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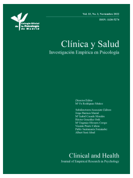

Psychological Distress and Family Stress in Alzheimer's Caregivers: A Forgiveness Longitudinal Mediation Model

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ABSTRACT

Background: The present study examined how family stress, distress, and forgiveness influenced the quality of life (QoL) of family caregivers (FCs) of persons living with Alzheimer's disease over time. *Method:* Using a longitudinal design, data were collected at baseline (T1), 6 months (T2), and 12 months (T3). *Results:* Family stress at T1 predicted family stress at T2, while forgiveness at T1 predicted family stress at T2. Forgiveness (T1 and T2) mediated the relationship between distress (T1) and mental QoL (T3). Additionally, forgiveness (T1 and T2), along with mental QoL (T3), were mediators between distress (T1) and physical QoL (T3). Multigroup analysis revealed that the effects of forgiveness on distress and QoL were moderated by disease severity, with stronger mediation effects in the moderate and severe groups. *Conclusion:* The study underscores the importance of early distress screening and forgiveness-based interventions to enhance both mental and physical QoL in FCs, particularly as the disease progresses.

La angustia psicológica y estrés familiar en cuidadores de personas con Alzheimer: un modelo de mediación longitudinal del perdón

Palabras clave:
Enfermedad de Alzheimer
Cuidadores familiares
Estrés familiar
Perdón
Calidad de vida

RESUMEN

Antecedentes: El estudio analiza en qué medida el estrés, distrés y perdón familiares influyen en la calidad de vida y en los cuidadores familiares de personas que padecen la enfermedad de Alzheimer. *Método:* Con un modelo longitudinal se recogieron datos de línea base (T1), a los 6 (T2) y a los 12 meses (T3). *Resultados:* El estrés familiar en línea base (T1) predice el estrés a los 6 meses(T2), mientras que el perdón de línea base (T1) predice el estrés familiar a los 6 meses. El perdón de línea base (T1) y a los 6 meses (T2) media la relación entre el distrés de línea base (T1) y la calidad de la vida mental a los 12 meses (T3). Además, el perdón de línea base (T1) y a los 6 meses (T2), junto con la calidad de vida mental a los 12 meses (T3) eran mediadores entre el distrés de línea base (T1) y la calidad de vida física a los 12 meses (T3). El análisis multigrupo indica que los efectos del perdón en el estrés y la calidad de vida eran moderados por la gravedad de la enfermedad, siendo los efectos mayores en los grupos moderados y graves. *Conclusión:* Se subraya la importancia del análisis temprano del distrés, así como las intervenciones que utilizan el perdón, para mejorar la calidad de vida mental y física de los cuidadores familiares, sobre todo a medida que avanza la enfermedad.

Over the last three decades, Alzheimer's disease prevalence, on a global basis, has increased by 144%, with associated deaths rising by 184%. Additionally, 75% of dementia cases remain undiagnosed, affecting 41 million people (Organization for Economic Cooperation and Development [OECD, 2021]). In Portugal, around 153,000 individuals have dementia, including 90,000 with Alzheimer's disease (OECD, 2021). Alzheimer's disease leads to progressive cognitive decline and loss of daily living skills, causing high dependency, disability, and significant emotional and psychological impact (Bessey & Walaszek, 2019).

Family caregivers' (FCs) quality of life (QoL) is influenced by health status, financial issues, social support, health conditions, and caregiver dependence (Damian et al., 2023). Female caregivers, especially those providing over 11 hours of care per week and those who are married, are predominantly affected by well-being and mental health concerns (Madruga et al., 2020).

Being a family caregiver (FC) significantly reduces QoL and well-being, leading to higher distress, financial burden, and negative impacts on health, relationships, and leisure. Caregivers often feel anguish, impatience, loneliness, frustration, anger, and sadness (Costa et al., 2021). Caregiving affects psychological, professional, and social status, causing burnout, poorer immune function, and loneliness (Rajovic et al., 2021). Damian et al. (2023) found that

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cynicism, effectiveness, distress, and sleep quality explained 87.8% of the variance in caregivers' QoL during the Covid 19 pandemic.

The quality of prior family relationships is crucial when a family member becomes a caregiver. Healthier dynamics often lead to greater personal strengths and better QoL for caregivers, who are less likely to neglect self-care despite financial burdens. However, daily caregiving, patient dependence, and the decision to stop working can cause caregivers to postpone medical exams, which, consequently, adversely impacts upon their own health (Lindeza et al., 2020).

FCs face overwhelming demands from Alzheimer's care while managing other commitments. Financial strain from reduced work hours or income loss increases anxiety and decreases mental QoL (Fabbietti et al., 2024). Emotional burdens, from witnessing a loved one's decline, add to distress, with guilt, grief, helplessness, limited support, and inadequate resources exacerbating feelings of isolation and frustration (Nemcikova et al., 2023). Social support, close family relationships, and engaging in hobbies mitigate these challenges, serving as protective factors (Maggio et al., 2021).

The quality of FCs relationships with those they care for affects their QoL (Hazzan et al., 2022). Alzheimer's increases dependency, causing role imbalances and persistent stress. Caregiving evolves from "noticing" to "balancing" and redefining roles post-diagnosis (Esandi et al., 2018). Spousal caregivers often face disrupted closeness, communication, intimacy, and support. Healthier family dynamics, such as cohesion, flexibility, communication, and empathy, boost caregivers' mental health (Hazzan et al., 2022). Family functioning in adaptation, growth, partnership, and affection mediates caregiver burden and QoL, with higher family stress leading to lower QoL (Lindeza et al., 2020).

Research on forgiveness in stress management is limited, but it shows that using forgiveness as a coping strategy reduces marital and family stress in caregivers (Decaporale-Ryan et al., 2016). Better family relationships correlate with lower anxiety, depression, and burden (Rasmussen et al., 2019). Forgiveness involves compassion, love, and benevolent thinking, not just releasing anger and resentment (Kaleta & Mróz, 2020). It decreases distress, reduces rumination, and improves mental QoL (Çolak & Güngör, 2020). Some caregivers report forgiveness as a crucial aspect of their relationship with a person living with Alzheimer's disease.

The results indicate that FCs involved in spiritual activities tend to be more compassionate and forgiving, suggesting spiritual support enhances these traits (McGee et al., 2021). Rasmussen et al. (2019) identified the calming effect of forgiveness on mitigating the deleterious impact upon health created by stress, reporting a positive link between forgiveness and better physical and mental health. Forgiveness can positively affect physical symptoms like heart rate and reduce psychological symptoms like stress, anxiety, and depression (López et al., 2021).

Prior research shows that during the pandemic, FCs experienced changes in responsibilities as well as in mental, physical, and financial health (de Sousa et al., 2022; Lorenz-Dant & Comas-Herrera, 2021), though other studies reported no changes in FCs' QoL (Lara et al., 2020).

This study is based on Pearlin's (1990) model, which conceptualizes QoL as an adaptation process of family caregiving on a caregiver's health and well-being. The model includes four core elements: a) caregiver background (history, gender, age), b) caregiving stressors (primary and secondary), c) stress outcomes, and d) mediators/moderators affecting these relationships. Unlike the original model, which sees burden as a primary stressor, this study considers QoL as an outcome variable. Distress, forgiveness, and family stress were assessed at baseline (T1), and 6 months later (T2). QoL (physical and mental dimensions) was assessed at 12 months later (T3).

Longitudinal studies of FCs of Alzheimer's patients are limited but essential to understand their evolving experiences and QoL. Such studies reveal how caregiver stress and coping mechanisms change, guiding targeted interventions. This study aims to explore the roles of distress, family stress, and forgiveness in physical and mental QoL over time. By focusing on emotional and interpersonal factors, it seeks to provide a deeper understanding of their impact on FCs' QoL and capture the broader effects of caregiving beyond immediate demands.

Further research is needed to explore forgiveness as a mediator in enhancing interpersonal dynamics, aligning with Pearlin's (1990) framework. Forgiveness, being an ongoing process, with lasting effects on family caregivers' physical and psychological health, warrants research as a mediator between caregiver psychological well-being, family stress, and QoL. The comprehension of the role of forgiveness at T1 may inform interventions aimed at bolstering caregiver resilience and well-being, over the long term.

Method

Participants

Participants were FCs, recruited from the Dementia and Fragility Research and Action Plan in a central county in Northern Portugal. This initiative includes a research and support office for FCs and persons living with Alzheimer's disease and fragility, offering home visits. Inclusion criteria were: i) being an informal caregiver of a family member with Alzheimer's disease at any stage, ii) being enrolled in and using the Portuguese National Health Care System, iii) being over 18 years. Exclusion criteria were: i) being a formal caregiver, ii) receiving psychological or psychiatric support, iii) having cognitive deficits (assessed by the Mini-Mental State Examination - MMSE). A total of 130 FCs, of persons living with Alzheimer's disease were included in this study. Sample characteristics are detailed in Table 1.

Procedure

FCs were evaluated three times over the course of twelve months: (T1, *n* = 130) – baseline defined at the beginning of their inclusion in the study, initial integration in the IADem Plan; (T2, *n* = 114) six months later; and twelve months after T1 (T3, *n* = 92).

Alzheimer's disease severity in patients was assessed using the Clinical Dementia Rating Scale (Morris, 1993), which evaluates impairment across six domains: memory, orientation, judgment, community affairs, home and hobbies, and personal care. Each domain is rated on a 5-point scale ranging from 0 (*no impairment*) to 3 (*severe impairment*). The sum of these domain scores yields a total score ranging from 0 to 18, with higher scores indicating greater impairment. In this study, Alzheimer's disease severity was categorized into three stages: mild, moderate, and severe. Of the total sample, 43 FCs cared for patients in the mild stage (33.1%), 37 FCs cared for patients in the moderate stage (28.5%), and 50 FCs cared for patients in the severe stage (38.5%).

Data Collection

Data collection occurred in participants' homes from 2021 to 2022. The study period coincided with Portugal's partial lockdown due to the pandemic and ongoing vaccination initiatives. At baseline, participants provided sociodemographic and clinical data, including details about the person living with Alzheimer's disease they were caring for.

This study was conducted in accordance with ethical guidelines and the Declaration of Helsinki. Approval was obtained from the Ethics Committee for Research in Life and Health Sciences at the University where the first and last authors are affiliated.

Instruments

Sociodemographic and Clinical Questionnaire

This questionnaire assessed sociodemographic variables in caregivers (age, gender, education, professional status, marital status, relationship with the person living with Alzheimer disease, duration of care, and caregiving hours) and in the person living with Alzheimer's disease (substance use, memory problems, and neurological/psychiatric conditions).

Short-Form Health Survey (SF-36; Severo et al., 2007; Ware et al., 1993)

This QoL questionnaire comprises 36 multidimensional items distributed into eight subscales: physical function (α = .93), physical performance (α = .82), bodily pain (α = .95), general health (α = .82), emotional performance (α = .83), social function (α = .90), vitality (α = .82), and mental health (α = .80). A higher score reflects a more positive perception of one's health status. In the Portuguese version, Cronbach's alpha was .82 for the physical dimension and .87 for the mental dimension. In the present study, Cronbach's alphas were .92 for the physical QoL scale and .87 for the mental QoL scale.

Index of Family Relations (IFR; Hudson, 1993; Pereira & Roncon, 2010)

This instrument includes 25 items and assesses the severity or magnitude of personal and social functioning problems in the context of family adjustment, more specifically, cohesion, adaptability, conflict, communication, and marital satisfaction. According to the author, the scale can be used as a measure of intrafamily stress characterizing the severity of relational problems in the family. A higher score indicates greater intrafamily stress. In the original version, the alpha was .95 in the Portuguese version and .91 in the present study.

Heartland Forgiveness Scale (HFS; Ikedo et al., 2020; Thompson et al., 2005)

HFS assesses the general tendency to forgive (i.e., dispositional forgiveness) others, oneself, and situations, with scores ranging from 18 to 126 on the total scale. Higher scores indicate more forgiving. In the original version, Cronbach's alpha was .86 for the total scale, .86 in the Portuguese population, and .85 in the present study.

Depression Anxiety and Stress Scale (DASS-21; Antunes & Mónico, 2015; Lovibond & Lovibond, 1995)

The DASS-21 assesses distress. Scores range from 0 to 63, with higher scores indicating more distress. The DASS-21 showed a Cronbach's alpha for the total scale of .93 in the original version (Henry & Crawford, 2005) and .94 in the Portuguese version. In the present study, Cronbach's alpha was of .97 for the overall scale. Caregivers in this study answered the questionnaire based on their caregiving experiences.

Data Analysis

A power analysis was performed with power set at .80, statistical significance at 5%, a medium effect size, and six independent variables (forgiveness, distress, and family stress at T1 and T2), requiring a sample size of 97 participants (Soper, 2019). Since the final sample size includes 130 participants, the desired power was achieved.

The assumptions for the use of parametric statistics were met as well as the corollaries to perform a path analysis (linearity, uncorrelated residuals, and multicollinearity: tolerance values were greater than 0.10 and the VIF values were below 2, eigenvalues not close to 0, and condition index values indicating non-collinearity) (Marcoulides & Raykov, 2019).

To evaluate the differences in sociodemographic and psychological variables, the chi-square test and a one-way repeated-measures ANOVA were conducted. A path analysis model was tested to assess the relationships among variables, according to the theoretical model. The model's adequacy was evaluated using goodness of fit indices. Due to the sensitivity of the chi-square test to sample size, alternative indices such as the comparative fit index (CFI), with a maximum value of 1.00 (indicating how well the hypothesized model fits compared to an independent model), were employed. A CFI result greater than .90 indicates a satisfactory fit. Additionally, the root-mean-square error approximation (RMSEA) was used, where values below .05 suggest a good fit, and values up to .08 are considered acceptable (Yuan et al., 2006).

A multigroup analysis was conducted to assess the moderator role of caregiver age and disease severity in the adjusted model. Age was categorized into two groups: younger (aged 65 years or under; n = 68) and older (over 66 years; n = 62). Disease severity was categorized into mild (n = 43), moderate (n = 37), and severe (n = 50) stages. The chi-square difference test ($\Delta\chi^2$) was used with a significance level of 5% to compare models. All analyses were performed using SPSS (version 28) and SPSS Amos (version 28).

Results

Sample Characteristics

Initially, 175 participants were screened for the study. Of these, 45 participants were not included: 37 were excluded based on exclusion criteria and 8 did not accept to participate. At T1, 130 participants were included. Nonetheless, 15 participants ceased to be caregivers, and one had made the transition to a nursing home, leaving a total of 114 participants at T2. Finally, at T3, 14 participants were no longer caregivers, and 8 had entered nursing homes, resulting in a final sample of 92 participants. So, the study enrolled 130 family caregivers at baseline (initial integration in the IADem Plan; T1; n = 130), six months later (T2; n = 114), and twelve months after T1 (T3; n = 92).

To examine potential differences between participants who dropped out of the study and who remained at the study, a binary logistic regression was conducted. The dependent variable was dropout status in any assessment moment (1 = did not drop out, 0 = dropped out), and the independent variables included caregiver characteristics. The significance of the model is evaluated using the Omnibus Tests of Model Coefficients (to assess the overall fit) and metrics like the Nagelkerke's R^2 and classification accuracy to interpret the model's performance. The results revealed that the model was not statistically significant (χ^2 = 12.290, p = .197), and none of the predictor variables reached statistical significance (p > .05). The model overall classification accuracy was 73.8, suggesting that caregiver characteristics were not significantly associated with study dropout. Similarly, a second binary logistic regression was conducted to explore potential differences based on the characteristics of the person living with Alzheimer's disease. The dependent variable remained dropout status, and the independent variables included gender, age, marital status, years of education, onset of memory problems, and prior treatments for memory issues. The results indicated that the model was not significant (χ^2 = 7.968, p = .240), with none of the predictor variables showing statistical significance (p > .05). The model overall classification accuracy was 71.5,

Table 1. Descriptive Statistics for Sociodemographic and Clinical Variables at T1, T2, and T3

	T1 ($n = 130$)	T2 ($n = 114$)	T3 ($n = 92$)
Variables	n (%)	n (%)	n (%)
Age	$M = 66.32$, $SD = 13.70$	$M = 66.71$, $SD = 13.67$	$M = 66.40$, $SD = 13.84$
Sex			
Male	29 (22.3)	26 (22.8)	25 (27.2)
Female	101 (77.7)	88 (77.2)	67 (72.8)
Marital Status			
Single	11 (8.5)	10 (8.8)	6 (6.5)
Married or Cohabitant	109 (83.8)	96 (84.2)	82 (89.1)
Widower	6 (4.6)	5 (4.4)	4 (4.3)
Divorced	4 (3.1)	3 (2.6)	-
Professional Status			
Employed	25 (19.2)	22 (19.3)	19 (20.7)
Unemployed	35 (26.9)	29 (25.4)	23 (25.0)
Retired	70 (53.8)	63 (55.3)	50 (54.3)
Education	$M = 4.54$, $SD = 3.58$	$M = 2.35$, $SD = 3.53$	$M = 4.39$, $SD = 3.35$
Degree of Kinship			
Parents	55 (42.3)	47 (41.2)	39 (42.4)
Companion	58 (44.6)	53 (46.5)	45 (48.9)
Others	17 (13.1)	14 (12.3)	8 (8.7)
Duration of care (years)	$M = 3.99$, $SD = 2.21$	$M = 4.10$, $SD = 2.20$	$M = 4.27$, $SD = 2.23$
1st time caregiver			
Yes	92 (70.8)	83 (72.8)	67 (72.8)
No	38 (29.2)	31 (27.2)	25 (27.2)
Secondary care			
Yes	71 (54.6)	63 (55.3)	49 (53.3)
No	59 (45.4)	51 (44.7)	43 (46.7)
Choose to care			
Yes	103 (79.2)	92 (80.7)	72 (78.3)
No	27 (20.8)	22 (19.3)	20 (21.7)
Person living with Alzheimer Disease			
Age	$M = 85.19$, $SD = 5.97$	$M = 85.06$, $SD = 6.04$	$M = 85.30$, $SD = 5.98$
Sex			
Male	44 (33.8)	38 (33.3)	28 (30.4)
Female	86 (66.2)	76 (66.7)	64 (69.6)
Marital Status			
Single	8 (6.2)	6 (5.3)	2 (2.2)
Married or Cohabitant	66 (50.8)	60 (52.6)	47 (51.1)
Widower	56 (43.1)	48 (42.1)	43 (46.7)
Education	$M = 1.38$, $SD = 1.91$	$M = 1.38$, $SD = 1.93$	$M = 1.27$, $SD = 1.95$
Duration of Memory problems	$M = 3.93$, $SD = 2.29$	M = 3.94, $SD = 2.33$	$M = 4.04$, $SD = 2.35$
Previous treatments for memory problems			
Yes	44 (33.8)	35 (30.7)	31 (33.7)
No	86 (66.2)	79 (69.3)	61 (66.3)

suggesting the characteristics of persons with Alzheimer's disease were not predictors of dropout.

Relationships among All Variables

The correlation coefficients between distress, family stress, forgiveness, and QoL at different time points (T1, T2, T3) are summarized in Table 2. Distress at T1 showed a significant positive correlation with family stress at T1 ($r = .218$, $p < .05$), and with distress at T2 ($r = .394$, $p < .01$), and a negative correlation with forgiveness at T1 ($r = -.510$, $p < .01$). Family stress at T1 was negatively correlated with forgiveness at T1 ($r = -.195$, $p < .05$) and positively with family stress at T2 ($r = .277$, $p < .01$). Forgiveness at T1 showed a positive correlation with forgiveness at T2 ($r = .343$, $p < .01$), that correlated positively with mental QoL at T3 ($r = .253$, $p < .05$). Distress at T2 was negatively correlated with forgiveness at T1 ($r = -.246$, $p < .01$) and forgiveness at T2 ($r = -.424$, $p < .01$), and mental QoL at T3 ($r = -.569$, $p < .01$), and physical QoL at T3 ($r = -.340$, $p < .01$). Family stress at T2 correlated negatively with forgiveness at T2 ($r = -.423$, $p < .01$) and mental QoL at T3 ($r = -.204$, $p < .01$). Finally, mental QoL at T3 correlated positively with physical QoL at T3 ($r = .590$, $p < .01$).

Predictors and Mediators of QOL

Results showed a good model fit: chi-square, $\chi^2(14) = 15.991$, $p = .314$; comparative fit index, CFI = .992; incremental fit index, IFI = .992; root mean square error of approximation, RMSEA = .033; 90% IC [.000, .095], $p = .000$, explaining 29.2% and 51.8% of the variance of physical QoL and mental QoL, respectively (Figure 1).

Table 2. Correlations between Psychological Variables at T1, T2, and T3

	1	2	3	4	5	6	7	8
1. Distress T1	1	.218*	-.510**	.394**	.004	-.148	-.142	-.084
2. Family Stress T1		1	-.195*	.080	.277**	-.028	-.175	-.022
3. Forgiveness T1			1	-.246**	-.047	.343**	.158	.198
4. Distress T2				1	.061	-.424**	-.569**	-.340**
5. Family Stress T2					1	-.423**	-.204**	-.087
6. Forgiveness T2						1	.253*	.158
7. Mental QoL T3							1	.590**
8. Physical QoL T3								1

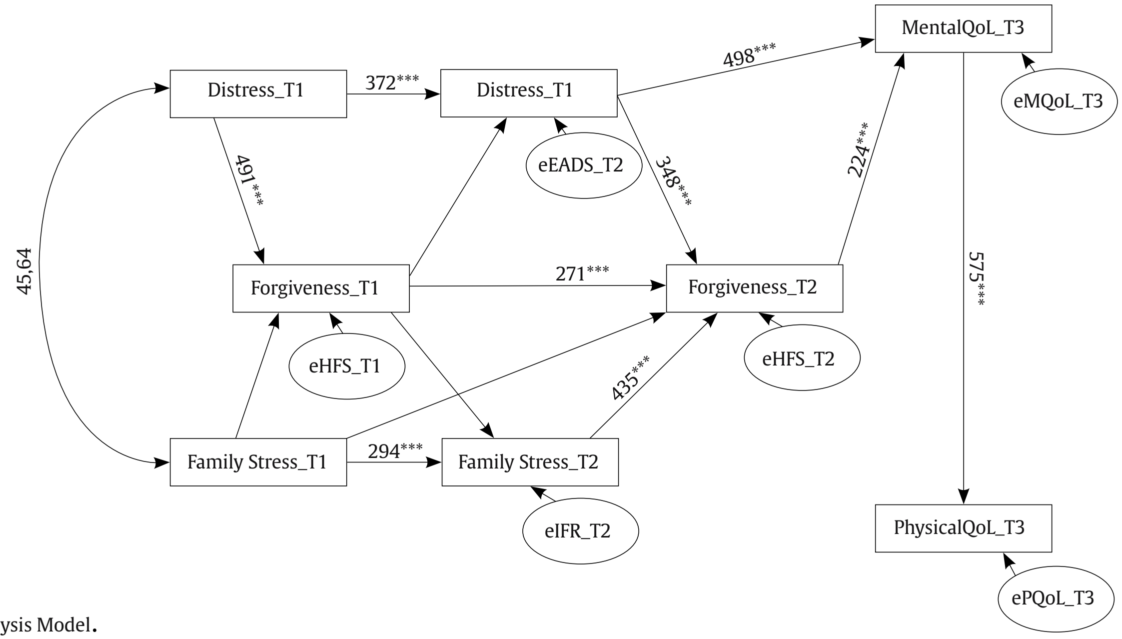

Figure 1. Path Analysis Model.

Regarding direct effects, the results showed that family stress at T1 positively predicted family stress at T2 (β = .294, *p* < .001, 95% CI [.156, .576]) and the latter was negatively associated with forgiveness at T2 (β = -.435, *p* < .001, 95% CI [-.659, -.341]). Forgiveness at T1 positively predicted forgiveness at T2 (β = .271, *p* < .001, 95% CI [.134, .422]). Distress at T1 was negatively associated with forgiveness at T1 (β = -.491, *p* < .001, 95% CI [-.659, -.349]), and positively predicted distress at T2 (β = .372, *p* < .001, 95% CI [.168, .498]). Distress at T2 was negatively associated with forgiveness at T2 (β = -.348, *p* < .001, 95% CI [-.569, -.247]) that, in turn, predicted lower mental QoL at T3 (β = -.498, *p* < .001, 95% CI [-.372, -.192]). Forgiveness at T2 predicted positively predicted mental QoL at T3 (β = .224, *p* < .001, 95% CI [-.038, .116]). Finally, mental QoL at T3 was negatively associated with physical QoL at T3 (β = .575, *p* < .001, 95% CI [.503, .829]).

Regarding mediation effects, forgiveness at T1 and T2 played a mediating effect between distress at T1 and mental QoL at T3 (β = -. 224, *p* < .001, 95% CI [-.335, -.121]). Forgiveness at T1 and T2 and mental QoL (T3) mediated the relationship distress at T1 and physical QoL at T3 (β = -.129, *p* < .001, 95% CI [-.213, -.069]). (See Table 3).

The Moderating Role of the Alzheimer's Disease Severity

The analysis of the moderating role of Alzheimer's disease severity (mild, moderate, and severe) showed that the adjusted model without any constraints and the fully constrained model were significantly different, $\Delta\chi^2(26) = 39.295$, *p* = .046. Only in the moderate and severe groups, a significant positive relationship between distress at T1 and distress at T2 was found (β =.451, *p* = .003; β =

Table 3. Mediator Effects of Forgiveness at T1 in the Path Analysis

Predictor	Indirect Effect	Outcome	β	*p*	95% CI	
					LL	*UL*
Distress T1	Forgiveness T1 → Forgiveness T2	Mental QoL T3	-.224	.000	-.335	-.121
Distress T1	Forgiveness T1 → Forgiveness T2 → Mental QoL	Physical QoL T3	-.129	.000	-.213	-.069
Family Stress T1	Forgiveness T1 →Forgiveness T2	Mental QoL T3	-.002	.674	-.032	.017
Family Stress T1	Forgiveness T1 → Forgiveness T2 → Mental QoL	Physical QoL T3	-.001	.664	-.019	.010

.511, $p < .001$) while in the mild and severe groups, a negative relationship between distress at T1 and forgiveness at T1 ($\beta = -.512$, $p < .001$; $\beta = -.526$, $p < .001$) and between distress at T2 and forgiveness at T2 ($\beta = -.453$, $p < .001$; $\beta = -.494$, $p < .001$) were found. Only in the mild group, a negative relationship was found between forgiveness at T1 and family stress, at T1 ($\beta = -.288$, $p < .001$) and only in the moderate group, there was a positive relationship between forgiveness at T1 and forgiveness at T2 ($\beta = .391$, $p = .002$).

The mediating effects show that forgiveness at T1 and T2 mediated the relationship between distress at T1 and mental QoL at T3 in both the moderate group ($\beta = -.221$, $p = .013$) and severe group ($\beta = -.238$, $p = .010$). In turn, forgiveness at T1 and T2 and mental QoL at T3 were mediators between distress at T1 and physical QoL, at T3, in the moderate and severe groups, respectively ($\beta = -.084$, $p = .014$; $\beta = -.150$, $p = .009$).

Forgiveness at T2 and Mental QoL at T3 mediated the relationship between forgiveness T1 and physical QoL, at T3, in the mild group ($\beta = .151$, $p < .001$).

The Moderating Role of the Family Caregiver's Age

The results of the multigroup analysis regarding family caregivers' age (younger versus older) showed that this variable was not a moderator in the adjusted hypothesized model, $\Delta\chi^2(13) = 14.150$, $p = .363$.

Discussion

The main goal of this study was to evaluate the impact of psychosocial variables, specifically family stress, distress, and forgiveness, on FCs' Qol over time, within the framework of Pearlin's (1990) Stress Process Model.

Higher distress levels at T1 correlated positively with family stress at T1 and T2, indicating an increased strain in family relationships for caregivers. These results are consistent with previous research linking stress to increased family conflicts (Rajovic et al., 2021). Additionally, higher distress at T1 was associated with less use of forgiveness, consistent with findings that stress impedes forgiveness (Worthington & Sandage, 2016). Strained family dynamics at T1, also hindered forgiveness, highlighting how conflicts can complicate forgiveness and add to caregivers' emotional burdens (Pietromonaco & Overall, 2022). Forgiveness significantly influenced FCs' QoL. Positive correlations between forgiveness at T1 and T2, and forgiveness at T2 and mental QoL at T3, suggest that early adoption of forgiveness may lead to sustained benefits for long-term mental health. These findings support forgiveness as a crucial coping mechanism that enhances emotional resilience and well-being over time (Toussaint et al., 2015).

The negative correlations of distress at T2 with forgiveness at T1 and T2, and from the later mental and physical QoL at T3, suggest that ongoing distress may impact the capacity to forgive that consequently negatively impacts QoL. This result is in line with findings from previous studies that showed the adverse effects of chronic stress on QoL (Damian et al., 2023; Maggio et al., 2021).

The strong positive correlation between mental and physical QoL at T3, underscores the close relationship between mental and physical health. This supports the holistic view that interventions enhancing mental well-being can also improve physical health outcomes (Wiegelmann et al., 2021).

A significant finding in this study was the cascade effect of family stress at T1 predicting family stress at T2. This result highlights how initial stressors within the family context can persist over time, emphasizing the long-term impact of early stressors. Early interventions are therefore crucial for mitigating prolonged distress. Higher family stress at T2 predicted lower forgiveness at the same time point. This suggests that ongoing family conflicts can inhibit the forgiveness process, potentially perpetuating negative relational patterns and compromising family cohesion. Addressing family stress early is crucial to prevent the erosion of forgiveness, which is essential for maintaining emotional well-being and family unity. Family stress encompasses factors such as: interpersonal conflicts, caregiving responsibilities, financial strains, and emotional burdens within the family unit (Lindeza et al., 2020). These conflicts often stem from differences in caregiving approaches and financial matters, contributing to emotional distress among FC.

Forgiveness at T1 predicted forgiveness at T2, which in turn predicted mental QoL at T3, highlighting forgiveness as a potential buffer against the adverse effects of family stress. This suggests that early forgiveness practices tend to be sustained over time, fostering a positive emotional environment, despite ongoing challenges in caregiving. Embracing forgiveness involves letting go of resentment, anger, and negative emotions related to caregiving experiences. Research indicates that forgiveness enables FCs to adopt a more compassionate and empathetic outlook, reducing emotional burdens and promoting psychological well-being (Rasmussen et al., 2019).

Distress at T1 positively predicted distress at T2. Initial levels of distress had a compounding effect, leading to increased distress later. This result underscores the chronic nature of distress in caregiving, suggesting that without effective interventions, distress may escalate over time. These findings are consistent with prior research emphasizing the cumulative burden of caregiving responsibilities, which frequently results in sustained psychological strain (Costa et al., 2021). Moreover, the results showed that distress at T2 also negatively predicted mental QoL at T3. This finding is crucial, as it underscores the long-term negative impact on mental health outcomes, indicating that FCs experiencing high initial distress, are more likely to suffer from poor mental QoL over time. The continuous demands of caregiving and witnessing the inexorable decline of a loved one, may intensify distress levels among FCs, leading to adverse effects on their mental health and overall QoL. During the pandemic, FCs and those they care for, were among the most affected groups. The caregiving role, already physically, emotionally, and economically challenging, became even harder with reduced formal and informal support. The increased challenges, stress, and often a sense of helplessness in managing the situation or seeking assistance (Bergmann & Wagner, 2021).

One key finding of the present study was the detrimental impact of distress on forgiveness at both T1 and T2. The present results indicated that higher distress at T1 predicted less use of forgiveness at T1. Furthermore, the findings revealed a persistent negative impact of distress on forgiveness over time, with distress at T2 also predicting less use of forgiveness, as a coping strategy, at T2. Initial distress negatively affects emotional regulation and forgiveness over time, posing challenges in resolving conflicts and letting go of negative emotions among FCs. Coping through forgiveness is crucial as it reduces stress and promotes positive adaptation to adversity (Strelan, 2020). Research indicates that forgiveness offers significant physical and psychological benefits for well-being (Çolak & Güngör, 2020; López et al., 2021) underscoring the importance of managing distress effectively to mitigate the risk of prolonged emotional strain and unresolved conflicts (López et al., 2021).

Interestingly, the present study also revealed that forgiveness was a mediator in the relationship between distress and mental QoL. Specifically, significant distress at T1 predicted mental QoL at T3, mediated by forgiveness at T1 and T2. Fostering forgiveness early, and maintaining it, may protect FCs from the detrimental effects of distress on long-term mental well-being. Forgiveness reduces stress, anger, and frustration, promoting compassion and positive emotions towards the person living with Alzheimer's disease (Levy et al., 2021). The practice of forgiveness also prevents negative emotions, behaviors, and obsessive thoughts, which can improve mental QoL over time (Çolak & Güngör, 2020; Kaleta & Mróz, 2020). Integrating forgiveness into caregiving strategies could significantly benefit FCs' emotional health and overall QoL.

Furthermore, mental QoL at T3 was predictive of physical QoL at T3, suggesting that mental QoL may have a cascading effect on physical health outcomes. Improved mental well-being among FCs leads to better physical health and more effective management of caregiving responsibilities (Madruga et al., 2020; Maggio et al., 2021), better sleep, increased physical activity, and adherence to medical recommendations, all enhancing overall physical QoL (Gräler et al., 2022).

The results revealed that Alzheimer's disease severity (mild, moderate, and severe) moderated the final model. In both the moderate and severe disease groups, a strong positive relationship was observed between distress at T1 and subsequent distress at T2. This finding aligns with research by Clare et al. (2022) and Quinn et al. (2019), indicating that FCs of persons living with advanced dementia experience sustained high levels of stress. The progressive nature of the disease and increasing caregiving demands lead to prolonged exposure to emotional and physical challenges, contributing to persistent distress among FCs.

For both mild and severe dementia, distress at T1 correlated negatively with forgiveness at T1. Over time, ongoing distress at T2 was associated with decreased forgiveness at T2. This relationship was particularly significant in the mild group, underscoring the early psychological strain in the caregiving journey as FCs adapt to new roles and evolving needs of their loved ones (Hazzan et al., 2022). The ongoing negative relationship between distress at T2 and forgiveness at T2 in the mild dementia group indicated that early distress has lasting effects. FCs starting with high stress levels may struggle to cultivate and sustain forgiveness over time, leading to chronic emotional strain that impacts their well-being and caregiving effectiveness (Clare et al., 2022; Quinn et al., 2019). In cases of severe dementia, FCs face intensified and prolonged demands, resulting in higher distress levels and a greater need for effective coping strategies like forgiveness which is consistent with the significant cognitive and functional impairments, in severe stages, increasing caregiving burdens and distress ppersistently. FCs showing more use of forgiveness often adopt better coping mechanisms and maintain a positive outlook, aiding in effective stress management (Rasmussen et al., 2019). This finding underscores the importance of early support for FCs caring for both mild and severe Alzheimer's disease patients, starting from T1, as emphasized by Callahan et al. (2024).

In the mild dementia group, a negative relationship between forgiveness at T1 and family stress at T1 was found, which may indicate a protective role against family stress over time. FCs who exhibited more use of forgiveness experienced lower levels of family stress. In the early stages of Alzheimer's disease, FCs face significant emotional adjustments upon realizing their loved one's diagnosis and its implications for the future. Forgiveness in this context reflects the caregiver's capacity to release negative emotions and resentments, fostering healthier family dynamics (Damian et al., 2023; Rasmussen et al., 2019). For caregivers in the moderate dementia group, increased use of forgiveness at T1 was positively linked to sustained forgiveness at T2, indicating that those who began with a forgiving attitude were likely to maintain this coping strategy over time.

Regarding the mediating effects, forgiveness at T1 and T2 had a mediator effect in the relationship between distress at T1, and mental QoL at T3. Furthermore, forgiveness at T1 and T2 and mental QoL at T3 were mediators between distress at T1 and physical QoL at T3 in the moderate and severe groups. These results showed that early distress may have long-term detrimental effects on the caregiver's overall well-being. In advanced stages of dementia, FCs face heightened challenges due to intensified caregiving demands, which strain their emotional, physical, and financial well-being (Borges-Machado et al., 2020). Early distress predicted long-term well-being outcomes, reflecting the enduring impact of caregiving stress (Connelly et al., 2024). In mild dementia, forgiveness at T2 and mental QoL at T3 mediated the relationship between forgiveness at T1 and physical QoL at T3, illustrating forgiveness as a beneficial coping strategy that enhances physical QoL (Worthington & Sandage, 2016). These findings align with research highlighting the role of forgiveness in promoting emotional resilience and improving overall QoL.

FCs' age did not act as a moderator, indicating that distress, forgiveness, family stress, and QoL dynamics are consistent across different age groups of caregivers. This finding suggests that the challenges and stress, associated with caring for persons living with Alzheimer's disease, are similar whether caregivers are younger or older (Fabbietti et al., 2024). Caregiving tasks—such as managing behavioral symptoms, providing personal care, and coping with emotional distress—represent universal challenges that appear to transcend age among FCs. However, this finding contrasts with previous studies highlighting age as a significant factor influencing caregivers' QoL (Madruga et al., 2020). It is possible that the characteristics of our sample, where a majority were retired or unemployed, focused primarily on caregiving rather than balancing it with work responsibilities, may explain this result. Future research could explore this hypothesis further.

Conclusion

Limitations and Further Studies

The present study has several limitations that need to be acknowledged such as being focused only on a section of Pearlin's (1990) Stress Process Model concerning secondary strains, outcomes, and mediators and, as a result, critical interactions from primary stressors (e.g., the direct demands of caregiving), were not tested. Therefore, the results need to be interpreted with caution. Future studies should also analyze primary stressors and mediators addressing the full theoretical model.

The generalization of the findings is also limited by the sample size, as it consisted exclusively of FCs of persons living with Alzheimer's disease integrated into the IADem Plan, a community program. This specific focus means that the results may not be applicable to FCs in other settings, but only followed in the community such as the IADem Plan.

While a longitudinal design may provide valuable insights into the temporal dynamics of family stress, distress, forgiveness, and QoL, it also introduces challenges related to the timing of assessments. The intervals of six months (T1 to T2) and twelve months (T2 to T3) may not capture shorter-term fluctuations in stress and coping mechanisms or may need to be further apart. More assessments could provide a finer-grained understanding of how these variables interact over time.

The present study did not address the impact of caregivers' satisfaction with the dyadic relationship and the impact of the gender of the person living with Alzheimer's disease. Therefore, future studies should address the influence of such variables on caregivers' QoL. Finally, there may be other variables that influence the relationships observed in this study that were not considered. Factors such as social support, financial stability, and the severity of the care recipient's condition may also impact FCs' stress levels, coping strategies, and QoL. Including these variables in future research could provide a more holistic understanding of the caregiving experience.

Implications for Practice

According to the results, it is important to develop and provide psychosocial interventions for FCs of persons living with Alzheimer's disease, given the impact on physical and mental QoL, over time (12 months after T1).

The results showed that distress at T1 negatively predicted forgiveness at T1 and positively predicted distress at T2. The health care team should prioritize early screening for distress among FCs as soon as they enter structured caregiving programs. Early identification of high distress levels allows for timely interventions that may prevent the escalation of distress later and its negative impact on mental QoL.

Family stress at T1 predicted family stress at T2, and distress at T1 negatively predicted forgiveness at T1 and T2. Therefore, the integration of forgiveness intervention as a coping strategy is warranted. Given the negative impact of distress on forgiveness dynamics and QoL outcomes, early and sustained intervention focused on forgiveness should be implemented between T1 and T2.

Since early distress negatively predicted forgiveness and the early use of forgiveness at T1 predicted lower family stress at T2, interventions that promote forgiveness and emotional resilience could be beneficial, especially in the mild stage of Alzheimer's disease severity. FCs caring for moderate and severe dementia patients may require even more intensive and sustained support compared to those caring for persons living with mild dementia. Early distress also predicted lower mental QoL, twelve months later that in turn predicted physical QoL, particularly in moderate and severe dementia groups. This result underscores the importance of approaches that address both the mental and physical health needs of FCs.

According to results, promoting physical health and mental health into caregiving programs will enhance overall caregiver QoL. Mental health professionals should assess and address distress early on in FCs to develop adaptive coping strategies, such as forgiveness, that will promote QoL outcomes.

Mindfulness practices, such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT) (Kor et al., 2019) have been shown to reduce stress and enhance emotional regulation. These interventions help FCs become more present and less reactive to the daily stressors they face, promoting self-compassion and forgiveness. By incorporating these practices, caregivers can develop healthier emotional responses, which directly improve their mental and physical health. Cognitive-Behavioral Therapy (CBT) for FCs focuses on addressing maladaptive thoughts and behaviors, such as feelings of helplessness, while enhancing coping strategies. When combined with forgiveness-focused CBT, FCs are equipped with tools to reduce resentment or anger toward the person living with Alzheimer's disease or themselves, fostering emotional healing. This approach also provides practical skills to manage caregiving stress, improving FCs' mental QoL. Moreover, interventions like family therapy can be essential for improving communication, reducing conflict, and strengthening the support system within the family. These programs, when combined with forgiveness exercises, address relational strain and caregiving-related stress. By fostering empathy and acceptance, such interventions promote healthier family relationships, which enhance caregiving outcomes and reduce family stress and distress on caregivers, thereby improving their overall mental and physical QoL (Chacko et al., 2022).

Compassion-focused interventions tailored specifically for FCs of persons with Alzheime's disease help FCs develop greater self-compassion (Murfield et al., 2022) and are essential for managing common feelings of guilt, frustration, or burnout. By incorporating self-forgiveness practices, FCs learn to view caregiving with kindness and reduce self-criticism. Addressing the emotional toll of caregiving fosters a sense of peace and emotional resilience, significantly enhancing caregivers' mental and physical QoL.

Incorporating these evidence-based intervention models into caregiving intervention programs is critical to improving the QoL of FCs of persons living with Alzheimer's disease. These interventions not only reduce caregiver distress but also promote emotional healing and resilience, thereby enhancing caregivers' capacity to cope with the demands of caregiving while preserving their own well-being (Saragih et al., 2024).

Highlights

- The study highlights the crucial role of disease severity in family caregivers. In moderate and severe Alzheimer's stages, distress increased over time. Forgiveness mediated the relationship between distress and QoL, with forgiveness at T1 predicting less distress six months after (T2) and the latter predicting mental and physical QoL, one year after T1 (T3).
- Improvements in mental QoL were shown to positively influence physical QoL outcomes.
- The prolonged impact of early distress underscores the importance of timely interventions to alleviate long-term strain.

Conflict of Interest

The authors of this article declare no conflict of interest.

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Authors' Contributions

Conceptualization, LB and MGP; methodology, LB, MGP and AL; formal analysis, LB, AL and MGP; writing-original draft preparation, LB; writing review and editing, AL and MGP; supervision, MGP and AL.

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