Middle East Current Psychiatry

RESEARCH

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The impact of sense of loneliness on geriatric depression: the mediating role of sense of mattering and psychological adjustment

Haya Khaled Aman[1*]

Abstract

Background Depression is a highly prevalent mental disorder in older adults, and among its highest risk factors is loneliness. Although this relationship is commonly evident, the mechanisms underlying it, such as sense of mattering and psychological adjustment, lack exploration. The current research aims to examine the relationship between loneliness and geriatric depression and explore the mediating roles of sense of mattering and psychological adjustment.

Methods A sample of 200 older adults (63.5% females; mean age = 75.6; SD = 8.806) were recruited from 24 geriatric homes in Cairo, Egypt. Participants responded to the Arabic versions of the Mini-Mental State Examination for excluding the severely demented, Geriatric Depression Scale-15, University of California, Los Angeles Loneliness Scale-version 3, General Mattering Scale, and Brief Adjustment Scale-6. The mediation analysis was conducted using multiple linear regression with Hayes' process macro on SPSS26 and structural equation modeling on JASP0.18.1.0.

Results Sense of mattering and psychological adjustment showed a significant total effect (β = .051, 95%CI [.045, .056], $z = 18.436$, $p < .001$) separated into a significant direct effect (β = .019, 95%CI [.009, .029], $z = 3.784$, $p < .001$) and a significant indirect effect (β = .031, 95%CI [.022, .041], $z = 6.478$, $p < .001$), indicating simultaneous partial mediation by the two variables. Additionally, sense of mattering accounts for 76% of the impact of loneliness on geriatric depression, and psychological adjustment accounts for 60.1%.

Conclusion Loneliness significantly impacts geriatric depression through a sense of mattering and psychological adjustment. These findings implicate substantial insight for interventions that can be targeted at the reduction of geriatric depression through reducing loneliness feelings and enhancing sense of mattering and adjustment.

Keywords Sense of loneliness, Geriatric depression, Sense of mattering, Psychological adjustment, Mediation

Introduction

The elderly are a growing yet unattended population that is highly impacted by depression; geriatric depression affects 35.1% of the world's elderly [1], affecting people above 60 years of age and evidenced by common major depression symptoms, along with suicidal thoughts, somatic symptoms, and significant quality of life deterioration [2].

The elderly face paramount biological, psychological, and social challenges throughout the complex process of aging, such as genes, age-related neurocognitive changes, somatic disorders, perceived health, dependence on daily living activities, stressors, isolation/loneliness, and depression/suicidal history, which have been the most featured geriatric depression risk factors universally [3–5].

*Correspondence:
Haya Khaled Aman
Haya.aman@bue.edu.eg
[1] The British University in Egypt, El Sherouk, Cairo, Egypt

Loneliness, the subjective feeling and/or objective experience of isolation from social surroundings, is substantially experienced by elderlies along with depression [6, 7]. Nevertheless, its prediction and indirect impact through other controllable factors has been scarcely investigated, specifically with Egyptian elderlies, despite depression afflicting 23.7–74.5% of them [8]. Sense of mattering, feeling important, valued, and needed to others interpersonally and to/by the broader society [9], and psychological adjustment, the ability to change behaviors/attitudes, attempting to cope with changing conditions in the environment [10] are potential geriatric depression controllable contributors, given elderlies' inevitable changes/losses.

Leaving these factors' direct and indirect impacts unstudied and not implicated may lead depression and loneliness to stay problematic for the elderly population and their caregivers and strain health institutes. This significance is complemented by its feasibility in the Egyptian population through standardized tools and ethical standards, foreshowing potential prevention and treatment interventions for geriatric depression, enhancing elderly functioning and quality of life.

Hence, this research aims to examine the role of a sense of mattering and psychological adjustment in mediating the relationship between a sense of loneliness and geriatric depression in a sample of Egyptian elderly recruited from geriatric homes.

Research question: What is the mediating effect of a sense of mattering and psychological adjustment on the relationship between a sense of loneliness and geriatric depression?

Sense of loneliness and geriatric depression

The influence of loneliness on physical/mental health and depression can be explained by Cacioppos' (2018) evolutionary theory of loneliness, Weiss's (1973) theory of social needs that when unmet lead to feelings of loneliness, and cognitive discrepancy theory, were adults have a disparity between desired and actual social connection [11–13]. Additionally, this association has gained substantial research consideration; loneliness is prevalent in 20–34% of elderlies who are bound to their homes and pose significantly high risks of depression longitudinally in men and women [14–18], independently of demographic risk factors in cross-country studies [7, 19–22].

Furthermore, loneliness appears to have physiological mechanisms that manifest in declining neurocognitive and immune systems, cardiovascular disease, mortality risk, dementia, physical inactivity, and depression [23–26]. Moreover, during the COVID-19 pandemic, elderly mood-disorder inpatients and outpatients reported high loneliness that significantly correlated with depressive symptoms, poor subjective health, and fear [27–29]. Studies carried out in Egypt showed similar results, where self-reported loneliness positively correlated with and predicted depression in elderlies of various settings [4, 6, 30–34].

Hence, despite the non-abundance of Egyptian studies, the literature depicts vast evidence of positive, significant correlations between subjective/objective loneliness and geriatric depression. Therefore, the current study hypothesizes that:

H1: Sense of loneliness will be positively correlated with geriatric depression.

Sense of mattering and geriatric depression

Rosenberg's and McCullough's (1981) theory of mattering explains that humans' feelings of being valued, needed, and important to others strongly impact their thinking and behavior [9]. Furthermore, Erikson (1982) proposed that older adults may experience depressive symptoms due to feeling stagnant, or stuck, rather than generative, or useful and mattering [35]. Moreover, the sense of mattering's and depression's correlation has shown worthwhile findings in certain populations, postpartum women and adults [36, 37] yet scarcely with elderlies.

This association is evident in mattering's protection of elderlies' well-being during crisis/stress, such as the pandemic, contribution to positive aging and resilience, and physical/mental problems, including suicide when lacking [38–41]. Mattering feeling was significantly correlated to geriatric depression due to negatively perceived self-worth and low social support in elderlies of different sexual identities and circumstances, whereby trials of interventions that enhance their mattering/purpose after retirement showed efficacy [42–46].

Therefore, although not thoroughly studied, a sense of mattering proves essential for elderlies' physical and mental health with an inverse relation with depression. Consequently, the second hypothesis of this study is that:

H2: Sense of mattering will be negatively correlated with geriatric depression.

Psychological adjustment and geriatric depression

The transdiagnostic theory of adjustment explains that elderlies' stressful life changes cause emotional disequilibrium, often leading to depression [47]. Older adults experience several, simultaneous major stressors and losses, which may lead to adjustment disorders and depression [48]. Older adults' psychological maladjustment to retirement, physical disability, life changes, and acute cardiac problems significantly predicted geriatric depression due to a lack of acceptance and hopelessness, as explained by Erikson's concept of "ego integrity versus hopelessness" [49–53]. Moreover, maladjustment

and depression were correlated in older adults with early-stage dementia, those with strong memory functioning assessed during the pandemic, and those living without their families [54–56]. Higher adjustment abilities show evidence of lowering cortisol levels and less depressive symptoms in older adults [57, 58].

Therefore, psychological adjustment was found to correlate with geriatric depression, yet needs further investigation in Egyptian geriatric research. Hence, the third hypothesis of this study is that:

H3: Psychological adjustment will be negatively correlated with geriatric depression.

Sense of loneliness and sense of mattering in older adults: paving the way for mediation

Loneliness and sense of mattering demonstrate a significant, negative correlation [59, 60], where low mattering contributes to loneliness in older adults when they are abandoned, not involved in decisions, retired, or treated negatively by caregivers, impacting their physical and mental health [61–63]. This presumed yet underexamined relationship leads to a fourth hypothesis whereby: **H4:** Sense of loneliness will be negatively correlated with sense of mattering in older adults.

Studying factors that mediate the loneliness-geriatric depression relationship is rationalized by its consistency and temporal order, yet only a few studies examined its mediators, finding that social support, resilience, perceived health, hardiness, and perceived stress can mediate or partially mediate this relationship in older adults [64–68]. Nevertheless, although substantially evident to correlate with geriatric depression and loneliness [59, 60], the sense of mattering was not investigated as a mediator in this relationship before. Therefore, the current study hypothesizes that:

H5: Sense of mattering may mediate the relationship between a sense of loneliness and geriatric depression.

Sense of loneliness and psychological adjustment: paving the way for mediation

Loneliness induces feelings of "psychological loss" in older adults and has strong, positive associations with psychological maladjustment; maladjustment predicts loneliness and increased internet use [69–73]. Although this relationship requires further investigation, it is feasible to hypothesize that: **H6:** Sense of loneliness may be negatively correlated with psychological adjustment.

Since the literature has evidence on the loneliness-depression, loneliness-adjustment, and adjustment-depression relationships, with a rational temporal order, the current study additionally hypothesizes that: **H7:** Psychological adjustment may mediate the relationship between sense of loneliness and geriatric depression.

Therefore, the study's main hypothesis is that a sense of mattering and psychological adjustment will mediate the relationship between loneliness and geriatric depression.

Conceptual model

The interplay of several modifiable factors contributing to geriatric depression signifies the need to investigate them and their mechanisms to incorporate them in interventions targeting elderly depression. Sense of loneliness, sense of mattering, and psychological adjustment are all evident to correlate with geriatric depression in the global literature. However, there is a gap in knowledge regarding the relative importance of each contributor. Moreover, since loneliness is consistently correlated with geriatric depression, information about factors mediating this relationship, such as a sense of mattering and psychological adjustment, is important yet lacking.

Finally, geriatric research in Egypt has not yet investigated any of the aforementioned variables in relation to geriatric depression other than loneliness, or any mediating variables. Therefore, the purpose of the current study is to investigate the ability of sense of mattering and psychological adjustment to mediate the relationship between loneliness and depression; hypotheses are conceptualized in Fig. 1.

Research methodology

Research design

The current study utilized a quantitative, cross-sectional, descriptive, correlational research design; its selection is justified by its convenience to fulfill the purpose of this research and respond to its research question/problem. The researcher collected data from participants at a specific time point using psychometric tools and statistically analyzed the results, correlating variables and assessing mediation effects, rather than attempts of manipulation or establishing causation [74, 75].

Sample

The sample size was calculated using the software G*Power3.1.9.7, utilized for calculating sample size and statistical power [76]. The calculated sample size was 182; therefore, the current study aimed at 200 older adults for acceptable statistical significance, in congruence to sizes used in reviewed studies [4, 6, 31–33].

A total of 200 adults aged 60+, from all socioeconomic classes, were recruited from 24 geriatric homes in Cairo, Egypt through purposive sampling since participants were recruited upon meeting the eligibility criteria indicated below. Inclusion/exclusion criteria aimed to indicate participants' eligibility for assessment on the variables' tools and avoid the impact of confounding variables, such as severe dementia.

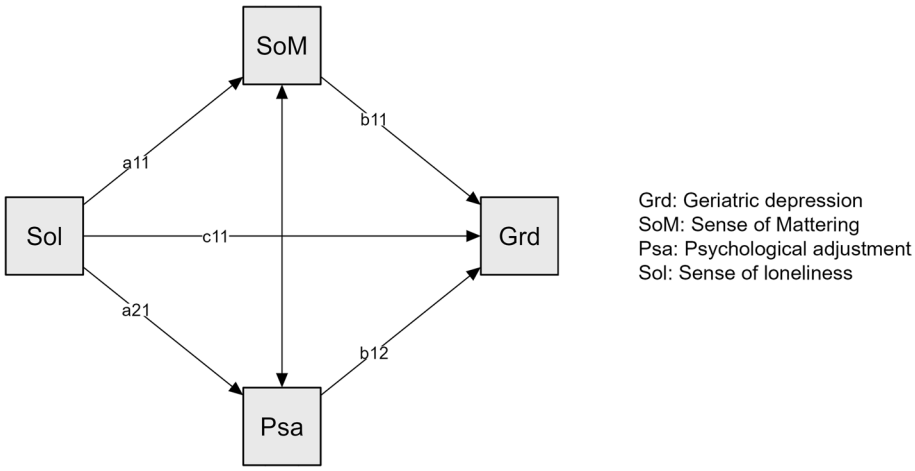

Fig. 1 Conceptual model

Inclusion criteria

60 + years, consent to participate, at least literate (can read and write—not necessarily received formal school education), and a fair hearing ability.

Exclusion criteria

Severe dementia/cognitive impairment indicated by a score lower than 17 on the Arabic Mini-Mental State Examination (MMSE) [77] and a history of psychiatric illness that may be contributing to current mood symptoms.

Measures

Mini-mental State Examination (MMSE)-Arabic

In order to screen for severe dementia that may prevent participants from understanding the variables' tools, the Arabic version of the Mini-mental State Examination (MMSE), adapted for Egyptian participants, was used. It covers 30 items of cognitive functions, providing cut-off scores for cognitive impairment levels; 23–30 for normal cognitive functioning, ≤ 22 for mild cognitive impairment, and ≤ 17 for severe cognitive impairment. These cutoff scores showed 95% sensitivity and 73.83% specificity in indicating cognitive impairment categories and screening for dementia; it has a high test–retest reliability of $r = 0.7$ and criterion validity [77–79].

Demographic data tool

A demographic data questionnaire was designed by the researcher to ensure that the intended sample characteristics are fulfilled, such as age (60 +), gender, education level, and socioeconomic status.

Geriatric Depression Scale-15 (Short Form)

Geriatric depression was measured by the "Geriatric Depression Scale-15" (GDS-15), which is the short version of GDS-30, developed by Yesavage et al. (1983) [80]. GDS-15 is a yes/no self-report that screens for depression symptoms in older adults, regarding the respondent's feelings over the past week. Scores range from 0 to 15; scoring 0–4 indicates no depression, 5–8 mild, 9–11 moderate, and 12–15 severe depression. 5 of the items are reversed (1, 5, 7, 11, 13) [81]. GDS-15 has high criterion, discriminant, convergent, and construct validity as well as internal consistency and test–retest reliability in original and Arabic-adapted versions [82–85].

The Arabic GDS-15 was administered on the present sample and revealed high internal consistency (Cronbach's $\alpha = 0.868$; McDonald's $\omega = 0.872$) and composite/construct reliability (coefficient $\omega = 0.856$; Coefficient $\alpha = 0.868$).

University of California, Los Angeles Loneliness Scale-Version 3 (UCLA-3)

The third, most recently revised version of the "University of California, Los Angeles Loneliness Scale" (UCLA) was used to measure the sense of loneliness. UCLA is a 20-item self-report that is responded to by rating statements with O (often), S (sometimes), R (rarely), and N (never) feeling the way stated. It has 9 reversed items (1, 5, 6, 9, 10, 15, 16, 19, 20); scores of 20–40 indicate low loneliness, 40–60 indicate mild loneliness, and 60–80 indicate high loneliness. UCLA-3 was assessed on the psychometric properties of elderly samples, resulting in high internal consistency, test–retest reliability, construct validity, and convergent validity on the original and Arabic, Egyptian versions [86–89].

UCLA-3-Arabic was administered on the current sample and had high internal consistency (Cronbach's α = 0.946; McDonald's ω = 0.946) and composite/construct reliability (coefficient ω = 0.931; coefficient α = 0.946).

Brief Adjustment Scale–6 (BASE-6)

The psychological adjustment was measured by "Brief Adjustment Scale–6" (BASE-6), a six-item self-report composed of 3 items for perceptions about distress and 3 items for relationships, self-esteem, and general functioning. Items are evaluated on a 7-point Likert scale (1 = not at all, 4 = somewhat, and 7 = extremely), where scores range from 6 to 42, and higher scores indicate low psychological adjustment [90]. BASE-6 was validated on older adults, demonstrating high internal consistency, test–retest reliability, as well as construct, convergent, content, and criterion validity in original and Arabic, Egyptian versions [90–93].

In the present study, BASE-6-Arabic showed high internal consistency (Cronbach's α = 0.932; McDonald's ω = 0.932) and composite/construct reliability (coefficient ω = 0.933; coefficient α = 0.932).

General Mattering Scale (GMS)

Sense of mattering was measured by the "General Mattering Scale" (GMS), conceptualized on importance, attention, and dependence as mattering dimensions [9]. GMS is a 5-item self-report that assesses the individual's extent of feeling important to others by a 5-point Likert rating (not at all to very much); scores range from 0 to 20, with higher scores indicating a higher sense of mattering. Unidimensional GMS previously demonstrated high internal consistency and construct, convergent, divergent, and criterion validity [94–96].

For standardization on the current sample, the GMS was translated and then back-translated with the assistance of English-language university professors and approved for content and face validity by a committee of academic psychiatry and psychology professors. GMS has high internal consistency (Cronbach's α = 0.92; McDonald's ω = 0.927) and composite/construct reliability (coefficient ω = 0.926; coefficient α = 0.92). Moreover, its single-factor has high construct validity (chi-square $\chi 2$ (5) = 5.040; $p = 0.411$, Comparative Fit Index (CFI) = 1, Tucker-Lewis Index (TFI) = 1, root mean square error of approximation (RMSEA) = 0.006), and significant item loadings ($p < 0.001$), ranging between 0.753 and 1.305. In addition, it has high convergent and discriminant validity, average variance extracted (AVE) = 0.724, and the square root of AVE = 0.85.

Data collection procedures

Geriatric homes in Cairo, Egypt were visited and briefed about the research, then provided approval for recruiting participants from their institutes; participants then provided their oral and written informed consents to participate.

Consequently, the researcher met and administered data collection tools with participants individually in their convenient settings. Initially, the researcher introduced herself to the participants, briefed the procedure, and encouraged them to ask questions, ensuring good initial rapport, evident from verbal and nonverbal participants' cues, before test administration.

To ensure the eligibility of all consented participants, information regarding some inclusion/exclusion criteria was first gathered from the responsible personnel in the geriatric homes; consequently, MMSE was implemented to ensure a study-eligible mental state, followed by the demographic data questionnaire, GDS-15, UCLA-3, BASE-6, and GMS. The tools were administered in a 20–25-min session with breaks in between upon the participant's request. The researcher repeated the procedure for 200 participants in 24 geriatric homes.

The research has obtained ethical approval from the research and ethics committee of the Faculty of Arts and Humanities at the British University in Egypt. All ethical guidelines of the American Psychological Association were adhered to prior to and throughout data collection and publication. These guidelines include an ethical board's approval and written informed consent for the geriatric home responsible personnel and the participants which contains the study's purpose, procedures, participants' rights for confidentiality, participants' rights to withdraw, expectations and benefits from participating, and participants' rights to acquire results.

Data analysis

The data collected from participants were then analyzed using specific descriptive and inferential statistics on SPSS26 and JASP0.18.1.0. Descriptive statistics included mean, standard deviation, and frequencies for the sample's demographic data and scores on the variables' tools. Inferential statistical tests included confirmatory factor analysis for assessing the construct, convergent, and discriminant validity of the tools utilized, as well as reliability analysis. In addition, multiple linear regression with Hayes' process macro with

bootstrapping and structural equation model was implemented for mediation analysis for the study's main hypothesis and results.

Results

Sample description

Table 1 demonstrates that participants ages ranged from 60 to 100 ($M=75.6$, SD = 8.806). The number of children participants ranged from 0 to 8 ($M=1.72$ children, SD = 1.586). Their average score on MMSE was 25.74 (SD = 3.844); these scores make them all eligible for participation in the study, categorized as no to moderate cognitive impairment. For gender, 63.5% ($N=127$) were females and 36.5% ($N=73$) were males. For the educational level, 6% ($N=12$) had no formal education yet literate, 11.5% ($N=23$) had primary education, 19% ($N=38$) had secondary education, 55% ($N=110$) had university education, and 8.5% ($N=17$) had postgraduate degrees. For the socioeconomic level, 30.5% ($N=61$) were in the low level, 40.5% ($N=81$) were in the middle level, and 29% ($N=58$) were in the high level. For marital status, 13% ($N=26$) were single, 17% ($N=34$) were married, 16.5% ($N=33$) were divorced, and 53.5% ($N=107$) were widowed.

Table 1 Demographic characteristics

Sample characteristics	*n*	%	Mean	Std. deviation
Gender				
Males	73	36.5		
Females	127	63.5		
Age			75.6	8.806
Educational level				
None	12	6		
Primary	23	11.5		
Secondary	38	19		
University	110	55		
Postgraduate	17	8.5		
Socioeconomic level				
Low	61	30.5		
Middle	81	40.5		
High	58	29		
Marital status				
Single	26	13		
Married	34	17		
Divorced	33	16.5		
Widowed	107	53.5		
Number of children			1.72	1.586
MMSE			25.74	3.844

N = 200

Descriptive analysis

Descriptive statistics were utilized to summarize data collected on each variable. Table 2 shows that participants GDS-15 scores ranged from 0 to 15, indicating no to severe depression, respectively ($M=7.04$, SD = 4.236); their average score indicates that the majority had geriatric depression symptoms. In addition, their UCLA scores ranged from 20 to 76, pertaining to a low to high sense of loneliness ($M=45.6$, SD = 15.7); their average score indicates that the majority experienced at least a moderate sense of loneliness. Their scores of BASE-6 ranged from 6 to 30, indicating good to poor psychological adjustment ($M=13.94$, SD = 8.185); their average score indicates that most participants had at least moderate maladjustment. Participants' scores on GMS ranged from 0 to 20, indicating no to a high sense of mattering ($M=9.88$, SD = 6.144); their average score indicates that most participants experienced a low sense of mattering.

Correlations

The correlations matrix (Table 2) shows that all variables were significantly correlated with each other ($p<0.0001$), and all correlations were strong, ranging from −0.747 to −0.872. As shown, the hypotheses regarding variables relationships are supported; geriatric depression was positively correlated with loneliness and psychological maladjustment, while negatively correlated with a sense of mattering. Loneliness was positively correlated with psychological maladjustment and negatively correlated with a sense of mattering. Psychological maladjustment negatively correlated with a sense of mattering.

Table 2 Variables descriptive statistics and correlations

Variable	*M*	*SD*	1	2	3	4
1. Geriatric depression	7.045	4.236	0.868			
2. Sense of loneliness	45.595	15.700	0.793***	0.946		
3. Sense of mattering	9.880	6.144	−0.759***	−0.872***	0.92	
4. Psychological adjustment	13.940	8.185	0.814***	0.775***	−0.747***	0.932

The diagonal line includes Cronbach's alpha of the tests' variables

N=200

***$p<.001$

Mediation analysis

To analyze the mediation effects of sense of mattering and psychological adjustment on the relationship between a sense of loneliness and geriatric depression, multiple linear regression with Hayes' process macro with bootstrapping and structural equation model (SEM) was utilized after ensuring significant correlations among variables. Both analyses revealed equivalent results.

In the mediation analysis of the SEM (Table 3), sense of mattering was a partial mediator in the model with a significant total effect (β = 0.051, 95%CI [0.045, 0.056], $z = 18.436$, $p < 0.001$), parted in a significant direct effect (β = 0.035, 95%CI [0.024, 0.046], $z = 6.411$, $p < 0.001$), and a significant indirect effect (β = 0.016, 95%CI [0.006, 0.025], $z = 3.248$, $p = 0.001$). Furthermore, analyzing psychological adjustment as a mediator revealed a significant total effect (β = 0.051, 95%CI [0.045, 0.056], $z = 18.436$, $p < 0.001$) that is separated into a significant direct effect (β = 0.026, 95%CI [0.019, 0.033], $z = 6.99$, $p < 0.001$) and a significant indirect effect (β = 0.025, 95%CI [0.018, 0.031], $z = 7.67$, $p < 0.001$), indicating partial mediation. When analyzed simultaneously, mattering and adjustment showed a significant total effect (β = 0.051, 95%CI [0.045, 0.056], $z = 18.436$, $p < 0.001$) separated into a significant direct effect (β = 0.019, 95%CI [0.009, 0.029], $z = 3.784$, $p < 0.001$) and a significant indirect effect (β = 0.031, 95%CI [0.022, 0.041], $z = 6.478$, $p < 0.001$), indicating simultaneous partial mediation by the two variables. Finally, a sense of mattering accounts for 76% of the impact of loneliness on geriatric depression, and psychological adjustment accounts for 60.1%. Model coefficients are indicated in Fig. 2.

Table 3 Mediation analyses by SEM

Model	Estimate	R^2	95% CI	
			LL	UL
Model1 (mediation by SoM)				
Total effect	0.051***	0.76	0.045	0.056
Direct effect	0.035***		0.024	0.046
Indirect effect	0.016**		0.006	0.025
Model2 (mediation by PsA)				
Total effect	0.051***	0.601	0.045	0.056
Direct effect	0.026***		0.019	0.033
Indirect effect	0.025***		0.018	0.031
Model3 (mediation by SoM and PsA)				
Total effect	0.051***		0.045	0.056
Direct effect	0.019***		0.009	0.029
Indirect effect	0.031***		0.022	0.041

N=200

SoM Sense of mattering, *PsA* Psychological Adjustment

**$p < .01$, *** $p < .001$

Discussion

This research examines the mediating effects of a sense of mattering and psychological adjustment on the relationship between a sense of loneliness and geriatric depression in elderlies in senior homes in Cairo, Egypt. The main hypothesis of this study was confirmed since loneliness has a significant, direct effect on elderly depression and a significant, indirect effect on it through sense of mattering and psychological adjustment. The study's main findings are discussed in relevance to the reviewed literature and implications.

Sense of loneliness appears to significantly, and positively correlate with and predict geriatric depression, evidenced by correlational and regression/SEM analyses,

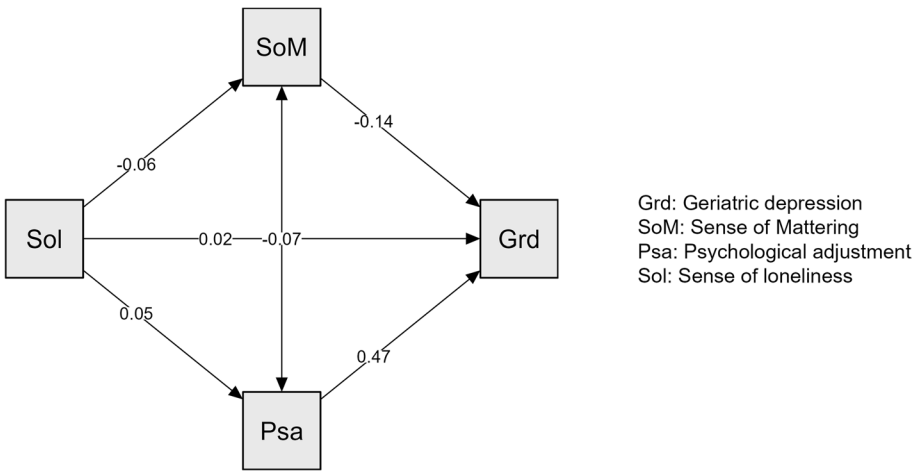

Fig. 2 Mediation analysis results

supporting the study's first hypothesis. These results align with previous research's substantial prevalence of loneliness and its longitudinal risk for depression in older adults universally, as it predicts depressive symptoms' onset persistently, independent of sociodemographic factors [14–18, 22]. Significant prediction by loneliness to elderly depressive symptoms was found in a previous longitudinal research ($p=0.019$) [20], while the current study's direct effect is more significant ($p<0.001$). These findings are further supported by previous research on loneliness's manifestation in physiological and neurocognitive diseases and consequent elderly depression [23–26] as well as in-and-out mood disorder elderly patients' highly reported loneliness and correlated depressive symptoms [27, 29]. Additionally, these results are similar to those of studies carried out in Egypt in numerous settings, finding high correlations/prediction of geriatric depression by self-reported loneliness (similarly assessed by UCLA) ($p<0.001$) [4, 6, 30–34]. These results are demonstrated by the evolutionary theory of loneliness, the theory of social needs, and the cognitive discrepancy theory [11–13]. Hence, reducing subjective loneliness can reduce depression symptoms in older adults.

Moreover, the analyses revealed that a sense of mattering and psychological adjustment are significantly, and negatively correlated with and predict depression, confirming the second and third hypotheses. These findings integrate with previous research on the sense of mattering's longitudinal, strong, significant correlation with elderly depression ($r=-0.60$, $p<0.01$) on 200 elderlies [37], yet in a stronger correlation with higher significance in the present study ($r=-0.759$, $p<0.001$). The results are further supported by studies that revealed protective impacts and reduction risks on elderlies' mental health, wellbeing, enhanced aging/stress resilience, and physical/mental risks when low [38, 41] and significant mattering-geriatric depression correlations in elderlies with difficult circumstances (ex: homosexuality, early retirement), where interventions enhanced mattering reduced depressive symptomatology [42–26]. The mattering-geriatric depression relationship is explained by theories of mattering impacting thinking/behaving and integrity-despair life stages [9, 35]. Moreover, the findings conform with research regarding the negative impacts of the elderly's maladjustment to major stressors on physical health and depression [48, 53]and maladjustment-depression correlations in elderlies with dementia, with strong memories, and residing away from their families, such as due to COVID-19 or elderly home residency in 925 reviewed studies and 60 assessed elderlies [54–56], whereas enhanced adjustment reduces depression and its related elevated cortisol [57, 58]. They are supported by the transdiagnostic theory of adjustment [47]. Hence, intervention targeting feelings of mattering and adjustment abilities may reduce elderly depression.

Additionally, loneliness and mattering were found to significantly, and negatively correlate, supporting the fourth hypothesis; this correlation was found in previous studies where loneliness/isolation negatively correlated with mattering in abandoned, neglected, retired, and negatively treated elderlies, producing profound negative physical/mental health effects [59, 62, 63]. This relationship led to the fifth hypothesis, which was supported, as a sense of mattering partially mediates the relationship between loneliness and geriatric depression, significantly ($\beta=0.016$, $p<0.01$), despite this specific mediator being unaddressed in that relationship previously. Therefore, interventions targeting loneliness may reduce elderly depression by enhancing mattering.

Furthermore, loneliness and adjustment are significantly, negatively correlated, confirming the sixth hypothesis and aligning with research about significant, positive loneliness-maladjustment associations in older adults, where both predict each other [69–71, 73]; Shafiq's (2020) study on 150 elderly, resulting in a significant association ($r=0.59$, $p<0.01$) [72], whereas this correlation in the current study was higher in significance ($r=0.775$, $p<0.001$). Moreover, psychological adjustment was found to partially mediate the loneliness-depression relationship, significantly ($\beta=0.025$, $p<0.001$), supporting the last hypothesis (H7), despite this specific mediator being unaddressed in that relationship previously. Hence, addressing loneliness may reduce geriatric depression through enhancing adjustment.

Thereupon, the partial mediation findings are justified and supported by previous research on other mediators in the relationship between loneliness and geriatric depression, such as social support, resilience, perceived health, hardiness, and perceived stress [64–68], yet mattering and adjustment are novel mediators. Hence, all findings conformed with and amplified previously limited research.

Limitations

Some of this study's limitations entail the inability to establish causal relationships due to the cross-sectional design. Future longitudinal research will help establish causal relationships between each variable and the outcome. Moreover, accounting for the setting where older adults reside may have had a role in the resultant relationships, such as in a comparative study of elderlies in their families' homes versus geriatric homes. Additionally, physical health impacts were not controlled. Elderlies have a variety of chronic, disabling diseases that must be examined and controlled in relation to depression. Finally, although high generalizability was aimed,

the purposive sampling technique may have restricted it; other probability sampling methods may guarantee higher generalizability.

Future research and practical implications

The findings of this study signify the need for further research in this area of geropsychology, given the scarcity of prior research on the investigated variables, while counterbalancing the aforementioned limitations. Future research may also capitalize on different types of mattering or adjustment within direct/indirect impact on depression and aim for a nationwide sample to enhance generalizability.

Additionally, given the prevalence of geriatric depression, clinical implications direct mental health professionals in clinical settings and geriatric homes to the need for regular elderly' screening for depression and incorporating in their depression treatment strategies for reducing their loneliness feelings, while enhancing their sense of mattering and adjustment ability. Other geriatric healthcare practitioners must consider collaborating with mental health professionals for elderly depression diagnosis and treatment. The findings also imply social practices regarding psychoeducation for elderlies and their families about geriatric mental health and depression, risk factors, and management. It can also direct policymakers to constitute regulations for public and private health institutes for geriatric depression screening and suggest training for mental health professionals and caregivers on the treatment and management; all directions are considered within cultural differences.

Conclusion

To conclude, the current study explores the mediating effects of a sense of mattering and psychological adjustment on the relationship between a sense of loneliness and geriatric depression. In spite of its limitations, this study revealed worthwhile findings regarding the mechanism of the elderly loneliness-depression association. Loneliness can directly predict elderly depression and indirectly, through reducing the partial mediators mattering and adjustment. Hence, these results amplify the literature on geriatric mental health and constitute frameworks for mental illness prevention and therapeutic interventions.

Abbreviations

AVE	Average Variance Extracted
BASE-6	Brief Adjustment Scale-6.
CFI	Comparative Fit Index
GDS-15	Geriatric Depression Scale-15
GMS	General Mattering Scale
MMSE	Mini-Mental State Examination for excluding the severely demented
PsA	Psychological adjustment
RMSEA	Root mean square error of approximation
SEM	Structural Equation Modeling
SoM	Sense of mattering
TFI	Tucker-Lewis Index
UCLA-3	University of California, Los Angeles Loneliness Scale-version 3

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s43045-024-00462-1.

Supplementary Material 1.

Acknowledgements

I sincerely thank Prof. Mohamed Saad, vice dean of the Faculty of Arts and Humanities in the British University in Egypt for supervising this research and guiding through it. I appreciate Dr. Yomna Breikaa for back translating the GMS.

Authors' contributions

HA is the only author in this research and have done all the work of the manuscript.

Funding

Not applicable.

Availability of data and materials

Data gathered and analyzed during this study are available in a supplementary information file.

Declarations

Ethics approval and consent to participate

This study was approved by the research and ethics committee of the Faculty of Arts and Humanities at the British University in Egypt. Participants signed an informed consent prior to participation.

Consent for publication

Participants consented to the publication of their anonymous results.

Competing interests

The authors declare no competing interests.

Received: 3 July 2024 Accepted: 25 August 2024
Published online: 20 September 2024

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