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ORIGINAL ARTICLE

Quality of life in early-stage Alzheimer's disease: the moderator role of family variables and coping strategies from the patients' perspective

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Abstract

Aim: This study assessed the effects of sociodemographic and psychological variables on quality of life (QOL), as well as the moderator role of family variables and coping strategies in the relationship between psychological morbidity and QOL, based on patients' perspective.

Methods: This study used a cross-sectional design. A total of 158 patients with early Alzheimer's disease completed the Mini-Mental State Examination, the Montreal Cognitive Assessment, the Hospital Anxiety and Depression Scale, the Ways of Coping Questionnaire, the Spiritual and Religious Attitudes in Dealing with Illness, the Family Adaptability and Cohesion Evaluation Scales, the Family Satisfaction Scale, the Family Communication Scale, the Barthel Index, and the Quality of Life in Alzheimer's Disease Scale.

Results: Being a man, having a higher education, and engaging in more exercise activity were associated with better QOL. Lower levels of cognitive impairment, psychological morbidity, and spirituality predicted better QOL. Also, lower levels of functionality, family communication, family satisfaction, and family functioning contributed to worse QOL. Gender, psychological morbidity, and functionality contributed significantly to QOL. Family satisfaction, family communication, and coping strategies moderated the relationship between psychological morbidity and QOL.

Conclusion: Intervention in early-stage Alzheimer's disease should focus on patients' coping strategies and family context, particularly family satisfaction and communication, to foster QOL.

Key words: *Alzheimer's disease, coping strategies, family variables, psychological morbidity, quality of life.*

INTRODUCTION

With the increasing number of elderly people, dementia has become a major worldwide problem because of its high prevalence and impact on the lives of the elderly and their families. The form of dementia associated with Alzheimer's disease (AD) is the most common. AD is a chronic neurodegenerative disease characterized by a progressive and irreversible deterioration of cognitive function, including memory impairment, cognitive disorders, apraxia, agnosia, and disruption of executive functioning.[1] According to the American Psychiatric Association,[1] pathological processes resulting from the progression of AD may lead to profound disabilities and fragility that affect psychic, functional, and affective dimensions impairing quality of life (QOL). In 2018, it was estimated that 5.5 million Americans over 65 years of age lived with AD, with the number of new cases increasing dramatically with age.[2] In Portugal, there have been no direct epidemiological studies on the topic, but the Alzheimer Europe estimated that about 182 000 people have dementia.[3]

In the elderly, depression and dementia are very prevalent and have common symptoms.[4] Although there is no consensus in the literature regarding the effect of depression on dementia progression,[4]

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several studies have revealed that depression is considered a risk factor for AD.[5] Depression is frequent in patients with AD and particularly prevalent in the mild phase of the disease.[6] Other studies have shown that anxiety and depressive symptoms negatively affect patients' QOL,[7] influencing family functioning and leading to difficulties in activities of daily living.[8] However, Zubenko *et al*. reported that depression in patients with AD may be less severe or persistent than in healthy people without AD.[9] Patients may also deny depressive symptoms.

Oyebode *et al*. found that patients with mild to moderate AD used a variety of coping strategies to deal with everyday situations that challenge their memory, highlighting the predominance of problem-focused strategies.[10] Likewise, a review by Kneebone and Martin concluded that problem-focused coping strategies were associated with fewer difficulties in caregivers of patients with dementia.[11] However, Souza *et al*. found that patients with AD used emotion-focused coping strategies more often than problem-focused strategies.[12] Furthermore, previous research suggested that emotion-focused coping could be more beneficial in stressful situations that were difficult to control.[13] Overall, given that people with dementia likely face a wide range of stressful situations, such as loss of friends and family, loneliness, cognitive decline, and health problems, they need to adjust their coping strategies to deal with the mulitple difficulties they face.[14] Patients' ability to cope has been shown to directly affect their QOL.[15]

Previous research on AD indicated that patients preserve their spirituality regardless of the decline in their cognitive functions.[16] Furthermore, spirituality is a resource that has been found to contribute to the QOL of patients with dementia.[17,18] Studies on AD have suggested that high levels of spirituality are associated with slower cognitive decline, contributing to longer survival, lower morbidity, and slower disease progression.[19,20] However, the effects of spirituality on the QOL of patients with AD has not yet been fully explored.

Family involvement in the care of patients with AD is important because of patients' limitations and their need for instrumental and emotional support.[21] In fact, given the progression of the disease, patients' functionality become progressively compromised, requiring the help of family members.[21] Inouye *et al*. argued that increasing knowledge about AD among patients' families can foster better QOL.[22] Additionally, the quality of a patient's relationship with family members affects patient's QOL.[23,24] The loss of functionality not only affects QOL in patients with mild AD,[25] but also influences family functioning and activities of daily living.[8] Overall, the greater the degree of a patient's independence, the greater the probability of a better QOL.[21,25]

In patients with AD, family variables and coping strategies have been shown to affect QOL, providing a protective effect for patients and their caregivers.[23,26,27] Therefore, it is important to assess whether family variables and coping strategies play a moderator role in patients with AD.

Few studies have focused on patients' perspectives, with the majority studying patients with AD from caregivers' perspective. With regard to QOL, however, it is important to consider patients' perspective.[25] Therefore, this study focused on patients' QOL from their perspective in early-stage AD, when they are still aware of their functional and cognitive losses. From a heuristic point of view, it is important to study the variables that contribute to a patient's QOL; it is also important to analyze the moderator role of family variables, because patients with AD need family support in various contexts, as well as the moderator role of coping, since patients in an ealy stage of AD are able to choose the best strategies to deal with their own difficulties. As such, we hypothesized the following:

1 Sociodemographic variables, cognitive function, psychological morbidity, spirituality, coping, family variables, and functionality will contribute to QOL.
2 Family variables (satisfaction, communication, and functioning) will moderate the relationship between psychological morbidity and QOL.
3 Coping (problem-focused and emotion-focused strategies) will play a moderator role between psychological morbidity and QOL.

METHODS

Participants

The sample for this cross-sectional study consisted of 158 patients in the early stage of AD who were followed in the neurology department of four hospitals in northern Portugal. Criteria for probable AD were based on the *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition, and the National

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Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association. Physicians considered patients to have mild AD based on their Clinical Dementia Rating scores. Patients who scored 1 on Clinical Dementia Rating were referred to the study as patients with mild AD.[28] Cognitive impairment was subsequently assessed and confirmed by researchers using two screening tests: the Mini-Mental State Examination and the Montreal Cognitive Assessment. A Mini-Mental State Examination score ≤23 and a Montreal Cognitive Assessment score ≤26 were considered indicative of cognitive impairment.[29,30] Patients were excluded if they had a diagnosis of a serious psychiatric disorder in their medical records.

Measures

Sociodemographic Questionnaire

This questionnaire was used to collect data regarding age, gender, marital status, education, and exercise frequency.

Hospital Anxiety and Depression Scale (HADS)

This instrument assesses depression and anxiety consisting of 14 items: 7 in the anxiety subscale (HADS-A) and 7 in the depression subscale (HADS-D).[31,32] Each item is answered on a 4-point Likert scale, and both HADS-A and HADS-D have a score range of 0–21. A global score may also be computed serving as a clinical indicator of emotional distress. A high score indicates more psychological morbidity. In the original Portuguese version,[32] Cronbach's α was 0.88 for HADS-D and 0.86 for HADS-A. In the present study, Cronbach's α was 0.84 for the global score, 0.70 for HADS-D, and 0.82 for HADS-A.

Ways of Coping Questionnaire

This Ways of Coping Questionnaire has 48 items and two subscales: the problem-focused subscale and the emotion-focused subscale. The instrument assesses cognitive and behavioural responses to internal and external demands in terms of eight coping strategies (i.e. confrontation, distancing, self-control, seeking social support, avoiding responsibility, escape-avoidance, planned problem-solving, and positive reassessment).[33,34] A high score indicates greater use of emotion- or problem-focused coping strategies. Each item is scored on a 4-point Likert scale, with a range of 0–3. In the Portuguese version,[34] Cronbach's α ranged between 0.52 and 0.83. In the present study, Cronbach's α for problem-focused coping was 0.84; it was 0.75 for emotion-focused coping.

Spiritual and Religious Attitudes in Dealing with Illness

This questionnaire consists of 15 items rated on a 5-point Likert scale (range: 0–4) that assess spiritual attitudes on how people deal with chronic illness.[17,35] A higher score indicates greater reliance on spirituality. In the Portuguese version,[35] Cronbach's α was 0.95 for the total scale, 0.93 for the support search subscale, 0.89 for the trust subscale, and 0.90 for the reflection subscale. In the present study, Cronbach's α was 0.94 for the total scale, 0.92 for the support search subscale, 0.84 for the trust subscale, and 0.84 for the reflection subscale.

Family Adaptability and Cohesion Evaluation Scale

This scale has 62 items scored on a Likert scale of 1–5.[36,37] It consists of six subscales: two assessing balanced levels (i.e. cohesion and flexibility) and four evaluating unbalanced functioning (i.e. enmeshed, disengaged, rigid, and chaotic). Subscale scores provide cohesion, flexibility, and global family functioning ratios. The higher the ratio (i.e. >1), the more balanced or healthy the family is. In the Portuguese version,[37] Cronbach's α ranged between 0.67 and 0.83. In the present study, only the global family functioning ratio was used with, a Cronbach's α of 0.81.

Family Satisfaction Scale

This scale consists of 10 items that assess family members' degree of satisfaction with each other, which is related to family cohesion and flexibility,[36,37] with higher scores indicating higher family satisfaction. In the Portuguese study,[37] Cronbach's α was 0.93 and was 0.95, in the present study.

Family Communication Scale

This scale consists of 10 items that assess communication among family members. Communication is considered a facilitator that may change levels of cohesion and flexibility.[36,37] with higher scores

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indicating better communication among family members. Cronbach's α for the Portuguese version was 0.89,[37] and was 0.96 in the present study.

The Barthel Index

The Barthel Index consists of 10 questions that assess a patient's degree of independence.[38,39] Each item describes an activity that has between two and four levels of dependency, with 0 indicating total dependence and 5, 10, or 15 points indicating independence. A higher score indicates greater independence. Cronbach's α for the total scale was 0.96 in the original Portuguese version and 0.87 in the present study.[39]

Quality of Life in Alzheimer's Disease Scale

This 13-item instrument assesses QOL in patients with AD.[40,41] The 13 items respectively evaluate physical health, energy, mood, living situation, memory, family, marriage, friends, self as a whole, ability to do chores, ability to do things for fun, money, and life as a whole. Items are scored on a scale of 1–4, with higher scores indicating better QOL. Cronbach's α was 0.89 for the original Portuguese version and 0.86 in the present study.[41]

Procedure

All procedures followed the ethical principles outlined in the Declaration of Helsinki. After study approval by the ethics committees of the four main public hospitals involved in the data collection. Patients who met the inclusion criteria were invited by their neurologist to participate. All patients were informed about the research objectives, confidentiality, and the right to discontinue their participation. Participation was voluntary and all participants provided written informed consent.

Data Analysis

Pearson correlations were performed to analyze the relationships between sociodemographic and psychological variables. Multiple linear regression was used to analyze the psychological contributors to QOL, controlling for the influence of gender, education, exercise frequency, and cognitive decline. To assess the moderator role of family variables and coping, the macro PROCESS for SPSS (http://processmacro.org/index.html) was used with the Johnson-Neyman (JN) technique. All statistics were performed with IBM SPSS version 26.

RESULTS

Sample characteristics

The sample consisted of 158 patients with mild 1AD (106 women (67.1%), 52 men (32.9%)). Patient characteristics are detailed in Table 1.

Relationships between sociodemographic and psychological variables

Male patients with higher levels of education and who exercised more frequently reported better QOL. QOL was positively correlated with cognitive decline, family satisfaction, family communication, family functioning, and functionality, but negatively associated with psychological morbidity and spirituality (Table 2).

Contributors to QOL

Gender, level of education, and exercise frequency contributed to QOL. However, in the final model, only gender ($P = 0.052$) remained statistically significant. Gender, along with psychological morbidity ($P = 0.001$) and functionality ($P = 0.007$), explained 46% of the variance in patients' QOL ($F_{6,111} = 8.610$, $P < 0.001$) (Table 3).

Family variables as moderators in the relationship between psychological morbidity and QOL

Results showed that family satisfaction moderated the relationship between psychological morbidity and QOL. The interaction was significant ($F_{3,144} = 15.753$; $P < 0.001$; $\beta = -0.026$; 95% confidence interval (CI): −0.045, −0.008; $t = -2.76$; $P = 0.006$), explaining 24.7% of the variance. The JN technique was used to determine the point at which family satisfaction was sufficient to detect a difference in the relationship between psychological morbidity and QOL (at $P = 0.050$). Results indicated that psychological morbidity was significantly correlated with QOL when the standardized value of family satisfaction was −1.202 above the mean ($\beta = -0.1273$, $P = 0.05$), which was true for 56.1% of the sample (Fig. 1).

Family communication also moderated the relationship between psychological morbidity and QOL.

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Table 1 Sociodemographic characteristics

Continuous measure	Minimum	Maximum	Mean	SD
Age (years)	56	88	75.94	7.25
Categorical measure	*n* (%)			
Gender				
Female	106 (67)			
Male	52 (33)			
Marital status				
Single	8 (3.3)			
Married	99 (40.7)			
Divorced	1 (0.4)			
Widowed	50 (20.6)			
Education				
No formal education	34 (14.0)			
1–4 years	111 (45.7)			
5–9 years	9 (3.7)			
10–12 years	4 (1.6)			
Exercise frequency				
Never	79 (32.5)			
Once a month	9 (3.7)			
Once a week	14 (5.8)			
2–3 times a week	18 (7.4)			
Daily	38 (15.6)			

The interaction was significant ($F_{3,144}$ = 14.666; $P < 0.001$; β = −0.022; 95%CI: −0.039, −0.006; t = −2.67; P = 0.009), explaining 23.4% of the variance. The JN technique showed that psychological morbidity was significantly correlated with QOL when the standardized value of family communication was −2.296 above the mean (β = −0.1338, P = 0.05), which was true for 62.8% of the sample (Fig. 2).

Family functioning did not moderate the relationship between psychological morbidity and QOL because the interaction was not significant ($F_{6,111}$ = 8.610; $P < 0.001$; β = −0.145; 95%CI: −0.527–0.236; t = −0.752; P = 0.453).

Coping strategies as moderators in the relationship between psychological morbidity and QOL

Results showed that problem-focused coping moderated the relationship between psychological morbidity and QOL. The interaction was significant ($F_{3,144}$ = 8.5829; $P < 0.001$; β = 0.014; 95%CI: 0.0009–0.0279; t = 2.108; P = 0.038), explaining 15.17% of the variance. The JN technique showed that psychological morbidity was significantly correlated with QOL when the standardized value of problem-focused coping was 6.446 below the mean (β = −0.1614, P = 0.05), which was true for 72.3% of the sample (Fig. 3).

Results also showed that emotion-focused coping moderated the relationship between psychological morbidity and QOL. The interaction was significant ($F_{3,144}$ = 9.3243, $P < 0.001$; β = 0.0217; 95%CI: 0009–0.0424; t = −2.07; P = 0.041), explaining 16.3% of the variance. According to the JN technique, psychological morbidity was significantly correlated with QOL when the standardized value of emotion-focused coping was 4.716 below the mean (β = −0.1592, P = 0.05), which was true for 81.1% of the sample (Fig. 4).

DISCUSSION

In this study, male gender was associated and contributed to better QOL, which is in line with previous studies conducted among community populations and people with dementia.[24,25,42] This result is not surprising given the longer life expectancy of women, the higher incidence of AD in women, and the faster neurodegeneration and clinical symptom development, especially in postmenopausal women.[43] Interestingly, among patients with AD, exercise frequency contributed to QOL and was associated with family communication, and family satisfaction. Recent studies have stressed the benefits of physical exercise to mitigate the effects of AD, as well as to delay the appearance and progression of symptoms.[44,45]

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Table 2 Correlations between sociodemographic and psychological variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	M	DP
1. Gender	—	−0.275**	−0.199*	−0.252**	−0.402**	0.133	−0.024	0.175*	0.368**	−0.047	−0.058	0.014	−0.090	−0.284**		
2. Education		—	0.176*	0.321**	0.414**	−0.146	0.038	−0.130	−0.352**	0.173*	0.177*	0.144	0.202*	0.346**		
3. Exercise frequency			—	0.292**	0.329**	−0.160*	−0.028	−0.063	−0.175*	0.235**	0.292**	0.147	0.145	0.305**		
4. Cognitive decline (MMSE)				—	0.696**	−0.022	0.170	−0.026	−0.220*	0.221*	0.161	0.228*	0.031	0.195*	19.69	4.88
5. Cognitive decline (MoCA)					—	−0.118	0.177	−0.089	−0.296**	0.114	0.109	0.172	0.107	0.220*	11.42	4.85
6. Psychological morbidity						—	0.045	0.183*	0.067	−0.192*	−0.292**	−0.117	−0.084	−0.349**	17.07	7.07
7. Emotion-focused coping							—	0.759**	0.122	−0.136	−0.141	−0.131	0.225**	0.115	14.49	5.36
8. Problem-focused coping								—	0.338**	−0.096	−0.166*	−0.148	0.281**	−0.001	27.62	8.76
9. Spirituality									—	−0.053	−0.055	−0.154	−0.056	−0.234**	30.75	13.33
10. Family communication										—	0.856**	0.594**	0.067	0.333**	36.40	6.41
11. Family satisfaction											—	0.606**	0.021	0.378**	35.94	6.02
12. Family functioning												—	0.049	0.286**	1.59	0.32
13. Functionality													—	0.460**	99.15	12.67
14. Quality of life														—	33.56	5.49

*$P < 0.05$. **$P < 0.01$. Standard Deviation-SD; M-Mean; MMSE-Mini Mental State Examination; MoCA-Montreal Cognitive Assessment.

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Table 3 Variables that contributed to quality of life

Model	R	R^2	Adjusted R^2	Standardized error of the estimate	Change statistics				
					R^2 change	F change	d.f. 1	d.f. 2	P-value
1	0.459	0.210	0.190	4.627 52	0.210	10.560	3	119	**0.000**
2	0.461	0.212	0.179	4.660 43	0.002	0.163	2	117	0.850
3	0.680	0.463	0.409	3.952 55	0.250	8.610	6	111	**0.000**

		B	Error	β	t	P-value
11	(Constant)	31.987	1.209		26.464	0.000
	Gender	−1.814	0.923	−0.169	−1.965	**0.052**
	Education	0.404	0.175	0.200	2.313	**0.022**
	Exercise frequency	0.845	0.258	0.278	3.279	**0.001**
2	(Constant)	31.662	2.108		15.021	0.000
	Gender	−1.917	0.975	−0.178	−1.966	**0.052**
	Education	0.418	0.185	0.206	2.251	**0.026**
	Exercise frequency	0.855	0.267	0.281	3.197	**0.002**
	Cognitive decline (MMSE)	0.058	0.122	0.054	0.474	0.636
	Cognitive decline (MoCA)	−0.071	0.132	−0.067	−0.541	0.589
3	(Constant)	6.988	8.002		0.873	0.384
	Gender	−1.713	0.876	−0.160	−1.956	0.**053**
	Education	0.213	0.164	0.106	1.295	0.198
	Exercise frequency	0.261	0.247	0.086	1.057	0.293
	Cognitive decline (MMSE)	0.038	0.106	0.036	0.355	0.723
	Cognitive decline (MoCA)	−0.066	0.114	−0.062	−0.576	0.566
	Psychological morbidity	−0.189	0.056	−0.254	−3.371	0.**001**
	Spirituality	−0.025	0.028	−0.071	−0.894	0.373
	Family communication	0.012	0.107	0.015	0.112	0.911
	Family satisfaction	0.198	0.125	0.238	1.586	0.116
	Family functioning	1.919	1.436	0.124	1.336	0.184
	Functionality	0.199	0.072	0.200	2.763	**0.007**

d.f., degrees of freedom; MMSE, Mini Mental State Examination; MoCA, Montreal Cognitive Assessment.

Furthermore, a patient's improved QOL is expected to positively contribute to family relationships.[46]

The present study also found that cognitive decline and functionality were positively associated with QOL. This result makes empirical sense given that higher levels of cognitive function and autonomy in patients with AD predict QOL.[21,47] This is consistent with previous research in the Portuguese cultural context, which found that impaired cognitive function and decreased functional performance, as reflected

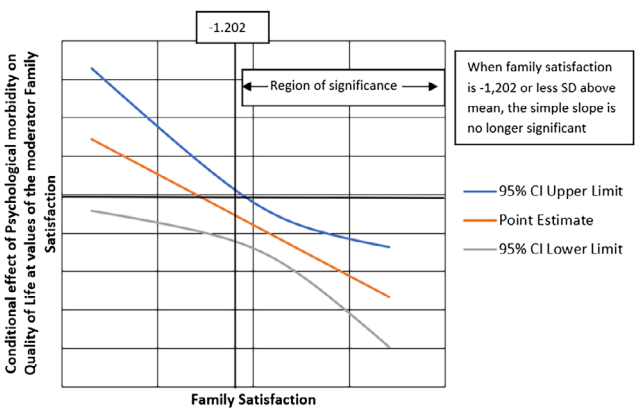


Figure 1 Family satisfaction as a moderator in the relationship between psychological morbidity and quality of life. CI, confidence interval.

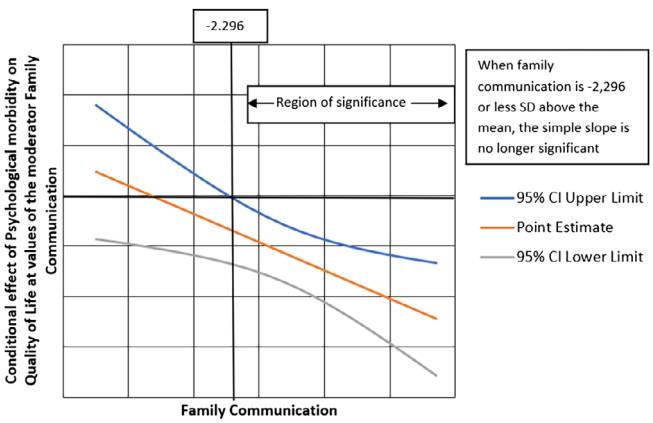


Figure 2 Family communication as a moderator in the relationship between psychological morbidity and quality of life. CI, confidence interval.

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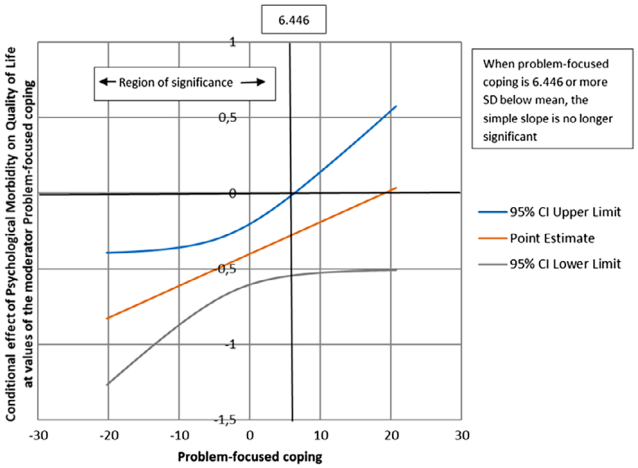


Figure 3 Problem-focused coping as a moderator in the relationship between psychological morbidity and quality of life. CI, confidence interval.

in the inability to perform basic activities of daily living as well as loss of productivity, negatively affected QOL.[25,41]

Dealing with a chronic illness such as AD involves routine changes not only for the patient but also for family members. In fact, the family dynamics must adjust to adapt to the disease.[48] Therefore, it comes as no surprise that family variables (i.e. functioning, satisfaction, and communication) were positively associated with QOL, as suggested by studies that showed the importance of the quality of the relationship between patient and family members.[23,24,49] However, family members' perceptions should also be considered because of their potential influence on

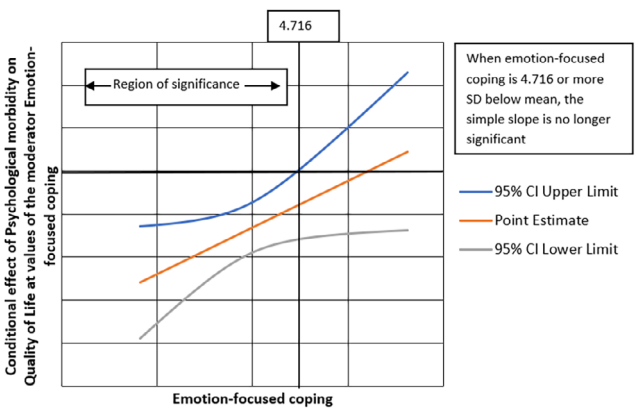


Figure 4 Emotion-focused coping as a moderator in the relationship between psychological morbidity and quality of life. CI, confidence interval.

a patient's opinion, especially when they are regular family caregivers.[50]

Psychological morbidity was also correlated and contributed to lower QOL, which is consistent with previous research,[7,47,51] including studies of Portuguese patients with AD.[25,41] In fact psychological morbidity was the only psychological variable that contributed to QOL, emphasizing its importance im mild AD.

In recent decades, the role of spirituality in the treatment of chronic diseases has been increasingly explored, but little is known about spirituality's potential effects in AD. Some studies found spirituality to be associated with better perceived QOL and stress control.[18,52] Spiritual practices, especially praying, may help patients with AD feel connected to their faith; in turn, patients may retain their memories, feel support, and consider how their experience with AD has affected their beliefs.[53] In the present study, spirituality was negatively associated with QOL. From the perspective of patients with mild AD, spirituality may foster reflection, help them find meaning in the disease, and connect with a higher force.[25] However, the results indicated the patients did not perceive spirituality as a resource for dealing with AD explaining why spirituality had no impact on QOL. One may hypotehsize that patients with early-stage AD may not feel the need to turn to spirituality as a way of coping. Future studies involving patients with more advanced stages of AD are needed to further test this hypothesis.

Family satisfaction and family communication were moderators in the relationship between psychological morbidity and QOL. Patients with very good family relationships, particularly with regard to satisfaction and communication, may not wish to worry or burden family members; therefore, psychological morbidity in patients with AD, in contrast to patients with acute illness, has a greater impact on their QOL.[54] Because family functioning was not a moderator, it seems that is not the structure of family functioning that influences the relationship, but rather the kind of relationship among family members that impacts QOL. In fact, family caregivers of patients with AD are more exposed to conflict and often have to limit their social life, they may experience emotional burden as a consequence of dealing with AD.[55] Therefore, it is very important that communication among family members be clear and gratifying to enable the family system to adapt, reorganize, and

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mobilize coping strategies to deal with AD over time as the disease progresses.[56]

Both problem-focused and emotion-focused coping strategies moderated the relationship between psychological morbidity and QOL. These results may relate to patients' difficulty in coping with changes arising from AD, especially with regard to its gradual nature and progressive cognitive decline.[10] Therefore, it makes intuitive sense that psychological morbidity has a great impact on QOL. Given that a patient's progressive losses function as a stressor that may cause emotional distress, developing effective coping strategies is crucial for patients adapting to AD and trying to preserve their QOL. In addition to cognitive impairment, patients also experience difficulties as their self-competence, declines, requiring coping strategies to deal with the changes.[57]

This study had some limitations and therefore the results must be interpreted with caution. First, the cross-sectional design did not allow us to identify causal relationships between the variables and QOL. Further studies should consider longitudinal designs to assess the contribution of family and individual variables regarding QOL, over time. Second, family caregivers' perceptions were not examined in this study. Given family members' possible influence on patients' opinions, future studies should analyze family' perceptions to evaluate the agreement between patients' and family members' perceptions and to examine the impact of differences between them, on patients' QOL. Third, interpretations of the results should take into account the potential lower ceiling effect of education, as the majority of participants had very low levels of education.

In conclusion, this study used patients' perspective to assess QOL in early AD, when patients are still aware of their functional and cognitive losses. According to the results, gender, psychological morbidity, and functionality contributed to QOL; family satisfaction and family communication moderated the relationship between psychological morbidity and QOL; and coping moderated the relationship between psychological morbidity and QOL. These results highlight the importance of delineating intervention programmes focused on psychological morbidity and functionality to promote patients' QOL, particularly among women. Because family satisfaction and communication also played moderating roles, this study reinforces the importance of family on patient's QOL, emphasizing the importance of family interventions. Therefore, family therapy may be warranted in situations in which patients and their families struggle with dementia to help them feel competent and maintain family functionality.

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