton’s *et al.* (2022), as well as Cramer and Tucker (2021), stated that risk prediction measures are ineffective and that an assessment centered on protective, dynamic (changeable or modifiable), anticipated factors is needed to devise collaborative treatment plans.

Moreover, in the last 10 years, most intervention programs focused on reducing risk factor, especially depression or isolation (Laflamme *et al.*, 2022; Lapierre *et al.*, 2011; Okolie *et al.*, 2017; Wallace *et al.*, 2021; Zeppego *et al.*, 2018). Only a few researchers have attempted to develop programs focusing on protective factors, such as meaning in life (Heisel *et al.*, 2020; Heisel *et al.*, 2015), hope (Hernandez and Overholser, 2021), and the realization of personal projects (Lapierre *et al.*, 2017; Lapierre *et al.*, 2007). However, research on protective factors in the older population is still scarce and there is a need for a systematic up-to-date review of the quantitative studies (Cramer and Tucker, 2021). The objective of this present study is to synthesize knowledge on protective factors and to examine their predictive associations with a reduced suicide risk in older adults.

## Method

### Conceptualization of protective factors

In the current study, a protective factor is viewed as a positive psychology construct, and is defined as a resource, an attribute, or an ability that protects the individual from SI and suicidal behaviors. Many studies are using concepts that negatively mirror protective factors (e.g., social disconnectedness, social isolation, and hopelessness). These negative words were not searched because the objective of this review was to find features that can improve the lives of individuals and counteract the negative influence of risk factors. Nonetheless, studies were retained if the authors chose to present the results on protective factors using a negative formulation.

This systematic review is investigating only psychosocial variables. Therefore, studies considering physical health (health-related quality of life) or demographic characteristics, such as religious affiliation, civil and marital status, family structure, and presence of children, grandchildren, or siblings, were not included in order to focus on an individual’s social and psychological functioning. Protective factors related to governmental, organizational, and social policies, programs, or services were not included, although it is clear that the variability of protective factors is closely linked to these macro systems.

One difficulty when conceptualizing the protective factors lies in the unclear demarcation between the factors. Most are inter-related and share a common root. Therefore, even if researchers are using the same name for a protective factor, they often measure different concepts or dimensions. Nonetheless, we identified 15 psychosocial protective factors (details follow below) classified as either intrapersonal or interpersonal. Intrapersonal factors refer to one's inner perceptions or attitudes. Interpersonal factors stem from interrelations with people and community. Interpersonal characteristics are usually classified into structural and functional aspects. Structural support refers to the extent to which an individual is connected within a social network (often assessed objectively), while functional support corresponds to the role provided by the network and is usually measured by the subjective perception of the help available. Thus, we tried to distinguish between subjective and objective measures of interpersonal factors, although it is sometimes difficult because variables, such as social support, are often defined in terms of both quantity (objective) and quality (subjective) of interrelations.

### Search and selection procedures

An a priori protocol was developed and registered on PROSPERO for registration of systematic reviews (CRD42022377759). The search procedure was conducted in two steps. First, selection of protective factors was made by conducting a scoping review of relevant studies to look for pertinent search terms. It was conducted using broad terms such as “protective factors”, based on combinations of keywords (#1 (suicide) + #2 (elderly) + #4 (protective factors) as in Supplementary Table 1) in five databases (PubMed, EMBASE, Cochrane, SocINDEX, and PsycINFO). It provided a total of 15 protective factors, that represented general dimensions that were included for the review: perceived control, well-being and quality of life, life satisfaction, purpose-in-life, resilience, coping, religiosity, hope, self-regulation, sense of belonging, mattering, positive relationship, social support, social connectedness, and social participation.

In the second step, searches were conducted for each factor using specific search terms (#1 + #2 + #3 (specific protective factor) in Supplementary Table 1) in the five previously mentioned databases. Peer-reviewed journal articles met the inclusion criteria if the published study had a population/sample of older adults aged 60+, living in the community or in residential care facilities. No restrictions were made on language, country, or publication year. Case reports,

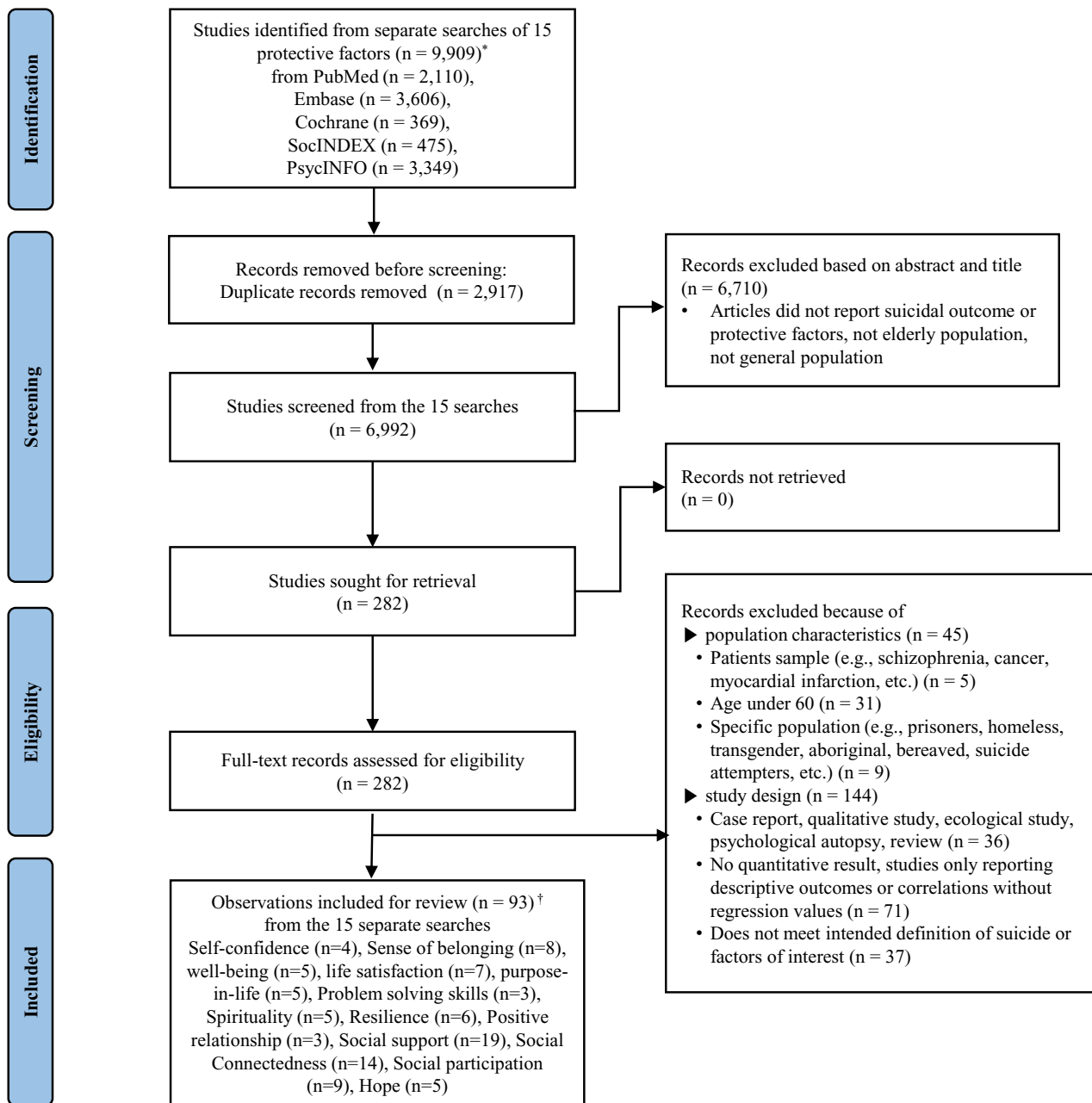
dissertations, psychological autopsies, qualitative-, ecological- and descriptive studies were excluded, as these designs do not provide quantitative estimates of the associations (e.g., the strength of association between protective factors and suicide ideation). Intervention studies were also excluded if they had multimodal components because it would be impossible to identify the influence of a particular protective factor. Also, studies involving specific populations (e.g., suicide attempters, abused or bereaved older adults, patients' sample, transgender, aboriginal people, or prisoners) were excluded, due to the limitation of generalizability. The selection procedure was carried out independently by two researchers. When there was a disagreement, a third party was involved to resolve it.

Evidence was collected about study population, design, measures, outcomes, and findings. When SI was measured using a single item, a further distinction was made between PSI and ASI. If the item covered statements such as ‘would be better off dead’ (‘rather be dead’, ‘wish to be dead’ or ‘tired of living’), it was classified under PSI, while items representing thoughts about ‘ending one's life’ (‘killing oneself’ or ‘taking one's life’), were classified under ASI. Data were extracted by two reviewers who were assigned to each protective factor to increase accuracy. Given the wide range of methodologies and variables in the included studies, we narratively summarized patterns of findings. The reviewers independently assessed the methodological quality of the studies using the NIH quality assessment tool (NIH, *n.d.*) for cohort and cross-sectional studies (14 criteria), and case-control studies (12 criteria). The quality of each study was assessed with a summary score ranging from 1 to 14 or from 1 to 12, according to their respective design, which was then transformed into a percentage, that led to one of three grades: Poor (<50%), Fair (50–74%), Good ( $\geq 75\%$ ) (Supplementary Table 4-1 and 4-2).

## Results

### Study selection

The literature search yielded 9,099 reports from the 15 separate searches of the five databases. After 2,917 duplicates were removed, screening on title and abstract excluded 6,710 papers, leaving 282 studies. On reading the full text, 189 studies were found to be ineligible, the most common reason for being removed was that they were no predictive analyses or available estimates of the association. The PRISMA flowchart (Figure 1) summarizes each step and provides further details on reasons for



**Figure 1.** PRISMA flow diagram. \*The literature search yielded 9,909 studies in total for 15 protective factors from the five databases. <sup>†</sup>The 93 results were selected from 70 papers.

exclusion. A total of 70 studies were retained, and results were summarized on 13 protective factors (See Supplementary Table 2 for the selection process of an individual factor). Searches on two factors, mattering and self-regulation, did not lead to any findings. Since many studies ( $n = 18$ ) examined more than two protective factors simultaneously, the analysis was done on a total of 93 different observations/results (see the summary of results in Table 1). Each of the 13 factors is presented individually under one of the main categories:

intrapersonal ( $n = 40$  observations) or interpersonal protective factors ( $n = 53$  observations).

### Study characteristics

Heterogeneity of these quantitative studies was high and the majority ( $n = 59$ ) were cross-sectional in design and used representative samples ( $n = 42$ ) (see Supplementary Table 3 for characteristics of included studies). There was an increasing trend over time in the number of studies on protective factors; 36% ( $n = 25$ ) were carried out recently (in

2020 or after). Most studies were conducted in Asia ( $n = 38$ ) and North America ( $n = 14$ ), while some were conducted in Europe ( $n = 4$ ), Oceania ( $n = 7$ ), and the Middle East ( $n = 6$ ), but only one in Africa, and one in South America. A substantial number ( $n = 20$ ) had small samples ( $<300$  participants), especially those examining intrapersonal factors, such as purpose-in-life and hope. Larger samples ( $>300$ ) were more often used for interpersonal protective factors, with the exception of sense of belonging. Only a few recruited older adults living in residential care facilities. Quality assessment scores indicated that most studies ( $n = 61$ ) were rated as fair and only five studies were of good quality, while four were rated as poor. The details of the assessment and the assigned score to each study are provided in the Supplementary Tables 4-1 and 4-2.

Measurement scales were frequently used to assess intrapersonal factors (77%; 31/40). However, scales were not commonly used to measure religiosity, social connectedness, and social participation. Only a small number of studies ( $n = 6$ ) used deaths by suicide, suicidal attempts or deliberate self-harm as an outcome variable; the majority examined SI. For the latter, many studies ( $n = 35$ ) used a single item to assess PSI or ASI or both (e.g. Bernier *et al.*, 2020; Liu *et al.*, 2014). Studies ( $n = 29$ ) also used validated scales, such as the *Geriatric Suicide Ideation Scale* (GSIS) or the *Beck Suicidal Ideation Inventory*, to assess SI. The majority of studies looking at the intrapersonal factors used a scale to measure SI but, for interpersonal factors, the use of a single item was more common.

Overall, associations with SI and suicidal behaviors were consistently observed for all protective factors. The proportion of significant associations was larger for intrapersonal factors (73% = 29/40) compared to interpersonal factors (51% = 27/53). The overall status of association was partly affected by types of measurement (scale vs single item) used to access each protective factor. The use of scales, instead of a single item, to measure protective factors was more efficient to capture the associations. It was clearly the case for studies on life satisfaction, which showed highly consistent associations with suicidality when utilizing the *Satisfaction with life scale* compared to a single question approach.

The variation of associations by study design, sample size, or the quality level of the studies were not particularly obvious. Studies conducted in Asia (15/17) and in the Middle-East (3/4) consistently showed significant associations between intrapersonal factors and suicidality, while the results were less consistent in Western countries: nine studies

showed significant associations, but four studies respectively showed mixed or non-significant associations. Though limited in number, all three studies that included a sample of persons over 70, were significant.

### **Intrapersonal protective factors**

Even if the majority of studies focused on interpersonal factors, the included studies identified 13 different intrapersonal variables that are considered potential protective factors against suicidality: perceived control, self-efficacy, self-esteem, well-being, quality of life, life satisfaction, happiness, purpose-in-life, resilience, coping, religiosity, hope, and self-forgiveness. Surprisingly, there were no studies on self-regulation, even if the literature considers that the ability to control impulsive behaviors and deal with emotional pain is an important factor for suicide prevention (Turton *et al.*, 2021). The associations of intrapersonal factors with SI were more evident when PSI was used as an outcome (i.e. two out of three studies were significant), compared to ASI (three out of nine studies were significant).

Since suicide prevention has to take into consideration various components simultaneously, some studies looked at the interactions between variables, examining the moderating or mediating effects of protective factors on suicidality or testing conceptual models. For example, purpose-in-life was found to be a moderator between hopelessness and PSI such as this association was significant when meaning in life was low, but not when meaning in life was average or high (Beach *et al.*, 2021). Purpose-in-life also came out as a mediator between internal locus of control and risk for suicide, so that a more internal control was associated to higher purpose-in-life, which in turn was related to lower risk for suicide (Aviad and Cohen-Louck, 2021). Meanwhile, all studies showed that people who think that their life is meaningful were less likely to score highly on the SI scale. Therefore, purpose-in-life seems to be an important protective factor for older adults. As for hope, although it is more often studied in a negative way (hopelessness), it seems to be a protective factor against SI since 4 out of 5 studies showed significant associations.

Seven studies investigated life satisfaction/happiness, and five examined psychological well-being/quality of life. All results were in the expected directions; however, most studies presented them in a negative way, looking at dissatisfaction, poor quality of life, or unhappiness instead of the positive side. As for psychological well-being (PWB), when depression and number of perceived health

problems were entered as covariates in the regression, its predictive strength disappears, while purpose-in-life remained significantly associated with decreased SI (Heisel and Flett, 2008). It should be mentioned that a global score of PWB was used in the regression even if the multidimensional model of well-being, assessing six dimensions (autonomy, environmental mastery, personal growth, positive relations with others, purpose-in-life, and self-acceptance), is considered better than the single-factor model (Ryff and Keyes, 1995). It would have been interesting to see which dimensions were associated with lower SI, but the researchers did not have enough participants to include each of them in the regression.

There were interesting findings related to coping. Even if one of the three studies of this protective factor showed that older adults who were using adaptive coping strategies (religious coping, acceptance, active coping, and positive reframing) exhibited less SI (Ahn and Kim, 2015), the other two noted that problem-focused coping (managing or altering the circumstance that is causing distress) was not a significant predictor, indicating that it may be less relevant for older adults. As for emotion-focused coping, the associations with SI vary according to the strategies that were assessed for regulating the emotional response to distress. Marty *et al.* (2010) found that emotion-focused coping (seeking emotional support, positive reinterpretation, acceptance, humor, and turning to religion) was a protective factor against SI, while Yoon *et al.* (2022) found the opposite results with other emotion-focused coping strategies (self-distraction, behavior disengagement, denial, self-blame and venting). Therefore, as Marty *et al.* (2010, p. 1021) stated “simplistic distinction between problem- and emotion-focused coping is not adequate.” The distinction between diverse emotion-focused coping strategies may be especially important for older adults for whom there is often nothing that can be done to actually change the circumstances related to ageing. As for perceived control, a higher level was associated with lower odds of PSI and ASI, and risk of suicide. Interestingly, in a longitudinal study, changes in perceived control were predicting changes in PSI: improving control reduced SI, and decline in control increased it (Stolz *et al.*, 2016). It should be noted that among the six studies on resilience, five showed a significant protective association against SI.

Results on the predictive effect of religiosity are inconsistent. Although, Nishi *et al.* (2017) found an inverse association with SI in participants who give importance to their religious beliefs and attend religious services frequently, Heisel and Flett (2008) found a positive association. The authors suggested

that older adults experiencing higher levels of SI are more likely to turn to fervent religious observance for help than older adults who are less suicidal.

### Interpersonal protective factors

Among the 53 observations compiled on interpersonal factors (see Table 1), the majority ( $n = 26$ ) reported a significant association, but a substantial number did not ( $n = 18$ ), or presented mixed results ( $n = 9$ ). It is interesting to note that both the functional aspects (sense of belonging, positive relationship or social support) and the structural aspects (social connectedness or social participation) showed similar level of associations. When scales were employed to measure SI, significant associations were notable throughout the interpersonal factors ( $76.5\% = 13/17$ ) and these associations were similar, regardless of the outcome measure used (PSI or ASI).

First, it should be noted that there was no study on mattering, the human need to feel significant for others (Flett, 2018). This suggests that this is an under-researched area. There were eight eligible studies regarding sense of belonging. All studies used the *Interpersonal Needs Questionnaire* to measure the association with SI or suicidal behaviors. Five studies reported a significant relationship, but three did not. Among eligible studies, the study with the largest number of participants ( $n = 669$ ) by McLaren *et al.* (2015) showed that there was a significant association between sense of belonging and SI ( $\beta = -0.007$  (0.01),  $p < .001$ ).

Three studies examined the association between positive relationships and suicidality. There was heterogeneity in terms of type of protective factor and outcome measures; one study looked at the association between having a confidant and PSI (Bernier *et al.*, 2020), another at the relation between interpersonal trust and ASI (Yu *et al.*, 2019), and the third, at positive relationships and intentional self-harm (Neufeld *et al.*, 2015). Among these studies, the presence of a confidant did not protect against PSI, when social participation, satisfaction with social life, and closeness to others were covariates (Bernier *et al.*, 2020).

There were 19 studies on social support. All studies used a form of scale to measure social support, while outcome measures were mostly confined to a single item of SI with only five studies using a scale (Almeida *et al.*, 2012; Liu *et al.*, 2018; Shiraly *et al.*, 2022; Vanderhorst and McLaren, 2005; Won *et al.*, 2021). Compared to other protective factors, social support showed the least consistent results in terms of significant associations (10/19 studies), probably because relying on support from others can diminish older adults' sense of

**Table 1.** Summary of the included studies in the review on protective factors and suicidality

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
<b>Intrapersonal protective factors</b>						
<i>Perceived control</i>						
Liu <i>et al.</i> (2023) (China)	C-S	N = 538 (≥ 60, Female = 59.7%), Nursing home residents	Rosenberg Self-Esteem Scale (RSES). 10 items.	Beck Suicidal Ideation Inventory-(Chinese Version)	$\beta$ (SE) = -0.102 (0.043), $p < 0.05$	Fair
Aviad and Cohen-Louck (2021) (Israel)	C-S	Convenience sample, N = 195 (≥ 65, Female = 63.1%)	Locus of control questionnaire. 12 items.	The Israeli index of potential suicide (IIPS)	$\beta$ (SE) = -0.07(0.10), (not significant)	Poor
Stolz <i>et al.</i> (2016) (Europe, 12 countries)	Cohort (f/u = 2yrs)	N = 6791 (≥ 75, Female = 57.6%)	Perceived control measured by additive index from the Control, Autonomy, Self- realization, and Pleasure scale (CASP-12)	Passive suicide ideation (1 item) (1M) (PSI)	OR (95%CI) = 0.86 (0.81, 0.91)	Fair
Malfent <i>et al.</i> (2010) (Austria)	C-S	Convenience sample, N = 129 (≥ 60, Female = 82.9%), Care home resident	Inventory for the Measurement of Self-efficacy and Externality (I-SEE)	Suicide ideation (1M) (ASI)	OR (95%CI) = 0.93 (0.87, 1.00), $p = 0.044$	Fair
<i>Well-being: quality of life</i>						
Chen <i>et al.</i> , 2022 (China)	Matched C-C	N = 484 (≥ 60, Female = 44.2%)	Quality of Life (6 items)	Suicide death	$\beta = -0.141$ ( $p < 0.01$ )	Fair
Erlangsen <i>et al.</i> (2021) (Australia)	Cohort (f/u = 12yrs)	N = 102,880 (≥ 65, Female = 48.3%)	Quality of life (1 item).	Suicide death & Deliberate Self Harm	1. Suicide death: Fair QOL: IRR (95% CI) = 3.21 (2.01, 5.14); Poor QOL: IRR (95%CI) = 4.27 (1.70, 10.72) 2. Deliberate self-harm: Fair QOL: IRR (95%CI) = 2.24 (1.54, 3.25); Poor QOL: IRR (95%CI) = 4.90 (2.69, 8.93)	Fair
Lee <i>et al.</i> (2019) (Korea)	C-S	N = 266 (≥ 70, Female = 69.9%)	Modified QOL Scale (20 items)	Suicide ideation scale (5 items)	$\beta$ (SE) = -0.2193 (0.0734), $p = 0.0031$	Fair
Kim <i>et al.</i> (2014) (Korea)	C-S	N = 684 (≥ 65, Female = 78.51%)	Korean Psychological Wellbeing Scale (18 items)	Beck scale for suicide ideation (Korean version)	$\beta = -0.074$ ( $p < 0.05$ )	Fair
Heisel and Flett (2008) (Canada)	C-S	Convenience sample, N = 107 (≥ 65, Female = 76%)	Ryff's Scales of Psychological Well-Being (SPWB)	Geriatric Suicide Ideation Scale total scores minus the meaning in life item (GSIS-TOT)	$B$ (SE) = -0.17 (0.15), $p = 0.261$	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
<i>Life satisfaction</i>						
Erlangsen <i>et al.</i> (2021) (Australia)	Cohort (f/u = 12yrs)	N = 102,880 (≥ 65, Female = 48.3%)	Satisfaction with one's achievement (y/n)	Suicide death & Deliberate Self Harm	1. Death by suicide: Achieved less: IRR (95%CI) = 1.35 (0.87, 2.08); 2. Deliberate self-harm: Achieved less: IRR (95%CI) = 1.76 (1.29, 2.40)	Fair
Won <i>et al.</i> (2021) (Korea)	C-S	Convenience sample, N = 1,375 (≥ 60, Female = 66.8%)	Korean version of the Satisfaction with Life Scale (KSWLS)	Suicidal Behaviors Questionnaire-Revised (SBQ-R)	$\beta$ (SE) = - 0.353 (0.077), $p < 0.001$	Fair
Foroughan <i>et al.</i> (2021) (Iran)	C-S	Convenience sample, N = 159 (≥ 60, Female = 49.7%)	Life Satisfaction Index-Z (LSIZ)	Beck Scale for Suicidal Ideation (BSSI)	$\beta$ (SE) = - 0.334(0.077), $p < 0.01$	Fair
Lu <i>et al.</i> (2020) (China)	C-S	N = 3148 (≥ 60, Female = 57.1%)	Satisfaction with Life Scale (SWLS)	Suicide ideation (I2M) (ASI)	1. Male: OR (95%CI) = 0.98 (0.95, 1.01); 2. Female: OR (95%CI) = 0.97 (0.95, 1.00)	Fair
Ramírez Arango <i>et al.</i> (2020) (Colombia)	C-S	N = 1,514(expanded to 557,285), (≥ 60, Female = 58.2%)	Satisfaction with quality of life (1 item); Happiness (1 item)	Suicide ideation (NS) (ASI)	1. Dissatisfied: OR (95%CI) = 1.19 (0.60, 2.36); 2. Unhappy: OR (95% CI) = 1.186(0.70, 4.94)	Fair
Yilmaz and Karaca (2020) (Turkey)	C-S	Convenience sample N = 323 (≥ 60, Female = 53.6%)	Dissatisfaction with life of Geriatric Depression Scale (GDS)	Suicide Probability Scale (SPS)	Dissatisfaction: OR (95%CI) = 2.63 (1.54, 4.50)	Fair
Ge <i>et al.</i> (2017) (China)	C-S	N = 3,313 (≥ 60, Female = 55.8%)	Life satisfaction (1 item)	Suicide ideation (lifetime) (ASI)	OR (95%CI) = 0.55 (0.34, 0.91)	Fair
<i>Purpose in life</i>						
Aviad and Cohen-Louck (2021) (Israel)	C-S	Convenience sample N = 195 (≥ 65, Female = 63.1%)	Purpose in life test (PIL)	The Israeli index of potential suicide (IIPS)	$B$ (SE) = - 0.73 (0.05), $p < 0.001$	Poor
Beach <i>et al.</i> (2021) (USA)	C-S	Convenience sample N = 243 (≥ 60, Female = 59.3%)	Meaning in life subscale from GSIS	Death ideation subscale from GSIS (GSIS-DI)	$B$ (SE) = - 0.25(0.044), $p = 0.001$	Fair
Heisel and Flett (2016) (Canada)	Cohort (f/u = 1yr)	Convenience sample N = 126 (≥ 60, Female = 71.0%)	Purpose in life test (PIL), Experienced Meaning in Life scale (EMIL)	Geriatric Suicide Ideation Scale total scores minus the meaning in life item (GSIS-TOT)	1. EMIL: $\beta$ (SE) = - 0.16(0.04), $p = 0.031$ ; 2. PIL: $\beta$ (SE) = - 0.46(0.06), $p < 0.001$	Good
Heisel <i>et al.</i> (2016) (Canada)	Cohort (f/u = 1yr)	Convenience sample N = 126 (≥ 60, Female = 73.4%)	Reasons for living (RFL-OA), Experienced Meaning in Life scale (EMIL)	Geriatric Suicide Ideation Scale (GSIS)	1. RFL-OA: $\beta$ (SE) = - 0.04(0.02), $p = 0.678$ ; 2. EMIL: $\beta$ (SE) = - 0.39(0.06), $p < 0.001$	Good



**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Heisel and Flett (2008) (Canada)	C-S	Convenience sample <i>N</i> = 107 ( $\geq 60$ , Female = 76.0%)	Meaning in life (MIL)	Geriatric Suicide Ideation Scale total scores minus the meaning in life item (GSIS-TOT)	$\beta(\text{SE } B) = -0.25 (1.57), p = 0.002$	Fair
<i>Resilience</i>						
Liu <i>et al.</i> (2023) (China)	C-S	<i>N</i> = 538 ( $\geq 60$ , Female = 59.7%), nursing home residents	Connor-Davidson Resilience Scale-10 item (CD-RISC-10)	Beck Suicidal Ideation Inventory (Chinese Version)	$\beta(\text{SE}) = -0.173 (0.048), p < 0.001$	Fair
Yang <i>et al.</i> (2021) (China)	C-S	<i>N</i> = 538 ( $\geq 60$ , Female = 59.7%), nursing home residents	Connor-Davidson Resilience Scale-10 item (CD-RISC-10)	Beck Suicidal Ideation Inventory (Chinese Version)	$B(\text{SE}) = -0.124 (0.049), p < 0.001$	Fair
Zhang <i>et al.</i> (2021) (China)	C-S	<i>N</i> = 538 ( $\geq 60$ , Female = 59.7%), nursing home residents	Connor-Davidson Resilience Scale-10 item (CD-RISC-10)	Beck Suicidal Ideation Inventory (Chinese Version)	$B(\text{SE}) = -0.154 (0.051), p < 0.01$	Fair
Cha and Lee (2018) (Korea)	C-S	Convenience sample <i>N</i> = 201 ( $\geq 65$ , Female = 62.2%)	Korean version of the Ego-Resilience Scale; 14 items	Scale for Suicidal Ideation (5 items, Korean version)	$\beta(\text{SE}) = -0.26 (0.05), p = 0.004$	Fair
You and Park (2017) (Korea)	C-S	<i>N</i> = 2,034 ( $\geq 65$ , Female = 59.0%)	Connor-Davidson Resilience Scale (CD-RISC)	Suicidal Behaviors Questionnaire-Revised (SBQ-R)	1. Total: $\beta = -0.01, p = 0.002$ ; 2. Men: $\beta = -0.12, p < 0.01$ ; 3. Women: $\beta = -0.03, p = 0.297$	Fair
Liu <i>et al.</i> (2014) (Australia)	C-S	<i>N</i> = 2,551 ( $\geq 65$ , Female = 48.3%)	Connor-Davidson Resilience Scale-25 item (CD-RISC)	Better Off Dead (PSI); Taking Your Own Life (ASI)	1. Better off dead: OR (95%CI) = 1.00 (0.97, 1.02); 2. Taking your own life: OR (95%CI) = 1.02 (0.98, 1.06)	Fair
<i>Coping</i>						
Yoon <i>et al.</i> (2022) (USA)	C-S	<i>N</i> = 6,125 ( $\geq 60$ , Female = 54.0%)	Coping Orientations to Problems Experienced scale (COPE)	Suicide ideation (lifetime) (ASI)	1. Problem-focused coping: $B(\text{SE}) = 0.036 (0.028)$ , (not significant); 2. Emotion-focused coping: $B(\text{SE}) = 0.136 (0.024), p < 0.001$	Fair
Ahn and Kim (2015) (USA, Korean immigrants)	C-S	Convenience sample, <i>N</i> = 220 ( $\geq 65$ , Female = 65%)	The Brief Coping Scale (BCS)	Beck Scale for Suicidal Ideation (Korean version, 14 items among the 19-items)	$B(\text{SE}) = -0.31 (0.019), p < 0.001$	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Marty <i>et al.</i> (2010) (USA)	C-S	Convenience sample, N = 108 (≥ 60, Female = 61%)	Coping Orientations to Problems Experienced scale (COPE)	Geriatric Suicide Ideation Scale (GSIS)	1. Problem-focused coping: B(SE) = 0.09 (0.20) (not significant); 2. Emotion-focused coping: B(SE) = -0.68 (0.19), <i>p</i> < 0.01; 3. Dysfunctional coping: B(SE) = 0.98 (0.26), <i>p</i> < 0.001	Fair
<i>Religiosity</i>						
Jeong and Chun (2019) (Korea)	C-S	N = 77,407 (≥ 60, Female = not reported)	Religious activity (y/n)	Suicide ideation (12M) (ASI)	Absence of religious activity: OR (95%CI) = 1.15 (1.09, 1.21)	Fair
Nishi <i>et al.</i> (2017) (USA)	Cohort (f/u = 7yrs)	N = 16,555 (≥ 65, Female = 56.1%)	Importance of religious beliefs (y/n) and frequency of religious service attendance (ref: 0 times)	Suicide ideation (12M) (ASI)	1. Presence of religious belief: OR (95%CI) = 0.54 (0.38, 0.76); 2. Attendance frequency: 1–2 times: OR (95%CI) = 1.06 (0.59, 1.92); 3–5 times: OR (95%CI) = 1.37 (0.83, 2.25); 6–24 times: OR (95%CI) = 1.16 (0.72, 1.87); 25–52 times: OR (95%CI) = 0.42 (0.26, 0.69); 53 times or more: OR (95% CI) = 0.34 (0.20, 0.59)	Good
Heisel and Flett (2008) (Canada)	C-S	Convenience sample, N = 107 (≥ 67, Female = 76%) living in care-providing facilities	Religious attendance(y/n), Engage in religious rituals (e.g. prayer) (y/n)	Geriatric Suicide Ideation Scale total scores minus the meaning in life item (GSIS-TOT)	1. Religious attendance: B(SE) = 1.03(1.14), <i>p</i> = 0.370; 2. Engage in religious rituals: B(SE) = 3.52(1.01), <i>p</i> = 0.001	Fair
Tsoh <i>et al.</i> (2005) (Hong Kong)	C-C	N = 224 (≥ 65, Female = 58.03%)	Strong religiosity (y/n)	Suicide attempt; Suicide death	Suicide attempt: unadjusted OR (95%CI) = 0.2 (0.1, 0.5); Suicide death: unadjusted OR (95%CI) = 0.2 (0.1, 0.5)	Poor
Yen <i>et al.</i> (2005) (Taiwan)	C-S	Convenience sample, N = 1,000 (≥ 65 and <75, Female = 44.9%)	Religious affiliation (y/n)	Suicide ideation (1W) (ASI)	No religious affiliation: OR (95% CI) = 2.08 (0.86, 5.05)	Fair
<i>Hope</i>						
Beach <i>et al.</i> (2021) (USA)	C-S	Convenience sample N = 243 (≥ 60, Female = 59.3%)	Beck Hopelessness Scale (BHS)	Death ideation subscale from GSIS (GSIS-DI)	Hopelessness: B(95%CI) = 0.27 (0.13,0.41), <i>p</i> < 0.001	Fair

Table 1. Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Simmons et al. (2021) (Ghana)	C-S	<i>N</i> = 2,147 (≥ 60, Female = 53.6%)	Hopelessness (1 item)	Suicide ideation (NS)–(PSI)	Hopelessness: OR (95%CI) = 2.15 (2.11, 2.20)	Fair
Kinory et al. (2020) (Israel)	C-S	Convenience sample, <i>N</i> = 160 (≥ 65, Female = 68.1%)	Beck Hopelessness Scale (BHS)	Suicidal Behaviors Questionnaire-Revised (SBQ-R) (12M)	Hopelessness: $\beta = 0.11$ , $p < 0.001$	Fair
Lee et al. (2019) (Korea)	C-S	Convenience sample <i>N</i> = 266 (≥ 70, Female = 69.9%)	Hope scale (HS)	Suicide ideation scale (5 items)	$\beta$ (SE) = $-0.2043$ (0.0662), $p = 0.0022$	Fair
Cheavens et al. (2016) (USA)	C-S	Convenience sample, <i>N</i> = 91 (≥ 60, Female = 75%)	Hope Scale (HS)	Suicide ideation subscale from GSIS (GSIS-SI)	$B$ (95%CI) = 0.79 (– 0.04, 2.03), $p = 0.14$	Fair
<b>Interpersonal protective factors</b>						
<i>Sense of belonging</i>						
Beach et al. (2021) (USA)	C-S	Convenience sample, <i>N</i> = 243 (≥ 60, Female = 59.3%)	The Interpersonal Needs Questionnaire (INQ)	Death ideation subscale from GSIS (GSIS-DI)	Thwarted Belongingness: $B$ (SE) = 0.01 (0.03), (not significant)	Fair
Shim et al. (2021) (Korea)	C-S	Convenience sample, <i>N</i> = 200 (≥ 65, Female = 58.5%)	The Interpersonal Needs Questionnaire (INQ)	Suicide ideation scale (5 items)	Thwarted Belongingness: $\beta = 0.12$ , (not significant)	Fair
Kinory et al. (2020) (Israel)	C-S	Convenience sample, <i>N</i> = 160 (≥ 65, Female = 68.1%)	The Interpersonal Needs Questionnaire (INQ)	Suicide Behaviors Questionnaire-Revised (SBQ-R), 4 items	Thwarted Belongingness: $\beta$ (SE) = 0.24, $p < 0.01$	Fair
Cheavens et al. (2016) (USA)	C-S	Convenience sample, <i>N</i> = 91 (≥ 60, Female = 75%)	The Interpersonal Needs Questionnaire (INQ)	Suicide ideation subscale from GSIS (GSIS-SI)	Thwarted Belongingness: $B = 1.01$ , $p = 0.047$	Fair
Guidry and Cukrowicz (2016) (USA)	C-S	Convenience sample, <i>N</i> = 151 (≥ 65, Female = 50%)	The Interpersonal Needs Questionnaire (INQ)	Death ideation subscale from GSIS (GSIS-DI)	Thwarted Belongingness: $B$ (SE) = 0.31 (0.089), $p = 0.001$	Fair
Jahn et al. (2015) (USA)	C-S	Convenience sample, <i>N</i> = 143 (≥ 65, Female = 51.0%)	The Interpersonal Needs Questionnaire (INQ)	Geriatric Suicide Ideation Scale (GSIS)	Thwarted Belongingness: $B$ (SE) = 0.553 (0.127), $p < 0.001$	Fair
McLaren et al. (2015) (Australia)	C-S	Convenience sample, <i>N</i> = 676 (≥ 65, Female = 57.7%)	The Sense of Belonging Instrument - psychological subscale	Suicide subscale of the General Health Questionnaire	$\beta$ (SE) = $-0.07$ (0.01), $p < 0.001$	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Vanderhorst and McLaren (2005) (Australia)	C-S	Convenience sample, N = 110 (≥ 65, Female = 79%)	The Sense of Belonging Instrument – psychological subscale (SOBI-P) and antecedent subscale (SOBI-A)	Suicidal Subscale of the General Health Questionnaire	1. Sense of belonging antecedent subscale: $\beta = -0.10$ , (not significant); 2. Sense of belonging psychological subscale: $\beta = -0.08$ , (not significant)	Poor
<i>Positive relationship</i>						
Bernier <i>et al.</i> (2020) (Canada)	C-S	N = 2,787 (≥ 65, Female = 59.0%)	Confidant (y/n)	Wish to die (12M) (without serious SI) (PSI)	OR (95%CI) = 0.85 (0.51, 1.43)	Fair
Yu <i>et al.</i> (2019) (China)	C-S	N = 7,070 (≥ 60, Female = 59.7%)	Interpersonal trust (one item)	Suicide ideation (12M) (ASI)	Mistrust: OR (95%CI) = 2.08 (1.56, 3.73)	Fair
Neufeld <i>et al.</i> (2015) (Canada)	C-S	N = 222,149 (≥ 60, Female = 64.1%) long-stay home care clients	Positive social relationship (NS)	Intentional self-harm (ICD-10 code)	OR (95%CI) = 0.85 (0.73, 0.99)	Fair
<i>Social support</i>						
Park <i>et al.</i> (2022) (USA)	C-S	N = 3,114 (≥ 65, Female = 49.5%)	Number of sources for emotional support	1 item from PHQ 9 (2W) (PSI)	OR (95%CI) = 0.64 (0.46, 0.89)	Fair
Shiraly <i>et al.</i> (2022) (Iran)	C-S	N = 803 (≥ 60, Female = 48.1%)	Multidimensional Scale of Perceived Social Support (MSPSS)	Ask Suicide-Screening Questionnaire (ASQ)	Low perceived social support: OR (95%CI) = 2.03 (1.11, 3.71)	Fair
Won <i>et al.</i> (2021) (Korea)	C-S	N = 1,375 (≥ 60, Female = 66.8%)	Multi-dimensional Scale of Pervasive Social Support (MSPSS)	Suicidal Behaviors Questionnaire-Revised (SBQ-R)	$B(SE) = -0.017 (0.006)$ , $p < 0.001$	Fair
Nie <i>et al.</i> (2020) (China)	C-S	N = 817 (≥ 60, Female = 54.0%), Nursing home resident	Social Support Rating Scale (SSRS)	Suicide ideation (1W) (ASI)	Reduced social support: OR (95%CI) = 3.85 (1.94, 7.61)	Fair
Ramírez Arango <i>et al.</i> (2020) (Columbia)	C-S	N = 557,285 (≥ 60, Female = 58.2%)	Medical Outcomes Study – Social Support Survey (MOS-SSS)	Suicide ideation (lifetime) (ASI)	OR (95%CI) = 0.74 (0.36, 1.54)	Fair
Bennardi <i>et al.</i> (2019) (Spain)	Cohort (f/u = 3.5yrs)	N = 1,186 (≥ 60, Female = 54.5%)	Oslo-3 Social Support Scale (OSS-3)	Suicide ideation (12M) (ASI)	OR (95%CI) = 1.00 (0.97, 1.03)	Good
Mizuno <i>et al.</i> (2019) (Japan)	C-S	N = 13,919 (≥ 65, Female = 65.6%)	Six items of instrumental support and emotional support derived from the Measurement of Social Support-Elderly (MOSS-E)	Suicide ideation (1M) (ASI)	Low receipt/low provision of social support: total: OR (95%CI) = 2.77 (2.32, 3.31); men: OR (95%CI) = 2.57 (1.88, 3.51); women: OR (95%CI) = 2.75 (2.20, 3.43)	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Cha and Lee (2018) (Korea)	C-S	Convenience sample, N = 201 (≥ 65, Female = 62.2%)	Multidimensional Scale of Perceived Social Support (MSPSS)	Suicide ideation scale (five items)	$B(SE) = -0.08(0.03), p = 0.006$	Fair
Liu <i>et al.</i> (2018) (China)	C-C	N = 208 (≥ 60, Female = 40.4%)	Social Support Rating Scale (SSRS)	Short Chinese version of the Suicide Intent Scale References (C-SIS)	OR (95%CI) = 0.96 (0.87, 1.06)	Good
Sun and Zhou (2018) (China)	C-S	N = 3,313 (≥ 60, Female = 55.8%)	Social Support Rating Scale (SSRS)	Suicide ideation (lifetime) (ASI)	1. Total: OR (95%CI) = 0.98 (0.95, 1.01); 2. Men: OR (95%CI) = 0.99 (0.94, 1.04); 3. Women: OR (95%CI) = 0.97 (0.94, 1.01)	Fair
Ge <i>et al.</i> (2017) (China)	C-S	N = 3,313 (≥ 60, Female = 55.8%)	Social Support Rating Scale (SSRS)	Suicide ideation (lifetime) (ASI)	OR (95%CI) = 0.98 (0.95, 1.02)	Fair
Noguchi <i>et al.</i> (2017) (Japan)	C-S	N = 10,094 (≥ 65, Female = 59.2%)	Six items of instrumental support and emotional support derived from the Measurement of Social Support-Elderly (MOSS-E)	Suicide ideation (1M) (ASI)	OR (95%CI) = 0.89 (0.85, 0.94)	Fair
Dong and Simon (2016) (USA, Chinese American)	C-S	N = 3,159 (≥ 60, Female = 57.9%)	Twelve items of social support	Suicide ideation (2W) from Patient Health Questionnaire-9 (PHQ 9) (PSI), Suicide ideation (12M) from Geriatric Mental State Examination-Version(GMSE-A) (PSI)	1. Total: SI(2W): OR (95%CI) = 0.94 (0.88, 0.99); SI(12M): OR (95% CI) = 0.93 (0.88, 0.98); 2. Women: SI(2W): OR (95%CI) = 0.95 (0.88, 1.01); SI(12M): OR (95% CI) = 0.94 (0.89, 1.00); 3. Men: SI(2W): OR (95%CI) = 0.91 (0.81, 1.01); SI(12M): OR (95% CI) = 0.89 (0.81, 0.99)	Fair
Noguchi <i>et al.</i> (2014) (Japan)	C-S	N = 11,218 (≥ 65, Female = 59.7%)	Six items of instrumental support and emotional support derived from the Measurement of Social Support-Elderly (MOSS-E)	Suicide ideation (1M) (ASI)	1. Instrumental social support: OR (95%CI) = 0.82 (0.77, 0.88); 2. Emotional social support: OR (95%CI) = 0.70 (0.66, 0.75)	Fair
Almeida <i>et al.</i> (2012) (Australia)	C-S	N = 22,150 (≥ 65, Female = 58.9%)	The Duke Social Support Index (DSSI) to measure perceived social support	Depressive symptom inventory-suicidality subscale	Poor social support: OR (95%CI) = 3.1 (2.6, 3.7)	Fair
Saias <i>et al.</i> (2012) (Europe)	C-S	N = 11,440 (≥ 65, Female = 58.9%)	Three types of material support	Suicide ideation (1M) (PSI)	1. Received social support: OR (95%CI) = 0.197 (0.94, 1.33); 2. Providing social support: OR (95%CI) = 0.724 (0.77, 1.20)	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Vasiliadis <i>et al.</i> (2012) (Canada)	C-S	<i>N</i> = 2,494 (≥ 65, Female = 57.9%)	Three questions on the availability of social support	Suicide ideation (12M) (ASI)	1. Female: OR (95%CI) = 0.72 (0.40, 1.31); 2. Male: OR (95%CI) = 0.69 (0.32, 1.50)	Fair
Awata <i>et al.</i> (2005) (Japan)	C-S	<i>N</i> = 1,145 (≥ 65, Female = 58.1%)	Perceived social support (SS) on the availability of five situations	Suicide ideation (current) (ASI)	1. No SS for trouble: OR (95%CI) = 1.2 (0.6, 2.2); 2. No SS for physical condition: OR (95%CI) = 0.9 (0.5, 1.7); 3. No SS for daily housework: OR (95%CI) = 1.1(0.6, 2.0); 4. No SS for hospital: OR (95%CI) = 1.3 (0.7, 2.4); 5. No SS for ill health: OR (95%CI) = 2.0 (1.1, 3.6).	Fair
Vanderhorst and McLaren (2005) (Australia)	C-S	Convenience sample, <i>N</i> = 110 (≥ 65, Female = 79%)	Social Support Subscale of the Coping, Resources Inventory	Suicidal Subscale of the General Health Questionnaire	<i>B</i> = −0.32 ( <i>p</i> < 0.001)	Poor
<i>Social connectedness</i>						
Paek <i>et al.</i> (2022) (Korea)	C-S	<i>N</i> = 10,255 (≥ 65, Female = 57.5%)	Number of social network(close siblings/relatives/friends/neighbors), Frequency of social contact with siblings/relatives/friends/neighbors	Suicide ideation (after age of 60) (ASI)	1. Social network: OR (95%CI) = 1.05 (1.01, 1.09); 2. Frequency of social contact: OR (95%CI) = 0.89 (0.82, 0.98)	Fair
Shiraly <i>et al.</i> (2022) (Iran)	C-S	<i>N</i> = 803 (≥ 60, Female = 48.1%)	Six-item Lubben Social Network Scale (LSNS-6)	Ask Suicide-Screening Questionnaire (ASQ)	Limited social network: OR (95%CI) = 1.77 (1.02, 3.08)	Fair
Dong <i>et al.</i> (2021) (USA, Chinese American)	C-S	Convenience sample, <i>N</i> = 3,157 (≥ 60, Female = 58.9%)	Twelve items of overall social interaction	Suicide ideation (2W), Suicide ideation (1M), Suicide ideation (1Y), Suicide ideation (lifetime) (PSI)	1. SI (2W): OR (95%CI) = 0.81 (0.76, 0.87); 2. SI (1M): OR (95%CI) = 0.80 (0.75, 0.85); 3. SI (1Y): OR (95%CI) = 0.81 (0.76, 0.86); 4. SI (lifetime): OR (95%CI) = 0.83 (0.80, 0.87)	Fair
Erlangsen <i>et al.</i> (2021) (Australia)	Cohort (f/u = 12yrs)	<i>N</i> = 102,880 (≥ 65, Female = 48.3%)	A single item from the Social Interaction Subscale from the Duke Social Support Index (DSSI)	Suicide death, Deliberate self-harm	1. Suicide death: Number of people to depend on: 2–4 people: IRR (95%CI) = 0.57 (0.41, 1.27); ≥ 5 people: IRR (95%CI) = 0.50 (0.28, 0.89);	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
					2. Deliberate self-harm: Number of people to depend on: 2–4 people: IRR (95% CI) = 0.77 (0.50, 1.16); ≥ 5 people: IRR (95%CI) = 0.45 (0.29, 0.70)	
Ko <i>et al.</i> (2021) (Korea)	C-S	N = 10,042 (≥ 65, Female = 57.4%)	Frequency of contact, Number in social network	Suicide ideation (1Y) (ASI)	1. Lower contact: OR (95%CI) = 1.70 (1.40, 2.07) 2. Higher social network: OR (95% CI) = 1.07 (1.03, 1.11)	Fair
Chang <i>et al.</i> (2018) (China)	C-S	N = 2,819 (≥ 60, Female = 51.3%)	Family and Friends subscale of Six-item Lubben Social Network Scale (LSNS-6)	Death wishes (Last year) (PSI); Suicide ideation (Last year) (ASI)	1. Death wishes: LSNS-6 total: OR (95% CI) = 1 (0.98, 1.04); Family subscale: OR (95%CI) = 0.95 (0.90, 1.00); Friends subscale: OR (95%CI) = 1.05 (0.99, 1.10) 2. Suicidal Ideation: LSNS-6 total: OR (95%CI) = 0.96 (0.91, 1.02); Family subscale: OR (95%CI) = 0.87 (0.80, 0.96); Friends subscale: OR (95% CI) = 1.03 (0.95, 1.12)	Fair
Kwon <i>et al.</i> (2018) (Korea)	C-S	N = 2,509 (≥ 65, Female = 81.9%) living alone	Social relationships with children, siblings and other relatives, and friends and neighbors(one question each)	Suicide ideation (after age 60 years) (ASI)	1. Children: OR (95%CI) = 0.89 (0.81, 0.97); 2. Siblings/relatives: OR (95%CI) = 0.94 (0.83, 1.05); 3. Friends/neighbors: OR (95%CI) = 0.88 (0.82, 0.96)	Fair
Li <i>et al.</i> (2016) (China)	C-S	N = 15,957 (≥ 60, Female = 47.3%)	Six-item Lubben Social Network Scale (LSNS-6)	Suicide ideation (1, 12, 60 month) (ASI); Suicide attempt (1, 12, 60 months)	1. SI (1 month): OR (95%CI) = 0.95 (0.92, 1.00); 2. SI (12 months): OR (95%CI) = 0.97 (0.94, 1.00); 3. SI (5 years): OR (95%CI) = 0.97 (0.95, 0.99); 4. SA (1 month): OR (95%CI) = 0.94 (0.89, 1.01); 5. SA (12 months): OR (95%CI) = 0.96 (0.91, 1.01); 6. SA (5 years): OR (95%CI) = 0.98 (0.94, 1.01)	Fair
Park <i>et al.</i> (2016) (Korea)	C-S	N = 10,997 (≥ 65)	Size of social network	Suicide ideation (after 60 years of age) (ASI)	No social network: OR (95%CI) = 1.28 (1.03, 1.59)	Fair
Stolz <i>et al.</i> (2016) (Europe)	Cohort (f/u = 2yrs)	N = 6,791 (≥ 75, Female = 57.6%)	Size of social network	A single question on Passive suicide ideation (1M) (PSI)	OR (95%CI) = 0.93 (0.87, 1.00)	Fair

**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Kim and Ahn (2014) (USA, Korean immigrants)	C-S	Convenience sample, N = 220 (≥ 65, Female = 65.9%)	Social support network sub-scale from Social Support Questionnaire (SSQ)	Beck Scale for Suicide ideation	B = -0.09, p < 0.01	Poor
Jang <i>et al.</i> (2014) (Korea)	C-S	Convenience sample, N = 514 (≥ 65, Female = 63.3%)	Size of social network	Beck Scale for Suicide ideation (Korean version)	B = -0.001, p = 0.977	Fair
Kang <i>et al.</i> (2014) (Korea)	Cohort (f/u = 2yrs)	N = 1,204 (≥ 65, Female = 62%)	Six social network deficits	Three questions from Geriatric Mental State schedule (GMS) and if answers are positive then timing was further asked (1M) (ASI)	1. Social network deficit on prevalence of SI: OR (95%CI) = 1.15 (0.93, 1.42); 2. Social network deficit on Incidence of SI: OR (95%CI) = 1.34 (1.03, 1.75)	Good
Turvey <i>et al.</i> (2002) (USA)	Cohort (nested C-C) (f/u = 6yrs)	N = 420 (≥ 65, Female = NS)	Six items on social interaction	Suicide death	Closeness to a child: OR (95%CI) = 1.52 (0.78, 3.19); Contact to a child: OR (95%CI) = 1.10 (0.38, 3.58); Closeness to relatives: OR (95%CI) = 0.54 (0.29, 0.97); Contact to relatives: OR (95%CI) = 0.65 (0.33, 1.21); Closeness to friends: OR (95%CI) = 0.31 (0.22, 0.73); Contact to friends: OR (95%CI) = 0.54 (0.30, 0.97)	Good
<i>Social participation</i>						
Erlangsen <i>et al.</i> (2021) (Australia)	Cohort (f/u = 12yrs)	N = 102,880 (≥ 65, Female = 48.3%)	Religious or social group meeting (ref: None) in a week	Suicide death & Deliberate Self Harm	1. Suicide death: Religious or social group meeting: once in a week or fewer: IRR (95%CI) = 0.90 (0.5, 1.60); more than once in a week: IRR (95%CI) = 0.73 (0.46, 1.17). 2. Deliberate self harm: Religious or social group meeting: once in a week or fewer: IRR (95%CI) = 0.50 (0.31, 0.81); more than once in a week: IRR (95%CI) = 0.52 (0.37, 0.73)	Fair
Lutzman <i>et al.</i> (2021) (Isarel)	C-S	Convenience sample n = 198 (≥ 65, Female = 0%)	Multidimensional social integration in later life scale (SILLS)	Beck Scale for Suicidal Ideation	B(SE) = -0.42 (0.21) (p < 0.05)	Fair
Bernier <i>et al.</i> (2020) (Canada)	C-S	N = 2,787 (≥ 65, Female = 59%)	Involvement in associations (y/n)	Wish to die (12M) (but not with serious SI) (PSI)	OR (95CI%) = 0.54 (0.33, 0.88)	Fair



**Table 1.** Continued

REFERENCES (COUNTRY)	STUDY DESIGN	STUDY POPULATION <sup>a</sup>	MEASURE OF PROTECTIVE FACTORS	MEASURE OF OUTCOMES	STRENGTH OF ASSOCIATION <sup>b</sup>	QUALITY SCORE <sup>c</sup>
Jeong (2020) (Korea)	C-S	<i>N</i> = 129,277 (≥ 65, Female = 58.8%)	Social activities (y/n)	Suicide ideation (12M) (ASI); Suicide attempt (12M)	No social activities: 1. SI (12M): Male: OR (95%CI) = 1.26 (1.14, 1.40); Female: OR (95%CI) = 1.32 (1.22, 1.41); 2. SA (12M): Male: OR (95%CI) = 1.10 (0.73, 1.66); Female: OR (95%CI) = 1.24 (0.91, 1.68)	Fair
Kwon <i>et al.</i> (2018) (Korea)	C-S	<i>n</i> = 2,509 (≥ 65, Female = 81.9%) living alone	List of social membership/ participation (y/n)	Suicide ideation (lifetime) (ASI)	OR (95%CI) = 0.83 (0.57, 1.21)	Fair
Cheung <i>et al.</i> (2017) (New Zealand)	C-S	<i>N</i> = 35,734 (≥ 65, Female = 60.7%) Home care or residential care	Three categories in change in social activities (no decline; decline + not distressed; decline + distressed)	Wish to die (PSI)	1. Decline, not distressed: OR (95% CI) = 1.14 (1.04, 1.26); 2. Decline, distressed: OR (95% CI) = 1.99 (1.76, 2.26)	Fair
Ra and Cho (2013) (Korea)	C-S	<i>N</i> = 5,836 (≥ 65, <i>n</i> = 1,415, Female = 58.3%)	Social participation (three dimensions from 11 items)	Suicide ideation (12M) (ASI)	1. Friendship network and hobby: $\beta = -0.06$ , $p = 0.40$ ; 2. Religious involvement: $\beta = 0.26$ , $p = 0.02$ ; 3. Instrumental social participation: $\beta = 0.03$ , $p = 0.57$	Fair
Saias <i>et al.</i> (2012) (Europe)	C-S	<i>N</i> = 11,440 (≥ 65, Female = 58.9%)	Community participation in the last month (y/n)	Death ideation (12M) (PSI)	Community activities (last month): OR (95%CI) = 0.90 (0.75, 1.08)	Fair
Yen <i>et al.</i> (2005) (Taiwan)	C-S	Convenience sample, <i>N</i> = 1,000 (≥ 65 and <75, Female = 44.9%)	Part of the questionnaire regarding community activity participation among 16 items of the Neighborhood Quality Index (NQI)	Suicide ideation (1W) (ASI)	No Community participation for past 6 months: OR (95%CI) = 1.72 (1.07, 2.96)	Fair

C-S: Cross-sectional study, C-C: Case-control study, f/u: Follow-up, NS: Not specified, PSI: Passive suicide ideation, ASI: Active suicide ideation, SI: Suicide ideation, SA: Suicide attempt, 2W: 2 weeks, 1Y: 1 year, 1M: 1 month, OR: Odds ratio, IRR: incidence rate ratio, CI: confidence interval.

<sup>a</sup>The study population is usually a representative sample of the general elderly population, unless a convenience or particular sample is mentioned.

<sup>b</sup>For the strength of association, if a protective factor is in opposite directions or is reported in multiple categories, the name of variable or category was provided. If the name is not given, it is the same as in the column of measures for protective factor. Additionally, either of two estimates in regression, *B* (or *b*, the unstandardized coefficient) and  $\beta$  (standardized coefficient, beta weights) were extracted as presented in the original article. If an article presented both estimates, we prioritized the standardized  $\beta$ .

<sup>c</sup>Quality scores were assessed using the National Institutes of Health (NIH) Quality Assessment Tool (Details in Supplementary Table 4-1 and 4-2).

competence and increase feelings of being a burden (Thomas, 2010). Studies, which examined men and women separately (Dong *et al.*, 2015; Mizuno *et al.*, 2019; Sun and Zhou, 2018; Vasiliadis *et al.*, 2012) did not show gender differences in the direction of association. When instrumental support (availability of help) was explicitly measured, two studies among three showed no association (Awata *et al.*, 2005; Saías *et al.*, 2012). Finally, most studies (except for Mizuno *et al.*, 2019) looked at received support, neglecting the role of support given to others, which might be more beneficial for older adults' well-being (Smith *et al.*, 2020; Thomas, 2010),

Among 14 eligible studies regarding social connectedness, 11 were conducted in non-Western countries. Associations were inconsistent; six studies exhibited significant protective effects of social connectedness (assessed by size of social network or frequency of social contacts) against SI, but three studies showed no associations and five studies showed mixed results. There were no differences between social network and social contacts in their respective association with lower suicidality, both seem to be equally protective. However, the measures did not evaluate the quality of the interactions or the satisfaction with one's network. Interestingly, results varied according to the types of relationship: family, children, relatives, or friends. For example, Chang *et al.* (2018) found that the protective effect of social connectedness against PSI and ASI was observed only within the family but not with friends, while Turvey *et al.* (2002) found significant associations for closeness and interactions with friends, but not with children, in predicting lower suicide deaths.

The literature search resulted in nine eligible studies in relation to social participation and the majority showed significant associations with suicidality. However, some presented mixed or no significant results according to types of participation and outcome measures, or in specific sub-groups of population. A Taiwanese study (Yen *et al.*, 2005) showed associations between community participation and ASI for the whole sample. However, subsequent analysis showed that, when the sample was separated into subgroups, associations appeared, for example, only in men but not women, and in the low-income group, but not the high-income group. A study from Korea differentiated between types of social participation and showed significant association only for religious involvement, but not for leisure activities, meetings with friends, or instrumental participation for social changes (Ra and Cho, 2013). A study with a large community sample (Jeong, 2020) showed that the association of social participation differed by

outcome measures; associations were found for ASI but not for suicide attempt.

## Discussion

This systematic review provides confirmation that protective factors are associated with lower SI. All of the included protective factors we examined were associated with a decreased likelihood of PSI and ASI. The most consistent results were among intrapersonal factors. In fact, purpose-in-life and resilience seem to be the most valuable protective factors, showing recurrent positive associations with reduced suicidality. These findings suggest potential value in attending to both purpose-in-life and resiliency when assessing SI and when developing interventions for vulnerable older adults (Heisel and Flett, 2008). However, except for social connectedness and support, each factor was truly neglected by research. Another problem is that, currently, investigators are mostly focused on deficits or risk factors. They are not examining the resources, attitudes, abilities, and coping strategies that individuals are using to avoid suicide as a possible solution to the suffering associated with the difficulties and losses of old age. Moreover, even if they are looking at protective factors, authors frequently present their results using a negative formulation, reporting that a deficiency in the predicting variable is associated with suicide risk, instead of stating the positive association with reduced suicidality. Though the labelling issue is important because it guides intervention, most protective factors are dynamic and the positive direction of a specific dimension is not sufficient to clearly distinguish it from a risk factor (Heffernan and Ward, 2017). Therefore, there is still work that needs to be done on the conceptualization of protective factors.

Some protective factors seem to have been completely overlooked, such as self-regulation (Turton *et al.*, 2021) and mattering (Flett, 2018), while others were examined in a small number of studies (e.g.,  $\leq 3$  for coping and positive relationships) and it is difficult to draw a generalizable conclusion on their importance for reducing suicidality. Moreover, scientific rigor varied across reviewed articles: while most studies were rated as fair, small sample and cross-sectional design were predominant. Furthermore, the evidence of the protective effects against suicidal attempts or suicide death requires a time span, which suggests that longitudinal designs, integrating quality measures on all outcomes, would be very pertinent. Another possibility is a data linkage between community

sample and hospital data or death registry using a probabilistic technique, as shown by Erlangsen *et al.* (2021). As for the types of measurement, the use of single questions is still a common practice, particularly when assessing religiosity, social connectedness, and social participation. However, number of contacts do not reflect the significance of relationships, nor does frequency of attendance at religious services reveal the importance of faith in the life of older adults (Deuter *et al.*, 2016). This limitation may partly be compensated by employing scales or pooling multiple questions into clusters. Since there were more significant associations between intrapersonal factors and PSI than with ASI, it is possible that the former outcome measure is more sensitive to the psychosocial losses experienced by older adults (Jonson *et al.*, 2023) and reflect their lower inclination to express ASI (Harmer *et al.*, 2023). However, this explanation has to be verified in future research.

The current review showed that results concerning participants aged 70 and older were more consistent than those obtained with people aged between 60 and 70 years. Previously, age was considered a moderator in the association between independent variables and suicidal outcomes because of a more pronounced impact in the older groups (Innamorati *et al.*, 2014). The importance of protective factors may be more relevant with older age, because adverse life events occur more frequently and the risk of suicide is higher as older adults advance in age (Shah *et al.*, 2016). Although it was not the objective of this review, it seems that protective factors for older adults are similar to those identified for younger people. For example, Seidler *et al.* (2023) explored various protective factors (coping, connecting, self-reported resilience, and selflessness) in men aged 16 years and over ( $M = 50.3$  years) during the COVID-19 pandemic and found significant associations with lower ASI. Future research should explore if some protective factors are unique in old age.

In the current review, the significant associations between intrapersonal protective factors and suicidality were more frequently present in non-Western countries. This suggests that in countries where collective identity is prevalent, intrapersonal factors have an added protective effect against suicidality. Collectivist societies give less importance/value to individual characteristics (Yoon, 2014) and as such, intrapersonal factors might be adding something special and essential to the prevention of suicide for people living within these cultures.

This systematic review was only concerned with psychosocial protective factors. However, each

individual is also greatly affected by his/her environment. As such, national suicide prevention programs (Lewitzka *et al.*, 2019), as well as public policies and social institutions that assist citizens needing help (Stack, 2021), have been used to lower suicide rates. Since social environments interact with intrapersonal or interpersonal factors and vice versa, strengthening of protective factors need to be extended to a population-level approach. Quality programs, targeting groups of individuals and communities to enhance protective factors through social connectedness, are highly promising suicide prevention strategies. Good examples of community interventions are proposed (Hou *et al.*, 2022), but these have not yet been widely recognized to be embedded in existing national suicide prevention programs, with few exceptions (Substance Abuse and Mental Health Services Administration, 2017).

Since suicidal ideation and behavior develop along a continuum, and often begin with a wish to die, it is important to conceive longitudinal studies that identify protective factors that are most beneficial at each step of the process described by the model of O'Connor and Kirtley (2018). Some factors might be more pertinent to prevent the transition between SI and suicide attempts, while others might be more effective to prevent the start of the process entirely.

More importantly, future research should evaluate protective factor models that translate into effective treatment models (Michel, 2021). For example, life satisfaction, psychological well-being, and quality of life could be outcome variables of the feeling that one's life is meaningful or of one's ability to cope with adversity (resilience). Variables such as character strengths (perseverance, creativity, gratitude, hope, humor, bravery, zest), which have been overlooked by research with older adults, might be considered as protective factors that can contribute to resilience, as it was observed during the COVID-19 pandemic (Lapierre *et al.*, 2023).

Future research could advance knowledge on protective factors by conducting systematic reviews on specific variables, as reported recently by Jeong and Noh (2023) for resilience, or by applying an ecological approach to assess the strategies that can momentarily reduce the intensity of suicidal thinking (Stanley *et al.*, 2021). Development of psychological interventions that can improve modifiable intrapersonal factors, such as hope (Hernandez and Overholser, 2021), resilience (Treichler *et al.*, 2020), coping strategies (Gysin-Maillart *et al.*, 2020), and purpose-in-life (Heisel *et al.*, 2020; Lapierre *et al.*, 2007) could be innovative ways to prevent suicidality in older adults. They might be of

particular interest, since they possibly can help shift the narrative away from deficits, toward self-efficacy, adaptation, and growth.

## Strengths and limitations

This systematic review was able to synthesize the current knowledge and evidence on the psychosocial factors that protect older adults against suicidality, namely passive and active suicidal ideation, suicidal attempts, and suicide. The foremost strength of this review was that the search was not restricted to the generic term of “protective factors”. Actually, the preliminary scoping review provided a list of 15 psychosocial dimensions (and their related terms), that represented specific protective factors (see Supplementary Table 1). Each was searched separately, producing a large number of studies to examine the predictive associations of each factor with reduced suicidality in older adults. Nevertheless, it is possible that some factors were not identified, as it was the case for self-forgiveness or self-compassion. Self-forgiveness was not an expected variable because it was not among the search terms. Nonetheless, it could be an important protective factor since a systematic review reported significant associations between higher levels of self-forgiveness or self-compassion, and lower levels of SI and self-harm in individuals aged between 11 and 66 years old (Cleare *et al.*, 2019).

The main limitation of the review has to do with the conceptualization of each protective factors. Clearly, there is frequent overlap between interpersonal protective factors. For example, sense of belonging share common features with other social constructs, such as social connectedness and social support, as point out by Hatcher and Stubbersfield (2013) in their own systematic review on the association between sense of belonging and suicide.

Another limitation relates to the assessment of SI. Most selected studies used SI as the outcome variable, probably because it is nearly impossible to examine the role of protective factors in people who attempted or ended their life with suicide. However, as mentioned previously, there is no universally accepted consistent definition of SI, which encompasses everything from life weariness to preoccupation with self-annihilation (Harmer *et al.*, 2023). This leads to ongoing challenges for research since it interferes with the ability to compare findings across studies (Harmer *et al.*, 2023). Although scales to measure SI exist, none is sufficiently reliable to predict suicide (Hawton *et al.*, 2022). Moreover, suicidal ideation fluctuates over time, and involves varying degrees of intent, motivation, intensity, imagery, and planning (Jonson *et al.*, 2023). Therefore, comparative investigations of the

predictive value of protective factors would need to sort out how each of the studies defined SI, especially those that use only one item to assess it. It was partly done here, by examining the items that were used in each study and distinguishing between PSI and ASI. Nonetheless, it is difficult to make this distinction, when the item includes both types of SI in one statement (e.g. item 9 of the PHQ-9), or if the assessment of SI includes positive answers to both PSI and ASI items.

## Conclusion

Suicide prevention has traditionally concentrated on risk factors and the current study advocated the need to widen the strategies to strengthen protective factors. Research on risk factors was meant to predict suicide attempts and prevent deaths. Research on protective factors can show how to improve well-being and quality of life so that the suicidal process does not even start. In fact, having reasons for living and leading a meaningful life are incompatible with suicide (Lapierre *et al.*, 2007), while building resilience could reduce the incidence of stress-related disorders (Sher, 2019). As Holman and Williams (2022) suggested, future research should use a network approach to explore the interactions between protective and risk factors to determine which variables are central in order to guide effective targeted interventions.

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None.

## Description of authors' roles

SL and MK designed the study. MK, BEG, MJH, MKK, MJJ, EJK, and LD conducted literature searches, drafted tables and figures, quality assessments, assisted analysis, and edited supporting files. SL, MK, and BM wrote the manuscript, and updated tables and figures. All authors edited the manuscript and read and approved the final manuscript.

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## Supplementary material

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