



## Research article

# The relationship between the meaning of life, psychological well-being, self-care, and social capital, with depression and death anxiety in the elderly living in nursing homes: The mediating role of loneliness

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## ABSTRACT

The current study aims to investigate the meaning of life, psychological well-being, self-care, and social capital, with depression and death anxiety in the elderly living in nursing homes through the mediating role of loneliness. The statistical population included all the elderly aged at least 60 years living in Tehran, Qazvin and Zanjan, Iran in 2020, among whom 489 (273 men and 216 women) were selected using convenience sampling method. Participants filled out Steger's Meaning of Life, Ryff and Singer's Psychological Well-Being Scale, Söderhamn et al.'s Self-Care Ability, Nahapiet and Ghoshal's Social capital, Beck's depression, Templer's Death Anxiety, Russell et al.'s Loneliness questionnaires. The results indicated that meaning of life, psychological well-being, self-care, and social capital are negatively associated with loneliness, which in turn, is positively associated to depression. Furthermore, meaning of life, psychological well-being, self-care, and social capital are negatively associated with loneliness, which in turn, is positively associated to death anxiety. Moreover, the results of path analysis revealed that the hypothesized model of the current study has an excellent fit in the study sample. That is, meaning of life, psychological well-being, self-care, and social capital are related to depression and death anxiety through mediating role of loneliness.

## 1. Introduction

The aging population is of essential interest in global population trends. The 65-year-olds and older individuals accounted for 9 % of the population in 2019, which is predicted to reach 12 %, 16 %, and 23 % until 2030, 2050, and 2100, respectively [1]. Given that the ratio of elderly people in countries with a high level of income is currently greater than that of others, it is predicted that the most significant change will take place in countries with a low and medium level of income, and 80 % of elderly people will live in developing countries until 2050 [2]. According to the census taken in 2016, 3.9 % of the population of Iran (more than seven million

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individuals) were 60 years and older. Besides, according to international estimations, the elderly population of Iran will grow at a higher rate than in other regions [3]. The acceleration in global population aging has raised some concerns regarding the mental health of the elderly. Aging can increase the risk of mental issues [4]. According to the World Health Organization (WHO) reports, more than one-fifth of people aged 60 years and over suffer from at least one psychological disorder [2]. Studies also indicated that the prevalence of psychological disorders among the elderly is higher than that in adults [5], among which dementia, depression and death anxiety are the most common [6].

### 1.1. Mental health in old age

Depression and anxiety are the most common psychological disorders in old ages [7]. Systematic reviews have reported the prevalence of depression symptoms among the elderly to be 10 %–20 % worldwide [8] and to be 43 % in Iran [9]. The prevalence of death anxiety among the elderly is also arguable. In some other studies, death anxiety is also reported to be high due to health problems, mobility limitations, and dependence on others [9].

Depression, known as the essential factor of inability worldwide, is recognized by symptoms, such as sadness, reduced level of interest or enjoyment, feeling of guilt, sleeping or appetite disorders, feeling of tiredness, and reduced concentration level [10]. The negative effects of depression on mental and behavioral states include a vast range of changes in feeling worthy, hopefulness, self-care behaviors, and quality of life [11]. Studies have indicated that depression is correlated with fundamental variables in the elderly, such as cognitive impairment [12], increased risk of hospital-treated conditions [13] increased suicide [14], and decreased health-related quality of life [15,16].

As a natural experience of humans, death anxiety includes thoughts, fears, and emotions pertinent to the end of life [17]. Even though death is a biological and psychological reality, thinking about it is fearful and a vast majority of individuals prefer not to think about it since death fear and anxiety are unpleasant [18]. Although it is normal to experience death anxiety to some extent, a high level of death anxiety in the elderly is associated with different problems, such as low psychological well-being [19,20] and depression [21]. Over the past years, the role that different variables play in predicting depression have been investigated, such as the meaning of life [22], defined by Steger and Frazier [23] as an individual's ability to perceive life, self and the external world, and being adjusted to it; psychological well-being [20,24,25], defined by Karademas [26], as emotional and cognitive reactions to perception of personal features and abilities, sufficient advance, efficient interaction with world, desirable connection and relationship with the community and positive advancement over time; self-care [27], defined by Chen et al. [28] as a self-development activity in order to the maintenance of physical and mental health; social capital [29–31], defined by Putnam [32] as interpersonal connections, social networks, trust norms, mutual action and reaction resulting from the mentioned connections. Besides, the meaning of life [33], psychological well-being [34,35], self-care [36], and social capital [37], have been studied as the predictors of death anxiety.

Although the above-mentioned studies have indicated the relationship between meaning of life, psychological well-being, self-care, and social support with depression and death anxiety in the elderly, there is found little evidence indicating the pathways through which the mentioned variables may be related to depression and death anxiety. For instance, Zhang et al. [33] figured out that the meaning of life is related to depression through the mediating role of self-esteem in the elderly. Besides, Sun et al. [30] indicated that social capital is correlated to depression through the mediating role of life satisfaction in the elderly. One variable that may play a determining role in this regard seems to be loneliness.

### 1.2. Loneliness and mental health

Loneliness is an upsetting state felt when there is a distance between people's desired interpersonal relationships and the relationships they currently have [38]. Loneliness is a pervasive phenomenon [38] and evidence indicates that 20 %–40 % of the elderly have reported that suffering from loneliness [39]. This undesired experience is reported to be between 19.6 % and 34 % among people aged 65 years and over in the United States of America [40]. Indeed loneliness is an essential index of mental health and quality of life in the elderly that widely increases the probability of physical and mental diseases during old ages [41]. Accordingly, on the one hand, the results of studies have indicated that loneliness is significantly correlated with meaning of life [42,43], psychological well-being [44,45], self-care [46], and social capital [47,48]. On the other hand, loneliness seems to be a significant predictor of depression [49–51] and death anxiety [52–54].

### 1.3. Aim of the present study

According to the studies having considered the relationship between the meaning of life, psychological well-being, self-care, and social capital with loneliness as well as the relationship between loneliness with depression and death anxiety, it seems that the relationship among these variables has been independently investigated and the results have confirmed the presence of a significant relationship among them. However, few studies have investigated the role of mediating variables that serve as a bridge between the mentioned variables, and there is still a huge gap in this regard in the literature of field of inquiry. According to the mentioned statistics regarding the acceleration rate of Iran population toward old age, studies on different fundamental psychological variables in this field could enrich the literature. The presentation of causal models regarding essential variables of old age may cause the therapists working in this field to gain a profound knowledge regarding the interaction between these variables. Accordingly, proposing a comprehensive model, this study aims to investigate the role that an essential parameter, such as loneliness, plays in the relationship between meaning of life, psychological well-being, self-care, social capital with depression and death anxiety in the elderly. The hypotheses of this model

are listed as follows [1]. The meaning of life is negatively correlated with depression through loneliness [2]. Psychological well-being is negatively correlated with depression through loneliness [3]. Self-care is negatively correlated with depression through loneliness [4]. Social capital is negatively correlated with depression through loneliness [5]. Meaning of life is negatively correlated with death anxiety through loneliness [6]. Psychological well-being is negatively correlated with death anxiety through loneliness [7]. Social capital is negatively correlated with death anxiety through loneliness. The model proposed by this study is indicated in Fig. 1.

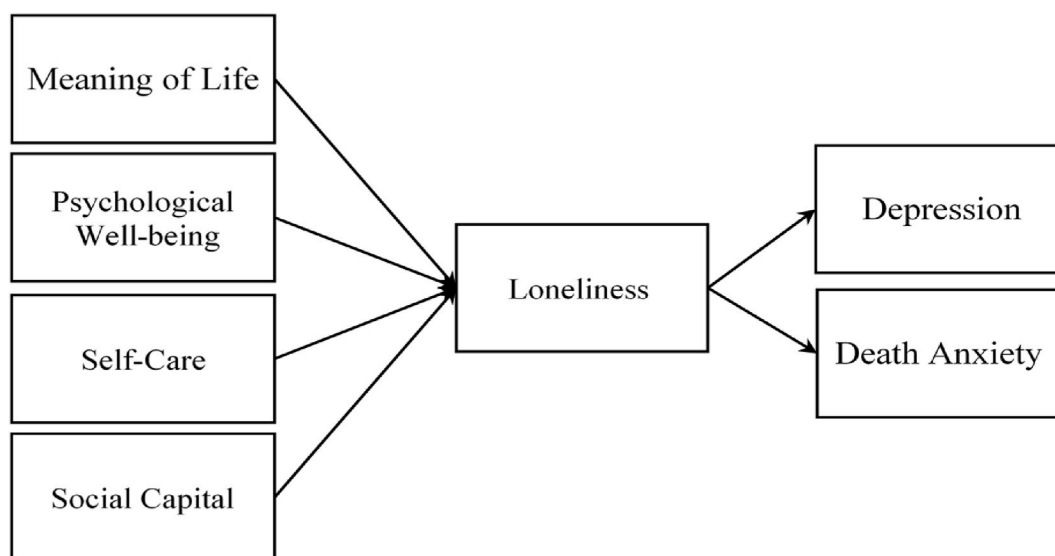
## 2. Method

### 2.1. Study design and participants

The method of the present study was correlational of path analysis type. The statistical population included all the elderly living in Iran in 2020. To recruit the statistical sample, three states of Tehran, Qazvin and Zanjan, Iran were selected using convenience sampling method, in which 12 daily nursing homes were chosen randomly. In the next step, 530 aged people were selected from the predesignated 12 nursing homes, among whom 489 were analyzed after exclusion of distorted questionnaires. Regarding the sample size, it is worth noting that Stevens [55] stated that considering 15 cases for each predictor variable in the multiple regression analysis by the conventional method of the minimum squared standard is a good rule of thumb. Based on this, it can be stated that because path analysis in some respects is completely related to multivariate regression, 15 cases for each variable measured in path analysis is not irrational [55]. Loehlin [55] states that for models with two or four factors, the researcher must plan to collect at least 100 or more, for example, 200. Also, the sample size was determined according to the Cochran's formula for a community with an unknown number, 364 people. Inclusion criteria included [1] age over 60 years [2], being literate [3], the absence of using psychiatric drugs [4], the absence of chronic illness [5], the absence of experience of any stressful event in the last six months. Out of 489 participants of this study, 273 (56 %) were men and 216 (44 %) were women, among all of whom 176 (36 %) were in the age group of 60–65 years, 146 (30 %) were in 66–70, 105 (21 %) were in 71–75, and 62 (13 %) were in 76–80. Among participants, 45 (9 %) were single, 137 (28 %) married and 307 (63 %) divorced or widow. The marriage length was  $41.49 \pm 7.93$ . The education level was elementary school in 103 (21 %), junior high school in 109 (22 %), senior high school in 130 (27 %), and higher education in 50 (10 %) of the participants, and eventually, 97 (20 %) of the participants were illiterate.

### 2.2. Measures

**The Meaning of Life Questionnaire.** This scale, developed by Steger's [56], includes ten items that measure two components of presence of meaning in life and search for meaning in life. Each item is scored on a 7-point Likert scale, ranging from "completely false" to "completely true". The minimum and maximum scores are 10 and 70, respectively, with higher score indicating higher level of the meaning in life and search for the meaning of life, and vice versa. Studies have confirmed the validity and reliability of the questionnaire and its convergent and differential validity [57,58]. For two components of the scale, Steger et al. [59] reported internal consistency with alpha coefficients between 0.82 and 0.87. They also reported the result of the reliability of two mentioned components through test-retest method with a time interval of one month to be 0.70 and 0.73, respectively. In Iran, the reliability of the questionnaire was reported to be between 0.86 and 0.87, and its validity is confirmed through confirmatory factor analysis [60,61].



**Fig. 1.** The hypothesized model of the relationship between the meaning of life, psychological well-being, self-care, and social capital, with depression and death anxiety through the mediating role of loneliness.

The reliability of this questionnaire in the present study was 0.74, using Cronbach's alpha method.

**Psychological Well-Being Scale.** This scale, developed by Ryff and Singer [62], includes 18 items, evaluating the subscales of autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance on a 6-point Likert scale, ranging from "strongly disagree" to "strongly agree". The minimum and maximum scores are 18 and 108, respectively, with higher score indicating higher psychological well-being and vice versa. Ryff and Singer reported that the correlation of this test with its 84-item version is between 0.70 and 0.89, and that the internal consistency of the scale is 0.56. In Iran, Khanjani et al. [63] obtained its internal consistency using Cronbach's alpha coefficient to be 0.51, 0.76, 0.75, 0.53, 0.73, and 0.72 for subscales of self-acceptance, environmental mastery, positive relations with others, purpose in life, personal growth, and autonomy, respectively. Besides, the total Cronbach's alpha coefficient was obtained to be 0.71. Using confirmatory factor analysis, Michaeli Manee [64] confirmed the three-factor and six-factor models of this questionnaire in an Iranian population. The reliability of this questionnaire in the present study was 0.82, using Cronbach's alpha method.

**The Self-Care Ability Scale for the Elderly (SASE).** This scale, designed by Söderhamn et al. [65], has 17 items. Each item is scored on a 5-point Likert scale, ranging from "strongly agree" to "strongly disagree". The minimum and maximum scores are 17 and 85, respectively, with higher score indicating higher level of the self-care, and vice versa. A score lower than 69 indicates a low level of self-care ability, and a score equal to or higher than 69 indicates a high level of self-care ability. Söderhamn et al. [66] reported the validity and reliability of this scale to be 0.68 and 0.88, respectively. Besides, Hashemlo et al. [67] reported the validity and reliability of the current scale equal to 0.86 and 0.743 in Iran. The reliability of this questionnaire in the present study was 0.73, using Cronbach's alpha method.

**Social Capital Scale.** This scale, designed according to Nahapiet and Ghoshal's [68] model, measures the level of social capital through three subscales of structural, cognitive, and relational elements. This scale consists of 15 items to measure social capital on a 5-point Likert scale, ranging from "very low" to "very high", with higher score indicating higher level of social capital, and vice versa. Ghalavandi et al. [69] reported the Cronbach's alpha coefficient of this scale to be 0.74, 0.78, and 0.79 for each one of above-mentioned three subscales of social capital. Using confirmatory factor analysis, Mohajeran et al. [70] confirmed the three-factor models of this questionnaire in an Iranian population. The reliability of this questionnaire in the present study was 0.79, using Cronbach's alpha method.

**Beck's Depression Questionnaire (BDI-13).** This questionnaire was published by Beck and Steer in a new form in 1987 [71]. The items of this questionnaire are obtained from observing and summarizing the attitudes and symptoms of depressed patients. Beck's depression inventory consists of 21 items and the short form consists of 13 items. In the 13-item form, applied in the current study, the score varies between zero and 39. There are four questions for each component, and the value of scores is between zero and 3. The score of zero indicates mental health, and the score of 3 indicates major depression. The validity and reliability of this test are reported to be acceptable [72]. In Iran, Tarsafi et al. [73] reported that the reliability coefficient of the depression scale is 0.87 using Cronbach's alpha method. Using confirmatory factor analysis, Ghassemyadeh et al. [74] confirmed the one-factor, two-factor and three-factor models of this questionnaire in an Iranian population. The reliability of this questionnaire in the present study was 0.76, using Cronbach's alpha method.

**Templer's Death Anxiety Scale (DAS).** This scale, designed by Templer [75], consists of 15 items that measure participants' attitudes toward death. Participants answer the questions by "Yes" and "No" to indicate that suffer and do not suffer from death anxiety, respectively. Accordingly, scores of this scale vary between zero and 15, with higher scores indicating individuals' higher levels of death anxiety, and vice versa. DAS has been employed in different studies worldwide for measuring death anxiety. In the main culture, test-retest coefficient of the scale with an interval of one month was reported to be 0.83 [75]. In Iran, Rajabi and Bahrani [76] reported the reliability of the DAS, through Cronbach's alpha, split-half, and two-week test-retest to be 0.6, 0.52 and 0.63, respectively. Rajabi and Bahrani have also reported the validity of DAS through considering its correlation with Dickstein's Death Concern Scale (DSC), the Collett-Lester's Fear of Death Scale (CL-FODS), the Abdel-Khalek's Reasons for Death Fear Scale (RDFS), the Abdel-Khalek's Death Obsession Scale (DOS) to be 0.52, 0.38, 0.50 and 0.47, respectively. Using confirmatory factor analysis, Soleimani et al. [77] confirmed the one-factor, and three-factor models of this questionnaire in an Iranian population. The reliability of this questionnaire in the present study was 0.75, using Cronbach's alpha method.

**UCLA Loneliness Scale.** This scale, designed by Russell et al. [78], consists of 20 items, half of which are negative sentences and half are positive ones. Each item is scored on a 4-point Likert scale, ranging from "never" to "always". The minimum and maximum scores are 20 and 80, respectively, with higher score indicating higher feelings of loneliness, and vice versa. The validity of the test is reported by Russell et al. using the test-retest method to be 0.89. Hojjati et al. [79] reported Cronbach's alpha for this scale to be 0.89. Hojjati et al., also reported the Cronbach's alpha coefficients for this scale through the test-retest method with a time interval of two weeks were obtained 0.91. Using confirmatory factor analysis, Soleimani et al. [77] confirmed the one-factor, two-factor and three-factor models of this questionnaire in an Iranian population. The reliability of this questionnaire in the present study was 0.80, using Cronbach's alpha method.

### 2.3. Procedure

The executive process of this research has been approved by the Ethics Committee of Kermanshah University of Medical Sciences under No. IR.KUMS.REC.1400.52. All procedures were carried out an adequate understanding and each participant provided their informed consent prior to the study. The study was conducted in accordance with the Declaration of Helsinki relative to clinical non-interventional research. After obtaining the necessary permits we conducted the preliminary stage of the research. During this stage, we designed the aforementioned questionnaires in the form of online ones. The procedure for developing online questionnaires

involves inputting the questionnaire’s items and corresponding rating scales into a platform that offers data collection services in Iran (the platform employed in this study was digit.kums.ac.ir). Subsequently, the platform generates a unique link through which individuals can access the survey. When respondents click on the provided link, they are directed to the survey webpage, allowing them to provide their responses. Participants were also asked to answer preliminary questions concerning inclusion criteria, and those who met the inclusion criteria were allowed access to the main questionnaires. One of the advantages of conducting this study online was that the questionnaires were designed in such a way that they would not be sent until they were fully answered. Therefore, there was no missing data. Finally, reviewing 530 questionnaires completed by the participants, we discarded 41 distorted questionnaires (for reasons such as age outside the scope of this study, and suffering from debilitating mental and physical illnesses) and analyzed 489 questionnaires as the final sample of the research. The data obtained from the questionnaires were analyzed using Pearson’s correlation coefficient and path analysis in SPSS-21 and LISREL-10.2 software .

### 3. Results

Table 2 shows the descriptive information including mean and standard deviation for research variables. In addition, Pearson’s correlations are reported to determine the relationship all variables included in the path model. The mean and standard deviation of death anxiety are 48.76 and 12.06, respectively. The correlation coefficient of death anxiety with life meaning was  $-0.36$ , with social support was  $-0.15$ , with Self-care was  $-0.24$ , with psychological well-being was  $0.32$ , with Loneliness was  $0.33$ , and with depression was  $0.34$ . All these coefficients are significant at the level of  $0.01$ . More details are shown in Table 1.

Table 2 shows the direct, indirect, and total effects for the relationship of the variables in the model to death anxiety, depression and loneliness. According to the results of this table, life meaning ( $\beta = -0.23$ ), Social support ( $\beta = -0.13$ ), Self-care ( $\beta = -0.11$ ) and well-being ( $\beta = -0.14$ ) have a significant direct effect in the variance of elderly’s loneliness. Also, life meaning ( $\beta = -0.23$ ), Self-care ( $\beta = -0.10$ ), well-being ( $\beta = -0.11$ ), loneliness ( $\beta = 0.16$ ) and depression ( $\beta = 0.14$ ) have a significant direct effect in the variance of elderly’s death anxiety. As well, life meaning ( $\beta = -0.11$ ), social support ( $\beta = -0.11$ ), self-care ( $\beta = -0.10$ ), well-being ( $\beta = -0.26$ ) and loneliness ( $\beta = 0.25$ ) have a significant direct effect in the variance of elderly’s depression.

According to the results of Table 2, the mediating role of loneliness in the relationship between life meaning, social support, self-care and well-being with death anxiety is significant and the mediating role of loneliness in the relationship between life meaning, self-care and well-being with depression is significant. Therefore, in addition to the direct effect of life meaning, social support, self-care and well-being on death anxiety and depression, their indirect effect was also confirmed by mediation alone of loneliness. Fig. 2 shows the relationships obtained from path analysis with the standard parameter index and the t-value (in parentheses) on the paths.

The goodness-of-fit indices reported in Table 3 show that the analyzed model has an excellent fit.

The fit indices of the model are presented in Table 3. For the  $X^2/df$  fit index, values smaller than 3 are appropriate, and the closer it is to zero, the better the model will fit. For GFI and IFI, CFI, a value close to or above 0.90 is considered an acceptable good fit, indicating that the model is good [80]. In relation to the RMSEA index, values close to or less than 0.05 indicate a good fit of the model and a value of 0.08 or less indicates a logical approximation error [80]. The fit indices presented in Table 3 indicate the appropriate fit of the model.

### 4. Discussion

The current study aims to investigate the relationship between the meaning of life, psychological well-being, self-care, and social capital with depression and death anxiety through the mediating role of loneliness in the elderly living in nursing homes. The pathway analysis indicated that the model proposed by this study properly fits in the studied sample. According to the obtained results, in addition to the direct effect of meaning of life, social capital, self-care and psychological well-being on death anxiety and depression, the indirect effect of them on death anxiety and depression through the mediating role of loneliness was confirmed. Accordingly, all hypotheses of this study were confirmed.

**Table 1**  
Descriptive statistics for research variables and correlation coefficient between them.

variable	M	SD	skewness	kurtosis	Correlation matrix						
					1	2	3	4	5	6	
1. life meaning	41.11	8.70	-0.607	-0.916	-						
2. Social support	48.07	9.35	-0.149	-0.182	0.23 <sup>b</sup>						
3. Self-care	57.29	7.45	-1.014	1.809	0.12 <sup>a</sup>	0.08	-				
4. well-being	53.06	9.59	-0.522	0.155	0.33 <sup>b</sup>	0.36 <sup>b</sup>	0.37 <sup>b</sup>				
5. Loneliness	64.42	10.67	-0.016	-0.889	-0.28 <sup>b</sup>	-0.23 <sup>b</sup>	-0.20 <sup>b</sup>	-0.29 <sup>b</sup>			
6. depression	43.07	10.50	-0.222	-0.668	-0.30 <sup>b</sup>	-0.29 <sup>b</sup>	-0.27 <sup>b</sup>	-0.44 <sup>b</sup>	0.40 <sup>b</sup>		
7. death anxiety	48.76	12.06	0.180	-0.880	-0.36 <sup>b</sup>	-0.15 <sup>b</sup>	-0.24 <sup>b</sup>	-0.32 <sup>b</sup>	0.33 <sup>b</sup>	0.34 <sup>b</sup>	

M = mean, SD = standard deviation

<sup>a</sup>  $p < 0.05$

<sup>b</sup>  $p < 0.01$

**Table 2**  
Path coefficients for, psychological distress, social support, self-compassion, resilience, emotion regulation and QOL.

Dependent	predictors	Direct effect	t-value	Indirect effect	t-value	Total effect	t-value
death anxiety (R2 = 0.50)	life meaning	-0.23	-5.22	-0.05	-3.69	-0.28	-6.42
	Self-care	-0.10	-2.38	-0.04	-2.89	-0.14	-3.15
	Well-being	-0.11	-2.22	-0.06	-3.53	-0.17	-3.63
	Loneliness	0.16	3.59	-0.03	-2.59	0.19	4.47
	depression	0.14	2.88	-	-	0.14	2.88
depression	life meaning	-0.11	-2.66	-0.05	-3.48	-0.16	-3.74
	Social support	-0.11	-2.64	-0.03	-2.55	-0.14	-3.30
	Self-care	-0.10	-2.49	-0.03	-2.32	-0.13	-3.07
	well being	-0.26	-5.73	-0.03	-2.58	-0.29	-6.32
	Loneliness	0.25	6.01	-	-	0.24	6.01
Loneliness	life meaning	-0.23	-4.27	-	-	-0.23	-4.27
	Social support	-0.13	-2.81	-	-	-0.13	-2.81
	Self-care	-0.11	-2.51	-	-	-0.11	-2.51
	well being	-0.14	-2.85	-	-	-0.14	-2.85

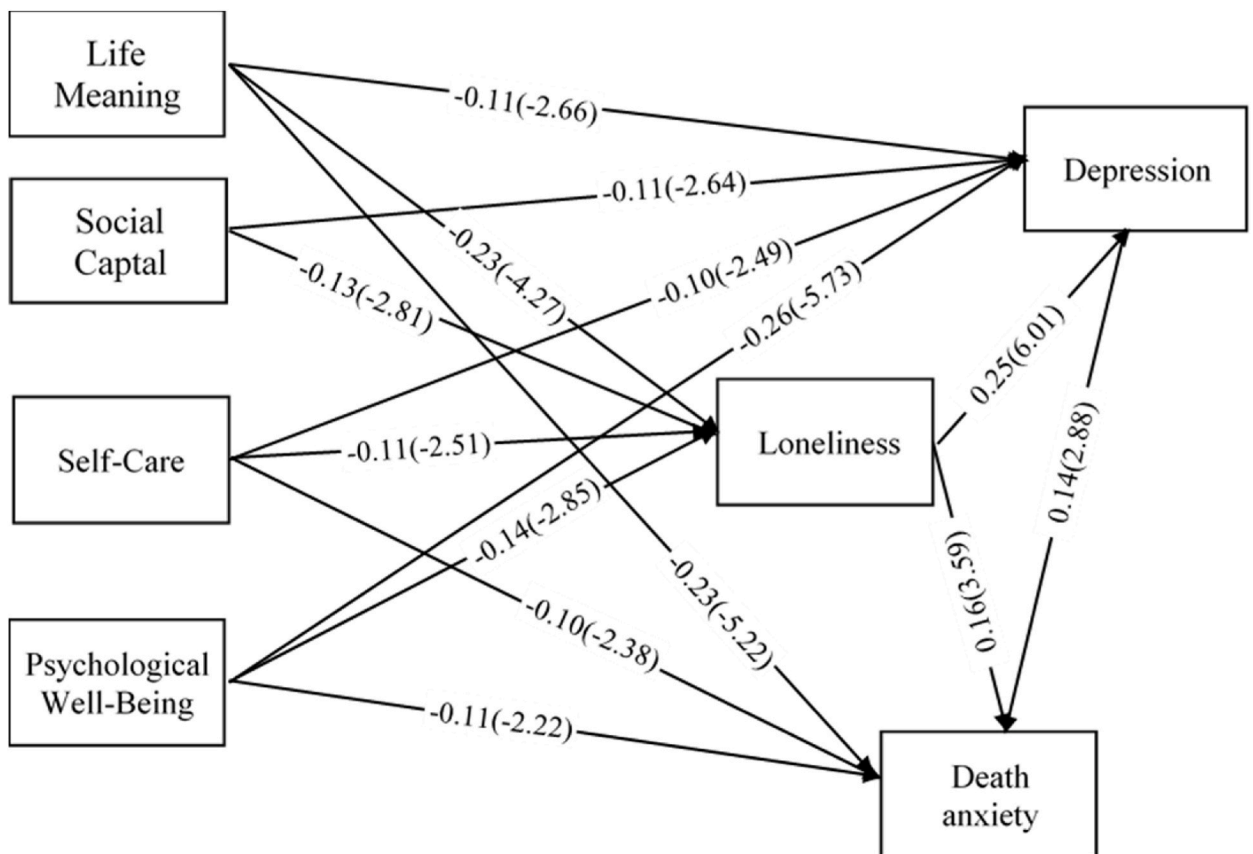


Fig. 2. Standard estimate (and t-value) for relationship between variables.

**Table 3**  
The goodness of Fit Indices for the Models.

Index	$\chi^2$	P-value	df	$\chi^2/df$	RMSEA	CFI	AGFI	NFI	IFI
Value	0.53	0.47	1	0.53	0.00	0.99	0.99	0.99	0.99

$\chi^2/df$ :  $\chi^2$  to the degree of freedom index; RMSEA: root mean square error of approximation; CFI: comparative fit index; AGFI: Adjusted goodness fit index; NFI: Normed Fit Index; IFI: Incremental Fit Index.



#### 4.1. *The relationship of meaning of life and depression through loneliness*

The first hypothesis stating that the meaning of life is negatively correlated with depression through loneliness was confirmed. In other words, individuals with a high level of meaning of life are less likely to feel loneliness, which in turn, leads them to experience lower level of depression. Although there is no study addressing this path, the finding of this study are consistent with that of previous studies [22,42,43,49,51,81] in terms of the constituent relationships of this pathway. Regarding the interpretation of this finding, Klefтарas and Psarra [81] pointed out that individuals experiencing the high meaning of life, have usually a positive perception of their personal health level, experience lower level of anxiety and sleep disorder and, most importantly, have higher social performance, all of which will lead to lower level of depression. Besides, Steptoe and Fancourt [42] believe that individuals with a higher level of meaning and value in their life are probably more in touch with their friends, and are more likely to participate in social and cultural events. The idea that they feel they are doing valuable things not only is the result of this social participation but also makes them stay involved in personal and social relationships, thus experiencing a lower feeling of loneliness. Ultimately, conducting a 12-year longitudinal study on the relationship between loneliness and depression, Lee et al. (2021) stated in the interpretation of the mentioned relationship that loneliness can lead to cognitive dysfunction, such as increased vigilance towards threatening social stimuli and negative cognitive bias. Lonely individuals are more likely to expect negative social interactions, reminiscence negative social memories, and negatively evaluate themselves and their social context. Loneliness can lead to negative thoughts about self and is accompanied by depression. Experiencing meaningful companionship, belonging, and communication has lots of advantages, and a reduced level of each leads to depression.

#### 4.2. *The relationship of psychological well-being and depression through loneliness*

The second hypothesis stating that psychological well-being is negatively correlated with depression through loneliness was confirmed. In other words, individuals with high psychological well-being are less likely to experience feeling of loneliness, which in turn, leads them to experience lower level of depression. Even though no study has investigated this path, the finding of this study are consistent with that of previous studies [24,25,44,45] in terms of the constituent relationships of this pathway. In interpretation of this finding, Hemingway & Jack [44] believe that three important parts of the elderly's well-being are maintained and developed in social communications. Hemingway and Jack believe that self-esteem, quality of life, and empowerment in old age may be increased through participating in communities and avoiding loneliness. They believe that the presence of the elderly in the community and avoiding isolation and loneliness are related to high well-being through the development of factors, such as collective and individual identity, taking a role in society, providing and receiving social support, friendship, inclusivity, and social connection. In addition, Dhara & Jogsan [24] stated that the relationship of the elderly with their family members seems to be of the essential factors in the relationship between depression and well-being. They believe that due to the lack of proper caring conditions by family members and being ignored by caregivers, the well-being of the elderly can be threatened which may lead to physical and mental problems, such as depression.

#### 4.3. *The relationship of self-care and depression through loneliness*

The third hypothesis of this study stating that self-care is negatively correlated with depression through loneliness was confirmed. In other words, individuals with a high level of self-care are less likely to experience the feeling of loneliness, which in turn, may cause them to experience lower level of depression in them. Although no study has investigated this path, the finding of this study are consistent with that of previous studies [27,46] in terms of the consistent relationships of this pathway. Regarding the interpretation of this finding, Canjuga et al. [82] believe that the elderly who have adequate knowledge and ability in self-care and an effective support system, are capable enough to increase their emotional, religious, and physical health, and to independently maintain their social participation, which in turn, lead them to experience a lower feeling of loneliness. According to Giardini et al. [83], however, insufficient self-care has some implications, such as reducing the level of health in individuals and may result in an increased level of disappointment, as the central core of depression. This type of disappointment usually reduces the incentive and tendency of individuals to do their desired activities and participate in social events, which leads to depression. This issue might lead to the formation of a downward spiral circle in which depression reduces self-care behaviors, which in turn increase the depression.

#### 4.4. *The relationship of social capital and depression through loneliness*

The fourth hypothesis of this study, stating that social capital is negatively correlated to depression through loneliness, was confirmed. In other words, individuals with high social capital are less likely to feel loneliness which, in turn, lead them to experience lower levels of depression. Although no study has investigated this path, the finding of this study are consistent with that of previous studies [29–31,47,48] in terms of the consistent relationships of this pathway. Regarding the interpretation of this finding, Bai et al. [47] believe that elderly with a low level of social capital are more likely to experience loneliness due to lower functional ability, lower level of trust in others, and lower level of participation and communication. Similarly, Nyqvist et al. [48] stated that the elderly have a lower chance of maintaining their own social capital due to the higher risk of losing their friends and spouse. They believe that aging and loss of cognitive ability and functional limitation do not directly lead to loneliness but bring about depression, which per se results in the feeling of loneliness. In their points of view, there is a circular causality between depression and loneliness, because the feeling of loneliness probably brings about depression. They believe that the important factor in the reduced social capital, which leading to loneliness and depression is the loss of social participation among the elderly. In support of this interpretation, Sun et al. [30] also

expressed that the most important reason behind higher social capital in the elderly (below 80 years old) is their ability for social interaction leading to the lower feeling of depression.

#### 4.5. *The relationship of meaning of life and death anxiety through loneliness*

The fifth hypothesis of this study, stating that Meaning of life is negatively correlated with death anxiety through the loneliness was confirmed. In other words, individuals with a higher meaning of life have a lower feeling of loneliness, which in turn, lead them to experience a lower death anxiety.

Although no study has investigated this path, the finding of this study are consistent with that of previous studies [33,52,53] in terms of the consistent relationships of this pathway. Regarding the interpretation of this finding, Moore et al. [84] expressed that it seems that individuals with a higher meaning of life understand the high meaning life clearly, explain the essence of life based on their own personal values, and are capable of recognize goals and values of survival and life, and for this reason, they can have a more realistic perspective, accept the death and the its pertinent issues easily, and experience lower death anxiety. According to the *meaning management theory* [85], the best way to alleviate death anxiety appears to be searching for the meaning of life. This model also states that individuals aspire to live a more meaningful life, and focusing on positive growth seems better than searching for a defense mechanism against death anxiety.

#### 4.6. *The relationship of psychological well-being and death anxiety through loneliness*

The sixth hypothesis stating that psychological well-being is negatively correlated with death anxiety through loneliness was confirmed. Indeed, individuals with higher psychological well-being have a lower feeling of loneliness, which in turn caused them to feel lower level of death anxiety. Although no study has investigated this path, the finding of this study are consistent with that of previous studies [44,45,52,53,86] in terms of the consistent relationships of this pathway. Regarding the interpretation of this finding, we can say that based on the existentialism theory [87], the awareness of an individual regarding the death issue is the most important factor in the highest level of psychological well-being. According to this theory, individuals with a higher level of psychological well-being focus more on the awareness of being alive when encountering the death issue. In this case, instead of thinking that life is a perpetual and immortal essence and being engrossed in it, they are aware that they are living and can take advantages of being alive. According to what was mentioned before [44], the elderly with higher well-being are present in society and have a more social role. In this case, we can probably assert that this the concentration on being alive, increases the tendency to use life properly, as well as the tendency to social participation among the elderly, and maintains the bonding with the common values of their own culture, and for these reasons, decrease their death anxiety.

#### 4.7. *The relationship of self-care and death anxiety through loneliness*

The seventh hypothesis of this study stating that self-care is negatively correlated with death anxiety through loneliness was confirmed. Indeed, individuals with higher self-care have a lower feeling of loneliness, which in turn causes them to experience lower death anxiety. Although no study has investigated this path, the finding of this study are consistent with that of previous studies [36,52,53] in terms of the consistent relationships of this pathway. In interpretation of this finding, we again refer to Canjuga et al. [82], based on which, individuals with higher self-care have the required ability to maintain emotional, religious, and physical health, which can be correlated with their awareness of being alive and using this mortal essence. In addition, individuals with lower self-care can experience consequences like decreased health that can convey the meaning of forthcoming death in their minds. Thereby, such individuals are less likely to experience death anxiety, which leads to lower level of depression among them.

#### 4.8. *The relationship of social capital and death anxiety through loneliness*

The eighth hypothesis of this study, stating that social capital is negatively correlated to death anxiety through loneliness, was confirmed. To put it differently, individuals with high self-care have a lower feeling of loneliness, which lead them to experience lower death anxiety. Although no study has investigated this path, the finding of this study are consistent with that of previous studies [37,52,53] in terms of the consistent relationships of this pathway. In interpreting this finding, we can again refer to the previously provided interpretations. In this case, individuals with lower social capital are less able to experience social interaction, trust, and reciprocity, and will probably have a more feeling of loneliness. Such loneliness deprives them of engaging in a social condition, feeling alive, and living a life as a mortal essence, which in turn leading to a higher experience of death anxiety.

## 5. Conclusion

Taking a glance at the aforementioned interpretations, we can find out a fundamental common issue among all of them, which is social participation, the opposite point of feeling loneliness. As indicated, the meaning of the elderly's life is formed by maintaining the social function, peer relationships, companionship, belonging, and connection. Their social well-being consisting of self-esteem, quality of life, and empowerment is satisfied thanks to their social relations, social participation, and receiving social support. Meanwhile, their self-care is closely correlated with maintaining the social participation, and their social capital is satisfied thanks to mutual trust, reciprocity, and social participation. Therefore, one of the fundamental variables in identifying and preventing



depression and death anxiety is loneliness among the elderly, which could only be improved by elevating their social participation.

### 5.1. *The implications of the current study for therapy*

Based on the findings of the current study, it is crystal clear that loneliness serves as a crucial variable in the elderly. Therefore, the current study can convey a clear message to authorities tasked with making policies for the elderly population. It appears that by organizing social events where older adults can engage with others, authorities can help the elderly increase their sense of meaning in life and well-being, as well as provide them with social capital. Incentivizing them to take care of themselves would also enable them to participate more effectively in these social programs. By doing so, an important step can be taken towards reducing depression and death anxiety in the elderly by alleviating their feelings of loneliness. It is recommended that experts and therapists working with the elderly apply interventions and therapeutic methods that ensure the presence of the elderly in communities and their active participation in various social activities.

### 5.2. *The limitations of the current study*

One of the limitations of this study is about the data collection method that was done using self-report questionnaires. Although providing useful information, sometimes, these questionnaires can reduce the validity of the obtained results. Besides, although path analysis is used in this study, the nature of the obtained relations is of correlative, not causal type. Due to the utilized statistical method and cross-sectional study, casual interpretation of this type of study is not appropriate. In addition, this study was conducted on Iranians, and due to the profound cultural difference between the eastern and western communities, some considerations should be considered in generalizing these findings to other communities.

### 5.3. *Suggestions for future studies*

According to the mentioned limitations in the current study, it is proposed that future studies use highly precise tools under a condition with controlling disruptive variables for investigating the mentioned relationship in this study. Moreover, future studies could use a longitudinal design to consider the relationship between these psychological structures. In addition, re-conducting such studies in different cultural contexts will help to obtain more universal and exact findings in this field.

## **Ethics statement**

The participation agreement for this study was obtained online through an informed consent process. At the beginning of the questionnaires page, participants were presented with an option titled, "By selecting this option and clicking continue, you are providing your informed consent to participate in this study." Through choosing this option, participants indicated their informed consent to participate in the study.

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## **Additional information**

No additional information is available for this paper.

## **Data availability statement**

The data related to this study is accessible via <https://osf.io/xmfb3/> or DOI: 10.17605/OSF.IO/XMFB3.

## **CRediT authorship contribution statement**

**Majid Yousefi Afrashteh:** Writing – review & editing, Supervision, Resources, Methodology, Conceptualization. **Mohammad Reza Majzoobi:** Writing – original draft, Software, Formal analysis, Data curation. **Parisa Janjani:** Writing – original draft, Validation, Data curation, Conceptualization. **Simon Forstmeier:** Writing – review & editing, Methodology.

## **Declaration of competing interest**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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