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Family Relationships and Alzheimer's Disease: A Systematic Review

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Abstract.
Background: Family caregivers of people with Alzheimer's disease are the most important support in concrete personal and economic terms. Family dynamics play a fundamental role in the provision of informal caregiving benefits.
Objective: This review aims to identify factors related to the family caregiving of relatives with Alzheimer's disease, taking specifically into account the construct of coping and expressed emotion.
Methods: This is a systematic review including articles selected using search terms including "caregivers," "Alzheimer's," "family," and "relationship" in research databases. Findings were synthesized and categorized into themes.
Results: A total of 454 abstracts were identified. Following screening, lateral searches, and quality appraisal, 36 studies were included for synthesis. A total of 5 themes were identified: burden; demographics; coping strategies; caregiver mental health; and family dynamics and expressed emotions.
Conclusion: The quality and level of evidence supporting each theme varied. We need further research into family dynamics ameliorating the caregiving and how to measure it.

Keywords: Alzheimer's disease, family caregivers, family relationship, systematic review

INTRODUCTION

Dementia is a complex clinical syndrome with many etiologies. The most common type of dementia, accounting for 60–80% of all cases, is Alzheimer's disease (AD) [1]. Behavioral and psychological symptoms of dementia (BPSD), also known as neuropsychiatric symptoms (NPS), in AD comprise a wide range of psychopathological manifestations, such as agitation, aggression, apathy, sleep abnormalities, changes in appetite and eating pattern. Difficulty remembering recent conversations, names, or events is often an early clinical symptom of AD, and likewise for apathy and depression [1, 2]. Later symptoms include impaired communication, disorientation, confusion, poor judgment, behavior changes and, ultimately, difficulty speaking, swallowing, and walking. BPSD seem to be a consequence of multiple, but sometimes modifiable, interdependent factors internal and external to the patient (untreated pain and undiagnosed medical conditions), caregiver (unsuccessful communication style), and environment (overstimulation or lack of activity/structure) [3]. One of the most dramatic consequences of AD consists in losing the capacity to perform activities of daily living (ADL), including, but not limited to, bathing, dressing, personal

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hygiene and self-feeding. Daily activities include also those ones called instrumental activities of daily living (IADL) which are not necessary for fundamental functioning, but allow an individual to live independently in the first stages of the disease. IADLs include meal preparation, daily household chores, managing money and/or managing medication, and moving. The majority of current reviews of the topic of AD caregiving highlights how family caregivers strive to adapt to the challenges brought by the illness. Whereas AD leads to increasing dependency on family members for the fulfilment of basic needs, relationships become increasingly imbalanced, inducing a profound restructuring of the established relationship. In these terms, caregiving becomes a potential fertile ground for persistent stress. Caregivers' reactions to the challenges of AD are varied, and while some caregivers might be able to successfully manage their relatives, the majority are unsuccessful, inducing a high level of stress. Mediating factors of stress have been the object of research in the widely known cognitive theory of psychological stress and coping by Folkman and Lazarus [4]. In this theory, stress is conceptualized as a relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and as endangering well-being. The theory identifies two processes, cognitive appraisal and coping, as critical mediators of stressful person-environment relationships and their immediate and long-term outcomes. Approaches studying specifically dementia stress-related caregiving have also considered the role of coping mechanisms as its mediating factors [5]. The concept of coping is related to personal characteristics, whereas the family context is considered as an environmental variable. Indeed, in the framework of family systems theories and literature [6], we understand an individual as part of the family system, as well as the family as part of an emotional unit. From literature, we can observe how the family could impact persons with dementia in the worsening of BPSD. Brodaty and Burns (2015) list some critical attitudes of family members: creating sudden, unexpected changes in routine or environment; ignoring the AD relative's needs; repeatedly prompting or questioning in an attempt to improve memory performance; instigating "power struggles" (e.g., insisting that they should behave in particular ways); being overtly rigid, controlling, or critical; shouting, expressing anger, or aggression; "talking down" to the person as if to a child; and running out of patience [7]. Considering such caregiver behaviors either as ways to cope or simply the results of prior dysfunctional family dynamics, these attitudes may elicit catastrophic reactions in the persons with dementia. Furthermore, negative family dynamics, or just one family member maintaining dysfunctional coping strategies toward the AD relative, affect caregivers themselves by increasing their burden and posing a major depression risk [8, 9]. Moreover, the use of certain coping mechanisms, such as disengaged coping strategies, also results in negative outcomes in the AD relative by increasing NPS [10]. On the contrary, high family cohesion has been associated with less caregiver burden and depression [11]. Therefore, considering families as systems of interconnected and interdependent individuals, which cannot be understood in isolation from the system, different coping strategies can be adopted by a single family member. Selection of a certain strategy might be related to specific family dynamics, which as a consequence characterizes the AD family caregiving.

The Expressed Emotion (EE) [12] construct is a way to study the perception of the ill relative by family members. EE measures to which extent a relative of a patient speaks about that patient in a manner that reflects criticism, hostility, or emotional over-involvement [13]. Conceived as a measure of family relationships in order to predict outcomes of patients' disorders, EE has been operationalized with the Camberwell Family Interview [14] (CFI), which analyses speech content during interviews with family members. Highly "negative" EE defines a presence of frequent critical comments about relative behavior (e.g., resentment, reproval), hostility (toward the relative as a person, not specifically their behavior), and emotional over-involvement (exaggerated emotional response, a mixture of worrying, self-sacrifice, identification with the relative, overprotection, and intrusiveness). Research on EE has served as a catalyst for the development of family-based interventions in many illnesses [14, 15]. The few studies using EE in dementia context shown that high EE is associated with distress [15], increases in depression and burden for caregivers of people with dementia [16].

The interplay between family caregiving and AD, with particular focus on the family relationships, plays a role in the improvement of many caregiving aspects including the management of BPSD, caregiver burden reduction, and a general better quality of life. In some case, psychosocial treatment approaches, including coping strategy-based family carer therapy, resulted to be pivotal for successful treatment of BPSD [7].

To our best knowledge, to date there is no comprehensive study linking family relationships (measured through EE and coping), BPSD (specific of AD), and the domestic setting in which the care takes place.

In order to fill this gap, this study relies on a systematic review of the quantitative and qualitative literature to explore the family caregiving in the AD context, taking specifically into account the construct of coping and EE.

METHODS

Protocol

The protocol is reported in line with recommendations of the PRISMA-P statement (Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols) [17].

Literature search

Quantitative, qualitative, and mixed-methods studies, published in English, were identified using accepted systematic review methodology in four electronic databases: 1) PubMed, 2) Science Direct, 3) PsychINFO, and 4) Google Scholar. The search was conducted using combinations of 12 search terms including "Alzheimer's" and "family" or "relatives" or "caregiving" and "caregiver" and "Expressed Emotion" and "relationship" or "management", or "attitudes", or "ADL", or "burden" or "coping strategies". In addition, we also examined the reference list of all included papers to identify any additional articles that might have been missed by the search strategy. All studies published between 2008 and 2018 retrieved at the search date were selected. The gray literature database OpenGrey and the Internet were also used as sources. Our search strategy was designed to be broad enough and sensitive enough to ensure that we captured all potentially relevant studies (see the Supplementary Material). We additionally used lateral searches, which can be helpful in identifying observational and qualitative studies. These included 1) checking the reference lists from primary studies and systematic reviews ("snowballing") and 2) citation searching using the "Cited by" function in Google Scholar and the "Related articles" option in PubMed ("lateral searching").

Eligible studies, inclusion and exclusion criteria

Study selection

The following inclusion criteria were taken into consideration when searching the literature for material on the relationship between family caregivers and AD relatives: cross-sectional or longitudinal studies; randomized or non-randomized; and controlled or not controlled; only original articles were included. Commentaries, editorials, and cost-effectiveness studies were excluded.

Population

The population of interest is exclusively people with AD and their family caregivers. The caregiver may be a spouse, child, or other family member. Non-family caregivers, such as friends, neighbors, or professional paid caregivers, are excluded as their relationship with a patient with AD is expected to be qualitatively different. The institutionalized context is excluded. Only the Alzheimer's type of dementia is included. Vascular dementia, mixed dementia, frontotemporal dementia, and dementia with Lewy bodies are excluded. Studies on patients with dementia in Parkinson's disease, Huntington's disease, Creutzfeldt-Jakob disease, Wernicke-Korsakoff syndrome, mild cognitive impairment, and other conditions are excluded as well. Studies involving mixed populations are only eligible if AD group represents at least 80% of the sample.

Exposures/risk factors studied

Studies were included if they measure any element of the relationship between the person with AD and the family caregivers. Amount of contact, closeness, attachment, expressed emotion, and the coping style were the primary points of interest. Measures of family relationship prior to AD onset and concurrently with AD are both included, although analyzed separately, as relationships are expected to change as a result of AD. Studies specifically focused on caregiver's abuse, such as those that only include participants who are in abusive relationships, were excluded. The rationale is that abuse is an 'extreme' dimension of relationship belonging to another area of research ('elder abuse', which leans towards long-term abusive relationships and in the wider context of aging, and does not focus specifically on AD). Studies in which participants in abusive relationships are included alongside participants in non-abusive relationships, which are also exploring our specified eligible exposures (and outcomes) of interest, are included (e.g., studies comparing risk of burden in caregivers in abusive relationships versus those in non-abusive relationships).

Selection of studies

Electronic search results were downloaded into Mendeley™ bibliographic software and duplicates were deleted. Auto- and hand-searching methods of identifying duplicates were used. Full articles were sought for all potentially relevant studies.

Data management and extraction

Key information was extracted from all studies that met the inclusion criteria. The extracted information included data source, study setting, sample characteristics, objectives and outcomes (e.g., burden, management of challenging behavior, family relationship). If relevant information was not presented in the identified articles, it was considered "off topic." We did not approach the authors for clarification. Themes were identified using an inductive approach [18], driven by the reported outcomes in the results sections of the included articles. Identified themes were extracted from qualitative studies.

Risk of bias assessment

Two researchers (A.L. and F.E.) independently assessed the risk of bias for each observational cross-sectional and cohort studies using the RTI Item Bank for Assessing Risk of Bias and Confounding for Observational Studies of Interventions or Exposures [19]. This tool provides a list of 13 questions, each one addressing a type of bias, such as selection bias, performance bias, detection bias, attrition bias, and selective outcome reporting. We did not assess risk of bias for the qualitative or mixed-methods studies. To the best of our knowledge, no specific instruments to assess risk of bias of this type of studies are currently available.

RESULTS

Study selection

The search was conducted in November 2018; 499 articles were identified using our search criteria. After automatic and manual deduplication, the titles and abstracts of the 454 unique articles were screened. Following the screening, 102 articles were considered potentially relevant. After reading the full texts of 102 articles, 33 articles were selected according to the inclusion criteria. An additional 3 articles were identified through snowballing and lateral search techniques. See Fig. 1 for the flowchart of the review process and the reasons why articles were excluded. Descriptive data were extracted from the 36 studies.

Participant and study characteristics

Of the 36 studies, 6 were qualitative [20–25], 4 were mixed-methods studies [24, 26–28], and the rest were quantitative in design (see Table 1). Caregivers were mostly spouses or children of the person with AD.

Risk of bias of observational research

Supplementary Table 1 synthesizes the risk of bias assessment for observational cross-sectional and cohort studies using the RTI Item Bank tool. The majority of studies showed a high risk of bias in at least 3 dimensions, especially "detection", "selective outcome reporting," and "confounding." The most common causes of risk were as follows: the assessor was not blinded to the outcome (detection bias); the role of coping strategies was not taken into account/reported/analyzed (selective reporting bias and confounding), EE measure was not taken into account/reported/analyzed (selective reporting bias); the potential role of family dynamics was not taken account/reported/analyzed (confounding). Finally, 1 study [29] only showed detection bias, because it did not provide sufficient information to be appraised, and we were unable to contact the authors of this study.

Narrative synthesis

Themes were identified using an inductive approach, driven by the reported outcomes in the results sections of the included articles. The results section was divided into sections, each covering a factor that characterizes and affects the family caregiving an AD relative.

A narrative synthesis method was used to describe the results from the selected 36 studies. Primary themes related to family relationships including the way to cope and EE measures are listed below. Secondary themes encompass caregivers' burden, caregivers' mental health, and demographics aspects.

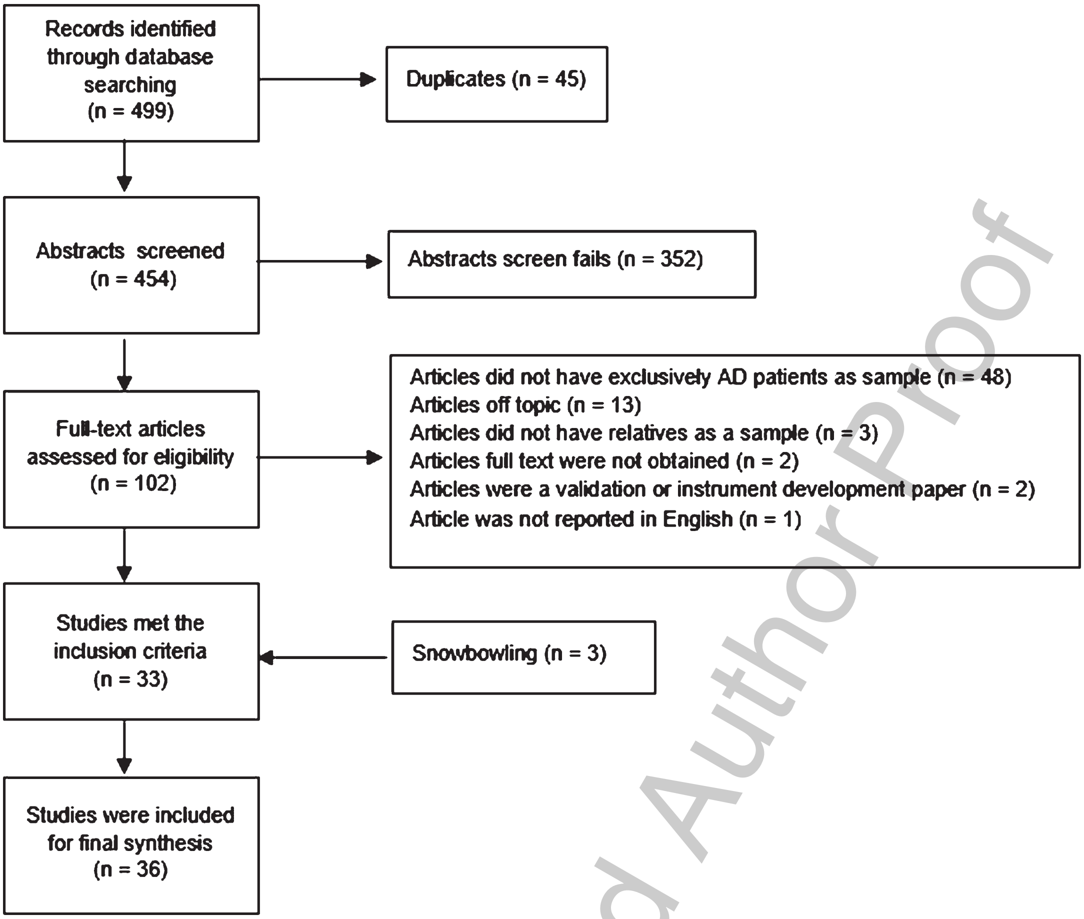

Fig. 1. Flow diagram of the systematic review process. AD, Alzheimer's disease.

Family relationships

Among family dynamics, caregiver role acquisition characterizes most of the family relationships in the caregiving, overall at the AD onset [29]. Before a clear diagnosis of AD, families go through different dynamics from "noticing" to "balancing" until the redefinition of new roles and reorganization of the family structure once AD diagnosis is delivered [30, 31]. For married couples, AD was more likely to be detrimental in terms of the disruption of marital closeness [20]. These spouse caregivers dramatically experience the change of roles, and the relationship becomes characterized by a feeling of loss, loss of communication, frustration, lack of intimacy, and lack of support, often without capacity to reconstruct marital closeness. For children, crossing adult–child-gender role boundaries escalated caregiver discomfort [25]. When compared to offspring, spouses reported fewer family conflicts [32]. In addition, a measure of high closeness in the dyad caregiver-AD relative in families that included children, spouses, children, and brothers in-laws showed slower cognitive and functional decline in the AD relative [28]. Family dynamic variables including cohesion, flexibility, pathology/functioning, communication, family satisfaction, and empathy were found to be associated with caregiver mental health variables, and caregivers presented stronger mental health when their family dynamics were healthier [33]. Family functioning in terms of adaptation, growth, partnership, and affection was found to mediate the level of cognitive function in the AD relative, caregiver burden (CB), and quality of care [34, 35]. Higher quality of care (including showing respect) was related to greater levels of empathy and reduced levels of overall dysfunction in caregivers' families [36].

Table 1
Summary of the characteristics of the eligible articles in alphabetic order

Study	Sample	Design	Instruments	Objectives	Results
[20]	N = 28 spouses CG	Qualitative	Semi-structured interviews	To study how AD affected marital closeness	Wives experienced disruptions in their marriage as a result of AD.
[48]	N = 142 CG and CR	Cross-sectional	CG: MMSE, ZBI, RMBPC, OARS, HDRC, NPI	To investigate the effects of different NPS on CG burden and depression	Behavioral problems and mood disturbances predict burden and depression.
[46]	N = 330 CG and CR	Longitudinal	CR: CDR, MMSE Demographics, MMSE, DAD, NPI, ZBI	To study caregiver burden, as well as the factors associated with it	Being the sole carer, poor mental health, and living with the patient as well as CR's NPS were associated with burden.
[37]	N = 83 CG and CR	Cross-sectional	CG: The attachment questionnaire, HADS, Brief COPE, ZBI	To test if CB and the coping strategies used mediate a relationship between attachment style and anxiety	Carers who were less secure or more avoidantly attached reported higher anxiety and adopted dysfunctional coping strategies.
[49]	N = 60 CG and CR	Cross-sectional	CR: MMSE, NPI, ADCS-ADL Demographics, CG' health status battery test, PSQI, CES-D, ZBI, IQCODE, CMAI	To investigate the relationship between AD relative sleep disturbance and CG' health status	The frequency of nocturnal disruptions of the CR was associated with poorer mental health of the CG.
[53]	N = 22 CG and CR	Mixed Methods	CG: ADL, IADL, CES-D, BRSS, PAC, BAI, ZBI	To study spousal dyad and their approach to AD caregiving	Spouses taking a We/Us approach were able to identify more positive aspects of the caregiving.
[32]	N = 122 CG	Mixed Methods	CR: MoCA, MMSE, PCS, RSCS, CAMI, FCCS, PDI	To study the characteristics of caregiving following diagnostic disclosure of AD	Compared with men CG women have more problems controlling disturbing thoughts and more family conflicts. Compared with offspring spouse are less able to cope with the relative's disruptive behaviors.
[30]	N = 22 CG and CR	Qualitative	Semi-structured interview	To study how people with AD and their families are affected by the disease	Three main temporal stages were identified: (a) noticing (b) watching and redefining; and (c) balancing process.
[31]	N = 200 CG and CR	Cross-sectional	CG: CBI	To study stress, anxiety and depression in Alzheimer caregivers	The severity of the disease determines the reorganization of the family environment.
[38]	N = 80 CG and CR	Cross-sectional	CR: MMSE, ADL-IADL Demographics, MMSE, ADLs, B-ADLs, GDS, NPI, CBI, BDI, STAI-S, CSI	To study the relationship between CB and NPSs and whether the CG coping strategies mediated this relationship	NPS were associated with more CB, and this was partially mediated by caregiver coping strategies. More disengagement coping was predictor for NPS.

(*Continued*)

Table 1
(*Continued*)

Study	Sample	Design	Instruments	Objectives	Results
[34]	N = 82 families (adolescent CG and their parents)	Cross-sectional	CBI, ADL-IADL, SCS, ATPLCS	To examine adolescent grandchildren's contributions to caregiving for grandparents with AD	Grandchildren provided more help when parents provided more care and when grandchildren had greater affection for grandparents.
[21]	N = 10 CG	Qualitative	Focus Groups	To describe the stressors in CGs and to identify the emotions that the CGs described most frequently	The stress determinants were: the inability of the relative to perceive reality, to understand the spoken word, impulsivity and irritability.
[25]	N = 25 CG	Cross-sectional	Focus-groups	To explore Alzheimer's family caregivers' perspectives about dressing ADL	CG ability to manage IADL, such as dressing, is acquired through several stages by trials and errors with related discomfort.
[39]	N = 391 children and CR	Cross-sectional	Semi-structured interviews Demographics, Decision to Care for Parent Scale, F-COPES, DDQ, DMS, CBI, CJCS	To examine familial caregivers—specifically adult children—of AD relatives	CGs who did not volunteer in their role and those ones with poor coping skills feel more burdened.
[29]	N = 100 CG	Cross-sectional	Demographics, CSS, MPBC, PAC, CES-D, measures of Role	To examine how different patterns of caregiving onset impact mental health and physical outcomes for CGs	CR's cognition and behavioral problems moderated the relationship between caregiving onset and mental health outcomes for CGs.
[28]	N = 167 CG and CR	Mixed methods	RCS, MMSE, CDR	To examine the effect of CG-CR relationship closeness on cognitive and functional decline in AD	Dyads with higher levels of closeness and with spouse CGs had slower CR cognitive decline.
[45]	N = 54 CG and CR	Cross-sectional	CG: FAS, FACES	To examine whether confabulation relates to familial factors	Family attitude was the factor most related to confabulation in our study.
[36]	N = 102 CG	Cross-sectional	CR: MCB, MMSE, GDS RFCS, FACES, FAD-GF, ECS	To investigate the relationship between family dynamics variables and quality informal care	Higher quality of care was related to greater levels of empathy and reduced levels of overall dysfunction in CG.
[40]	N = 172 CG	Cross-sectional	Demographics, MBPC, ZBI, CES-D, WOC	To examine caregivers' coping styles	Positive coping strategies are the most powerful in moderating the effect of burden on depression.
[50]	N = 2266 CG and CR	Cross-sectional	MMSE, CERAD, K-ADL, CBI, DCAP	To explores multidimensional determinants associated with family caregiver burden in AD	Dementia-related factors represent the majority of caregiver burden followed by caregiving-related factors.

(*Continued*)

Table 1
(*Continued*)

Study	Sample	Design	Instruments	Objectives	Results
[47]	N = 73 CG and CR	Cross-Sectional	CR:CDR, ADL, NPI, GDS. CG: CBI, COPE	To study factors contributing to burden and coping strategies adopted by family caregivers of patients with AD.	The severity of CGs distress was correlated with coping strategies.
[52]	N = 255 CG	Cross-sectional	Demographics, GHQ-28	To know the health perceived by the CG, according to the relationship of kinship and the duration of the care	Spouses and children showed severe depression and social dysfunction, anxiety and insomnia.
[41]	N = 84 CG and CR	Cross-sectional	PCI-DAT, MMSE, RMBPC, CBI	To investigate the impact of CG' appraisals of their own communication	The appraisals of communication strategies influence caregiver burden.
[54]	N = 18 CG	Qualitative	Semi-structured interviews	To identify caregiving stressors and coping strategies	Family conflicts as CG's stressor. Religious coping was considered within resilience.
[33]	N = 90 CG	Cross-sectional	FACES, FCS, FSS, CBI, SWLS, RFCS, PSS, FAD-GF	To examine the relationship between family dynamics and mental health in AD CGs	Family dynamics were associated with CG depression, and stress.
[43]	N = 100 CG and CR	Cross-sectional	CG: CFI, GHQ,	To study the relationship between attributions, EE, and patient and carer characteristics	High EE were associated with higher scores of carer distress and strain, and greater reports of non-cognitive features in the patient.
[55]	N = 236 CG spouse and CR	Longitudinal	CR: MMSE, GDS, CDR CG: GHQ, BDI, SOC	To explore family caregiver distress after AD diagnosis in a family member	Spousal relationship, CGs' depressive symptoms, and the severity of patients' NPS predict psychological distress.
[44]	N = 79 spouse CG and CR	Longitudinal	CR: MMSE, NPI, ADCS-ADL CGs: BDI, SAES, SWLS, EE, FMSS-EE	To check if AD problems were predicted longitudinally by caregiver EE	CG's EE was not predictive of relative cognitive or ADL decline. EE was predictive of increased negative behaviors.
[23]	N = 16 CG	Cross-sectional	CR: MMSE, RIL, HDRS CG: MQI, ZBI, CES-D	To identify factors within marital relationships that increase risk for CB and depression	Spouses who rated their marriage as strong and satisfying experienced less burden.
[56]	N = 168 CG and CR	Cross-sectional	Demographics	To explore the moderating role of the PAC on the subjective burden on CGs when managing depressive behaviors	CGs dealing with patients with low levels of depression but with high levels of the PAC had significantly lower levels of CB.
[51]	N = 44 CG and CR	Cross-sectional	CG: CBI, SAS, SDS CR: GDS CG: MBI, WOC, HARS	To investigate the factors related to burnout in the family caregivers of AD	The emotional exhaustion of CGs was related to his anxiety, to a submissive approach for coping and to the patient's self-maintenance.

(*Continued*)

Table 1
(*Continued*)

Study	Sample	Design	Instruments	Objectives	Results
[35]	N = 200 CG and CR	Cross-sectional	CR: MMSE, PSMS, GDS CG: Demographics, CBI, PAC, APGAR, SSRC, ADL	To assess the direct and indirect effects of patient or CGs factors on CB	Lower lever of CR cognitive function, hours of caregiving correlate with higher CB. Family function lowers CB.
[24]	N = 5 CG spouse and CR	Mixed methods	CR: BPSD, MoCA CG: Semi-structured Interviews. CR: MMSE	To explore how couples prior quality of relationship was related to their present relationship variables	All couples that reported positive prior quality relationships, present continued attachment. All couples had problems of marital adjustment.

Note. AD, Alzheimer disease; ADL, activities of daily living; APGAR, the family Adaptation, Partnership, Growth, Affection, and Resolve Index; ADCS-ADL, the Alzheimer's Disease Co-operative Study Inventory–Activities of Daily Living; ATPLCS, Attitude towards the Provision of Long-Term Care Scale; BDI, Beck Depression Inventory; BPSD, behavioral and psychological symptoms of dementia scale; BRSS, Burns Relationship Satisfaction Survey, CAMI, Carers' Assessment of Managing Index; CB, caregiver Burden; CBI, Caregiver Burden Inventory; CES-D, Centre for Epidemiological Studies-Depression Scale; CDR, Clinical Dementia Rating; CG, caregivers; CFI, Camberwell Family Interview; CMAI, the Cohen-Mansfield Agitation Inventory; COPE, Coping Orientation to Problem Experienced; CSDD, Cornell Scale for Depression in Dementia; CSI, Coping Strategies Inventory; CSS, Cognitive Status Scale; DAD, Disability Assessment for dementia; CJCS, Cultural Justification for Caregiving Scale; DCAP, Seoul Dementia Care Assessment Packet; DDQ, The Daily Drinking Questionnaire; DMS, Drinking Motives Scale; EE, Expressed Emotion; ECS, Exemplary Care Scale; FAD-GF, The Family Assessment Device-General Functioning; FAD-GF, Family Assessment Device-General Functioning; FA, Family Attitude Scale; FACES, Family Adaptability and Cohesion Evaluation Scale; FCS, Family Communication Scale; FCCS, The Family Caregiver Conflict Scale; F-COPES, Family Crisis Oriented Personal; FMSS-EE, Five Minute Speech Sample-EE rating; FSS, Family Satisfaction Scale; GDS, Geriatric Depression Scale; GHQ, General Health Questionnaire; GSS, Gilleard Strain Scale; HADS, Hospital Anxiety and Depression Scale; HARS, Hamilton Anxiety Rating Scale; HDRS, Hamilton Depression Rating Scale; HMSE, Hindi Mental State Examination, IADL, instrumental activities of daily living; IQCODE, Informant Questionnaire on Cognitive Decline in the Elderly; MoCA, Montreal Cognitive Assessment; MBI, Maslach Burnout Inventory; MBPC, Memory and Behaviour Problem Checklist, MMSE, Mini-Mental State Exam; MQI, Marital Quality Index; NPI, Neuropsychiatric Inventory; PAC, Positive Aspects of Caregiving; PCS, Preparedness for Caregiving Scale; PDI, Psychological Distress Index; PCI-DAT, The Perception of Conversation Index – Dementia of the Alzheimer's Type; PSMS, Physical Self-Maintenance Scale; PSQI, Pittsburgh Sleep Quality Index; PSS, Perceived Stress Scale; RCS, Relationship Closeness Scale; RIL, The Record of Independent Living; RMBPC, Revised Memory and Behavior Checklist; RSCS, Revised Scale for Caregiving Self-efficacy; RFCS, Relationship-focused coping scale; SAES, The Spielberg Anger Expression Scale; SAS, Self-rating Anxiety Scale; SCB, Screen for Caregiver Burden; SCS, social commitment subscale; SDS, Self-rating Depression Scale; SOC, Sense of Coherence; SSRC, Social Support Rating Scale; SWLS, The Satisfaction With Life Scale; WOC, Ways of Coping; ZBI, Zarit Burden Inventory.

Coping strategies

Several ways of coping were found to characterize the AD family caregiving. One study describes caregivers coping through different phases according to the stages of the illness. In the initial phase, caregivers may adopt protective attitudes toward their AD relative, either denying that something "really odd" happened, disagreeing with other family members, or hiding [30]. Eventually, they may recognize the adverse conditions that AD has brought to their life once they have to cope with daily activities [25]. In the last phase, some caregivers adapt the environment (i.e., in case of dressing IADL issue, modifying clothes, reorganizing wardrobe, and so on) to the cognitive limitations of the relative. However, other caregivers may not be so proactive. Another study identifies coping strategies predicting caregivers' anxiety, which was correlated with dysfunctional coping [37]. Other coping strategies were found to partially mediate the relationship between NPS and CB [38, 39]. Specifically, more disengagement coping was found to be a predictor for NPS. Among positive coping strategies, we find: confronting the problem, seeking social support, and a positive reappraisal of the situation, which resulted in the most powerful moderating effects on the burden of depression [40]. Religious coping helped in the acceptance of taking the caregiver role [39]. Some articles related to communication skills report that less pathological interaction patterns and stronger engagement in positive communication strategies result in strengthened caregiving tasks [33]. When caregivers use strategies that minimize communication breakdowns successfully, they experience less anxiety and perceive their relative with AD as less demanding or unreasonable [41].

EE

The EE construct has not been studied extensively in AD context. Only three studies were found to relate AD family dynamics with EE and they were sought through the snowballing technique [42–44]. Caregivers with high EE were associated with greater reports of non-cognitive symptoms in the AD relatives. Critical and overinvolved caregivers, respectively, made attributions of the patient's behavior to causes internal and external to the patients [43]. Larger amounts of caregiver criticism and hostility were associated with specific symptoms, such as repetitious speech and behavior, messiness, or argumentativeness [42]. EE predicted negative behaviors [44] and confabulation [45]. According to Okamoto's assumption (2018), AD relatives who thought their progression of symptoms was negative, based on their family caregivers' critical remarks, may have confabulated instead of saying 'I do not know' or 'I cannot remember', in order to cover up for a memory deficit.

Burden

The AD family caregiving was significantly characterized by CB. Principal determinants of CB were dementia-related factors followed by caregiving-related factors. Aspects related to dementia included: the progression of AD, manifestation of NPS (e.g., agitation, aggression, sleep disturbance, depression, and apathy), motor disturbances [31, 38, 46, 47], ADL/IADL dependency of the relative (especially housekeeping and medicament managements), psychosis, level of cognitive function [35, 48–50], and the inability to understand the spoken word [21]. Caregiving-related factors associated with burden included hours spent in caregiving, caregiver role acquisition [39], high EE [43], caregiver strong negative emotions [21], and the adoption of certain coping strategies such as: becoming submissive [51], seeking social support, using avoidance behaviors, focusing on problems [47], using alcohol [39], and wishful thinking strategies [40]. Also, poor family functioning (including family conflicts) induced a high level of CB [29]. However, literature did not clearly define if kinship, co-residency, age, and sex of the caregiver have an effect on CB.

Caregiver mental health

The presence of acute and chronic mental pathology has been observed in AD caregivers, leading often to early institutionalization. Severe depression and social dysfunction, along with anxiety and insomnia, have been observed in spouses and children [52]. The most strikingly described emotions by the caregivers were anger and sadness, arising mostly from the feeling of impotence to improve the health of a relative. Increase in the degree of anxiety and depression presented a positive relation to the severity of the disease [31]. Poor mental well-being was found to be associated with the management of certain NPS, including wandering, incontinence [25], and sleep disturbance [49].

Demographics

There is evidence that the demographic characteristics of both the caregiver and the relative with AD impacted the caregiving. Factors including caregiver gender and marital status and the age and length of caregiving appeared to relate to the quality of care, affecting most female caregivers. Female caregivers presented more difficulties in managing relatives' disruptive behaviors when compared to offspring caregivers. With regard to AD caregiving, female caregivers also experienced more family conflicts than male caregivers [32]. Spouse and adult child caregivers had different viewpoints regarding their relationship with their AD relatives. Feminine traits and cultural beliefs were important factors in predicting decisions about care [39]. Also, being the sole caregiver and living with the AD relative were both associated with increased burden [46].

DISCUSSION

This systematic review seeks to provide a comprehensive description of AD family caregiving, drawing on both the quantitative and qualitative literature. Recognition of the modifiable factors that may improve or worsen AD family caregiving can guide the formulation and delivery of policy, treatment, care, and support to maintain good care, which plays a vital role for the caregivers' well-being.

Of the 6 themes identified, a profound change in family relationships was found to be the primary outcome associated to certain coping strategies. Although, not enough literature data regarding EE measures was found, the selected studies provided insights into the role of caregiver appraisal within the AD caregiving. Secondary outcomes showed the caregiver's burden, caregivers' mental health state, and demographic aspects impacting the caregiving.

As general findings, preexisting conflictual relationships in family tend to worsen with the illness, deteriorating the interactions and increasing the risk to develop heavy burden. In the initial phases of AD, most families hide the reality of the relative's change. Caregivers also try to hide it to avoid worrying other family members. These findings highlight the importance of exploring family dynamics as they extend understanding beyond a dyadic context. In some cases, families got reinforced while resolving AD challenges, while in other case families do not managed neither the problems they perceive nor their reactions to them.

One of the most relevant mediating factors in lightening the psychological load carried out by caregivers was the selection of certain coping strategies. This selection varied according to the stage of AD. It is important to underline that current literature does not provide a classification of these strategies. The majority of the studies assessed only the general coping style of caregivers, which means that coping is likely to be considered in relation to quite different problems for individual caregivers. The diversity of coping measures used in all studies suggests that there are many mediating factors affecting the caregiving in different ways.

We sought to determine whether one of these mediating factors could be the family dynamics in terms of EE. Thus, we looked for emotional, behavioral perception, and caregivers' attribution toward the AD relative. Unfortunately, research exploring the association of family dynamics, EE, and the adoption of specific coping strategies is lacking. We found only one study exploring the relation between coping strategies and family functioning, measured through EE [42]. In Bledin (1990), caregivers using more frequently problem-solving strategies, distraction and wishful thinking strategies were found to make more positive comments and fewer critical remarks towards relatives. However, these findings were based on a mixed sample of dementia including Alzheimer's type and vascular dementia with unknown percentages of each group, so therefore caution must be taken when generalizing coping with NPS.

Despite the lack of research on the association between EE, family functioning and coping strategies in AD, our results have been useful in clarifying important aspects of the family caregiver-AD relative interaction. Family pathology in terms of EE predicted specific AD spouse negative behaviors such as agitation [44]; this is an important finding since agitation falls into the NPS major caregiver stressor category [50]. Therefore, particular attention to family relationships should be given to interventions aimed at the management of NPS. Without a specific EE measure, family systems with either hostile or overprotective traits resulted in negative impacts on caregivers, AD relatives, and the caregiving itself [30, 34]. On the other hand, caregivers' attitudes characterized by acceptance, attempts to balance the different dynamics brought by the illness and a positive appraisal of the caregiving led to better outcomes, including a better management of NPS [33, 35].

We suggest that interventions aimed at ameliorating AD caregiving should focus more on the functioning of the caregiver-AD relative interaction in terms of communication, caregiving appraisal, and if the case, resolution of family conflicts.

Limitations

The findings of this review need to be interpreted with regards to the methodological heterogeneity of the included studies. First, family groups, kinship, health conditions, and other characteristics of the caregiver varied between studies. This variability was also common in the characteristics of the AD relatives. In the end, because caregivers were either spouses or children, the conclusions made in our study may not be generalizable to other caregiver relationships. Second, self-selection bias may have occurred as many of the identified studies have been excluded for presenting null findings. Also, due to English language constraint a small number of eligible studies may be missed out resulting in slight selection bias. The majority of observational studies showed a high risk of detection bias, selective outcome reporting bias, and confounding. The most frequent causes of risk of bias in the reviewed studies were the absence of blinding to the outcome and the lack of acknowledgment of potential confounding variables, such as several aspects of family dynamics.

Conclusion

Our results show the impact that a heterogeneous condition such as AD has on a family caregiver's life. The biggest impact seems to be due to the AD symptomatology itself, representing the complex context of caregiving being affected by multiple factors. Additional research is required to explore these factors and family dynamics in well-designed studies that have the family care relationship as a primary outcome.

Data gathered in this research consider both family system (including various types of kinship) and dyadic relationships, such as marital relationships. This approach provided valuable insights into the interactions that occurred among different family members that could not have been captured if only the sole caregiving individual was considered. This theoretical understanding, therefore, represents a starting point for a different approach to comprehending how families live with AD and the need for professional support. Despite each family situation being unique, there are broad stages and processes which may help predict the occurrence of certain types of needs, and therefore "stage-specific" interventions would be needed. Traditional models of assessment focus often on symptomatology and problems rather than the personal and family experiences, which are often overlooked or dismissed.

Our findings would allow clinicians to improve family caregiving to the benefit of the caregivers, those they care for, and society as whole. Our findings could be empirically employed in future research, and this might well lead to the combination, change, or deletion of themes, as well as the generation of new ones. The lack of an established condition–specific measure of family system coping for AD is a clear gap in the evidence base. The findings presented here could provide the groundwork for development of such a measure.

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SUPPLEMENTARY MATERIAL

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REFERENCES

[1] Alzheimer's Association. Types of dementia. Available: https://www.alz.org/alzheimers-dementia/what-is-dementia/types-of-dementia.

[2] Lyketsos CG, Carrillo MC, Ryan JM, Khachaturian AS, Trzepacz P, Amatniek J, Cedarbaum J, Brashear R, Miller DS (2011) Neuropsychiatric symptoms in Alzheimer's disease. *Alzheimers Dement* **7**, 532-539.

[3] Kales HC, Gitlin LN, Lyketsos CG (2015) Assessment and management of behavioral and psychological symptoms of dementia. *BMJ* **350**, h369.

[4] Folkman S, Lazarus RS, Gruen RJ, DeLongis A (1986) Appraisal, coping, health status, and psychological symptoms. *J Pers Soc Psychol* **50**, 571-579.

[5] Pearlin LI, Mullan JT, Semple SJ, Skaff MM (1990) Caregiving and the stress process: An overview of concepts and their measures. *Gerontologist* **30**, 583-594.

[6] Bowen M (1966) The use of family theory in clinical practice. *Compr Psychiatry* **7**, 345-374.

[7] Role of family caregivers (2015) *The IPA complete guides to behavioral and psychological symptoms of dementia*. Available: http://www.bsa.ualberta.ca/sites/default/files/____IPA_BPSD_Specialists_Guide_Online.pdf

[8] Lim J, Griva K, Goh J, Chionh HL, Yap P (2011) Coping strategies influence caregiver outcomes among asian family caregivers of persons with dementia in Singapore. *Alzheimer Dis Assoc Disord* **25**, 34-41.

[9] Semple SJ (1992) Conflict in Alzheimer's caregiving families: Its dimensions and consequences. *Gerontologist* **32**, 648-655.

[10] García-Alberca JM, Cruz B, Lara JP, Garrido V, Almudena L, Gris E, Gonzalez-Herero V (2013) The experience of caregiving: The influence of coping strategies on behavioral and psychological symptoms in patients with Alzheimer's disease. *Aging Ment Health* **17**, 615-622.

[11] Torossian CL, Ruffins S (1999) Relationship between family dynamics of caregivers, depression, and the likelihood of institutionalization of Alzheimer's patients. *J Contemp Psychother* **29**, 127-142.

[12] Hooley JM, Rosen LR, Richters JE (1995) Expressed emotion: Toward clarification of a critical construct. In *The Behavioral High-Risk Paradigm in Psychopathology*, Miller GA, ed. Series in Psychopathology. Springer, New York, pp. 88-120.

[13] Brown GW, Birley JL, Wing JK (1972) Influence of family life on the course of schizophrenic disorders: A replication. *Br J Psychiatry* **121**, 241-258.

[14] Kuipers E, Leff J, Lam D (2002) *Family Work for Schizophrenia: A Pratical Guide*, London, Gaskill.

[15] Bjørge H, Kvaal K, Småstuen MC, Ulstein I (2017) Relationship quality and distress in caregivers of persons with dementia: A cross-sectional study. *Am J Alzheimers Dis Other Demen* **32**, 157-165.

[16] Daley RT, Sugarman MA, Shirk SD, O'Connor MK (2017) Spared emotional perception in patients with Alzheimer's disease is associated with negative caregiver outcomes. *Aging Ment Health* **7863**, 1-8.

[17] Moher D, Liberati A, Tetzlaff J, Altman DG (2009) Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Med* **6**, e1000097.

[18] Thomas DR (2006) A general inductive approach for analyzing qualitative evaluation data. *Am J Eval* **27**, 237-246.

[19] Viswanathan M, Berkman ND, Dryden DM, Hartling L (2013) Assessing Risk of Bias and Confounding in Observational Studies of Interventions or Exposures: Further Development of the RTI Item Bank. Agency for Healthcare Research and Quality, Rockville, MD, Report No. 13-EHC106-EF.

[20] Boylstein C, Hayes J (2012) Reconstructing marital closeness while caring for a spouse with Alzheimer's. *J Fam Issues* **33**, 584-612.

[21] Kotradyová K (2018) Determinants characterizing the life of a caregiver treating an individual with Alzheimer's disease. *Kontakt* **20**, 72-e80.

[22] Sun F, Hodge DR (2014) Latino Alzheimer's disease caregivers and depression. *J Appl Gerontol* **33**, 291-315.

[23] Williams C (2011) Marriage and mental health: When a spouse has Alzheimer's disease. *Arch Psychiatr Nurs* **25**, 220-222.

[24] Zahn SJ (2015) *Couples' prior quality of relationship, present attachment, adjustement, and depressive symptoms with early stage Alzheimer's*. Florida State University.

[25] Mahoney DF, LaRose S, Mahoney EL (2015) Family caregivers' perspectives on dementia-related dressing difficulties at home: The preservation of self model. *Dementia (London)* **14**, 494-512.

[26] Farina N, Page TE, Daley S, Brown A, Bowling A, Basset T, Livingston G, Knapp M, Murray J, Banerjee S (2017) Factors associated with the quality of life of family carers of people with dementia: A systematic review. *Alzheimers Dement* **13**, 572-581.

[27] Ducharme FC, Lévesque LL, Lachance LM, Kergoat MJ, Legault AJ, Beaudet LM, Zarit SH (2011) "Learning to become a family caregiver" efficacy of an intervention program for caregivers following diagnosis of dementia in a relative. *Gerontologist* **51**, 484-494.

[28] Norton MC, Piercy KW, Rabins PV, Green RC, Breitner JCS, Ostbye T, Corcoran C, Welsh-Bohmer KA, Lyketsos CG, Tschanz JT (2009) Caregiver-recipient closeness and symptom progression in Alzheimer disease. The cache county dementia progression study. *J Gerontol Psychol Sci Soc Sci* **64**, 560-568.

[29] Nikzad-Terhune (2011) Dementia caregiving outcomes: The impact of caregiving onset, role occupancy, and care-recipient decline. Available: https://search.proquest.com/docview/1547382360/abstract/239755F360BE47D8PQ/1?accountid=14624. Accessed June 12, 2019.

[30] Esandi N, Nolan M, Alfaro C, Canga-Armayor A (2018) Keeping things in balance: Family experiences of living with Alzheimer's disease. *Gerontologist* **58**, 56-67.

[31] Ferrara M, Langiano E, Di Brango T, De Vito E, Di Cioccio L, Bauco C (2008) Prevalence of stress, anxiety and depression in with Alzheimer caregivers. *Health Qual Life Outcomes* **6**, 93.

[32] Ducharme F, Lévesque L, Lachance L, Kergoat MJ, Coulombe R (2011) Challenges associated with transition to caregiver role following diagnostic disclosure of Alzheimer disease: A descriptive study. *Int J Nurs Stud* **48**, 1109-1119.

[33] Sutter M, Perrin PB, Chang YP, Hoyos GR, Buraye JA, Arango-Lasprilla JC (2014) Linking family dynamics and the mental health of colombian dementia caregivers. *Am J Alzheimers Dis Other Demen* **29**, 67-75.

[34] Hamill SB (2012) Caring for grandparents with Alzheimer's disease: Help from the 'forgotten' generation. *J Fam Issues* **33**, 1195-1217.

[35] Yu H, Wang X, He R, Liang R, Zhou L (2015) Measuring the caregiver burden of caring for community-residing people with Alzheimer's disease. *PLoS One* **10**, e0132168.

[36] Panyavin I, Trujillo MA, Peralta SV, Stolfi ME, Morelli E, Perrin PB, Lasa JP, Arango-Lasprilla JC (2015) Examining the influence of family dynamics on quality of care by informal caregivers of patients with Alzheimer's dementia in Argentina. *Am J Alzheimers Dis Other Demen* **30**, 613-621.

[37] Cooper C, Owens C, Katona C, Livingston G (2008) Attachment style and anxiety in carers of people with Alzheimer's disease: Results from the LASER-AD study. *Int Psychogeriatr* **20**, 494-507.

[38] García-Alberca JM, Lara JP, Garrido V, Gris E, González-Herero V, Lara A (2014) Neuropsychiatric symptoms in patients with Alzheimer's disease. *Am J Alzheimers Dis Other Dement* **29**, 354-361.

[39] Meyer GH (2017) Adult children caregivers of parents with Alzheimer's Dementia. Available: http://ir.ua.edu/handle/123456789/3247

[40] Papastavrou E, Tsangari H, Karayiannis G, Papacostas S, Efstathiou G, Sourtzi P (2011) Caring and coping: The dementia caregivers. *Aging Ment Health* **15**, 702-711.

[41] Savundranayagam MY, Orange JB (2011) Relationships between appraisals of caregiver communication strategies and burden among spouses and adult children. *Int Psychogeriatr* **23**, 1470-1478.

[42] Bledin KD, Maccarthy B, Kuipers L, Woods RT (1990) Daughters of people with dementia expressed emotion, strain and coping. *Br J Psychiatry* **157**, 221-227.

[43] Tarrier N, Barrowclough C, Ward J, Donaldson C, Burns A, Gregg L (2002) Expressed emotion and attributions in the carers of patients with Alzheimer's disease: The effect on carer burden. *J Abnorm Psychol* **111**, 340-349.

[44] Vitaliano PP, Young HM, Russo J, Romano J, Magana-Amato A (1993) Does expressed emotion in spouses predict subsequent problems among care-recipients with Alzheimer's disease? *J Gerontol* **48**, 202-209.

[45] Okamoto T, Yamamoto Y, Sakai K, Matsuyama K, Hashimoto T, Hayashi A (2018) Factors influencing confabulation in Japanese patients with Alzheimer's disease. *Psychogeriatrics* **18**, 276-282.

[46] Conde-Sala JL, Turró-Garriga O, Calvó-Perxas L, Vilalta-Franch J, Lopez-Pousa S, Garre-Olmo J (2014) Three-year trajectories of caregiver burden in Alzheimer's disease. *J Alzheimers Dis* **42**, 623-633.

[47] Raggi A, Tasca D, Panerai S, Neri W, Ferri R (2015) The burden of distress and related coping processes in family caregivers of patients with Alzheimer's disease living in the community. *J Neurol Sci* **358**, 77-81.

[48] Cheng ST, Lam LCW, Kwok T (2013) Neuropsychiatric symptom clusters of Alzheimer disease in Hong Kong Chinese: Correlates with caregiver burden and depression. *Am J Geriatr Psychiatry* **21**, 1029-1037.

[49] Creese J, Bédard M, Brazil K, Chambers L (2008) Sleep disturbances in spousal caregivers of individuals with Alzheimer's disease. *Int Psychogeriatr* **20**, 149-161.

[50] Park M, Sung M, Kim SK, Kim S, Lee DY (2015) Multidimensional determinants of family caregiver burden in Alzheimer's disease. *Int Psychogeriatr* **27**, 1355-1364.

[51] Yılmaz A, Turan E,Gundogar D (2009) Predictors of burnout in the family caregivers of Alzheimer's disease: Evidence from Turkey. *Australas J Ageing* **28**, 16-21.

[52] Ruiz Fernández MD, Ortega Galán AM (2018) Evaluation of the perceived health of caregivers of patients in mild-to-moderate stage Alzheimer's disease. *Perspect Psychiatr Care* **55**, 87-94.

[53] Daley RT, O'Connor MK, Shirk SD, Beard RL (2017) 'In this together' or 'Going it alone': Spousal dyad approaches to Alzheimer's. *J Aging Stud* **40**, 57-63.

[54] Sun F (2014) Caregiving stress and coping: A thematic analysis of Chinese family caregivers of persons with dementia. *Dementia* **13**, 803-818.

[55] Välimäki TH, Martikainen JA, Hallikainen IT, Väätäinen ST, Koivisto AM (2015) Depressed spousal caregivers have psychological stress unrelated to the progression of Alzheimer disease: A 3-year follow-up report, kuopio ALSOVA study. *J Geriatr Psychiatry Neurol* **28**, 272-280.

[56] Xue H, Zhai J, He R, Zhou L, Liang R, Yu H (2018) Moderating role of positive aspects of caregiving in the relationship between depression in persons with Alzheimer's disease and caregiver burden. *Psychiatry Res* **261**, 400-405.