





BMJ Open Cross-sectional study evaluating burden and depressive symptoms in family carers of persons with age-related macular degeneration in Australia

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ABSTRACT

Objectives We aimed to analyse the degree of carer burden and depressive symptoms in family carers of persons with age-related macular degeneration (AMD) and explore the factors independently associated with carer burden and depressive symptoms.

Methods Cross-sectional study using self-administered and interviewer-administered surveys, involving 96 family carer–care recipient pairs. Participants were identified from tertiary ophthalmology clinics in Sydney, Australia, as well as the Macular Disease Foundation of Australia database. Logistic regression, Pearson and Spearman correlation analyses were used to investigate associations of explanatory factors (family caregiving experience, carer fatigue, carer quality of life and care-recipient level of dependency) with study outcomes—carer burden and depressive symptoms.

Results Over one in two family carers reported experiencing mild or moderate-severe burden. More than one in five and more than one in three family carers experienced depressive symptoms and substantial fatigue, respectively. High level of care-recipient dependency was associated with greater odds of moderate-severe and mild carer burden, multivariable-adjusted OR 8.42 (95% CI 1.88 to 37.60) and OR 4.26 (95% CI 1.35 to 13.43), respectively. High levels of fatigue were associated with threefold greater odds of the carer experiencing depressive symptoms, multivariable-adjusted OR 3.47 (95% CI 1.00 to 12.05).

Conclusions A substantial degree of morbidity is observed in family carers during the caregiving experience for patients with AMD. Level of dependency on the family carer and fatigue were independently associated with family carer burden and depressive symptoms.

Trial registration number The trial registration number is ACTRN12616001461482. The results presented in this paper are Pre-results stage.

INTRODUCTION

Age-related macular degeneration (AMD) is a chronic and progressive disorder of the macula¹ and is the leading cause of blindness and low vision in Australia, directly affecting more than 1 million persons.^{2,3} The effects of

Strengths and limitations of this study

- The study design and method of surveying allowed for the collection of rich and extensive data from patients with age-related macular degeneration and their family carers.
- Several validated scales for the assessment of both carer and patient variables were used, including those for burden, depression, fatigue and visual functioning.
- Study participants were recruited from only one state in Australia.
- Due to the relatively small sample size, the study is likely to be underpowered for detecting modest associations.

vision impairment in AMD are not limited to declining visual function, with several studies showing that AMD affects multiple health domains and leads to significant emotional distress, poorer quality of life and reduced functional independence.^{4,5} For many patients, the ongoing nature of a chronic illness like AMD is such that it requires the provision of continuous physical and emotional care beyond the scope of what can be currently provided by hospitals or other institutions.^{6,7} Family carers of relatives with AMD are often expected to provide a high standard of care despite not receiving formal training and adequate support for this role.^{8,9} Surveys on the perceptions of family carers of relatives with AMD in their role as informal carers demonstrate experiences of significant psychological distress, with the negative impacts of caring extending to increased financial stress, disruptions to lifestyle and retirement plans and added strain on the relationship between carer and care recipient.^{5,10} Moreover, previous studies based in the UK have shown that caregivers of patients

with AMD experience burden levels comparable to those caring for persons with rheumatoid arthritis and multiple sclerosis.¹¹ Additionally, comorbidity has been shown to be associated with a higher degree of caregiver burden, as demonstrated in other caregiving settings such as for patients with dementia.¹² Furthermore, a significant degree of psychological distress has been reported in caregivers of legally blind patients, with one such study reporting more than a third of caregivers experiencing depression.¹³ Previous research conducted by our group on caregiving for AMD has demonstrated that the level of caregiver dependence and the presence of multiple chronic illnesses in the care recipient were independent predictors of psychological distress.¹⁴

Clearly, the impacts of AMD are far-reaching, with significant influence on family, friends and carers, as well as substantial cost to society.^{3,15} However, currently, there exists little literature reporting on the level and factors of burden and depressive symptoms experienced by family carers of relatives with AMD. As such, the key aims of this cross-sectional study were to: (1) analyse the degree of carer burden and depressive symptoms in family carers of persons with AMD; and (2) explore the factors that were independently associated with carer burden and depressive symptoms.

METHODS

Participants

Participants for this study were recruited as a part of a randomised controlled trial implementing a novel multi-component intervention targeting the drivers of stress and burden in family carers of patients with AMD. This study analysed a total of 96 patients with AMD and 96 of their family carers who were examined at baseline (preintervention). Recruitment of participants occurred between January 2017 and May 2020 across multiple ophthalmology practices in Sydney, Australia, as well as via the Macular Disease Foundation Australia (MDFA) database of members. The inclusion criteria for eligible family carers participating in this study were: adults aged more than 18 years old; family carer of a relative with AMD; willing to engage in a 10-week cognitive behavioural therapy intervention over a 3-month period and sufficient English fluency to effectively engage in the intervention. All participants in this study gave written informed consent. Information on baseline study participant characteristics were obtained via surveys of family carers and their relatives with AMD, completed onsite during clinic visits or at home either independently or with help from the study coordinator, for example, due to limitations imposed by poor vision.

Patient and public involvement

It was not appropriate or possible to involve patients or the public in the design, or conduct, or reporting or dissemination plans of our research.

Sociodemographic information and medical history

All participants (carers and care recipients with AMD) provided sociodemographic information including: age, sex, education level and marital status. They also self-reported any medical conditions such as: heart attacks; angina (without myocardial infarction); any other cardiac conditions; strokes or transient ischaemic attacks; high blood pressure; high cholesterol; diabetes or pre-diabetes; kidney disease; arthritis; hearing loss and visual impairment. This information was used to assess the general health status (GHS) of each participant. Participants who reported three or more health conditions were considered as having substantial comorbidity and received a score of 1, whereas those with fewer than three health conditions received a score of 0.

Carer variables

Family carers were asked to provide details about the patient with AMD that they cared for such as whether they were the sole caregiver of the patient; the type of caregiving duties performed and the hours of care (per day) they provided to the care recipient with AMD. This comprised of 21 questions detailing caregiving duties as they applied to typical activities of daily living and instrumental activities of daily living for the patient with AMD, including exercise and/or sport, cooking and preparing food, cleaning, reading, personal grooming, using public transport, driving and more. Each question was scored reflecting the degree of help given for each activity (*0=no help or little help given, 1=moderate amount of help given, 2=high amount of help given, 3=not applicable*). Additional information on family carers was determined by administering several validated instruments and scales as detailed below:

Carer burden

The Caregiver Burden Scale (CBS) is a 22-item questionnaire originally developed for assessment of perceived family carer burden in caring for patients with dementia.^{16,17} Each question was scored on a 5-point Likert-type scale (*0=never, 1=rarely, 2=sometimes, 3=quite frequently, 4=always*), reflecting the frequency of family carers' feelings when taking care of their family member. The total burden score calculated for each family carer was used to stratify levels of burden into three categories, with higher scores indicating higher levels of burden (*0–20=no/little burden, 21–40=mild burden, ≥41=moderate-severe burden*).¹⁶ The CBS is a reliable measure with a Cronbach's alpha of 0.92.¹⁸

Depressive symptoms

The short form of the Centre for Epidemiologic Studies Depression (CESD-10) scale is a 10-item questionnaire and was used to screen for symptoms of depression.¹⁹ Each question gauges the frequency of a family carer experiencing certain symptoms of depression per week and is scored on a 4-point Likert-type scale (*0=rarely or none of the time (<1 day), 1=some or a little of the time (1–2 days),*

2=occasionally or a moderate amount of the time (3–4 days), 3=most or all of the time (5–7 days)). A total CESD-10 score of 10 or more indicates significant presence of depressive symptoms, as reported by previous research evaluating the validity of the CESD-10 scale.¹⁹ The CESD-10 is a validated and reliable measure with a Cronbach's alpha of 0.80.^{19 20}

Fatigue

The Fatigue Severity Scale (FSS) is a 9-item questionnaire used frequently to assess the degree of impact that fatigue has on an individual's activities and physical functioning.²¹ Participants were asked to respond to statements about how much fatigue impacted their ability to function on a scale of 1 (*disagree*) to 7 (*agree*). Previous studies have shown mean (SD) FSS scores for healthy individuals to be 2.3 (0.7).²¹ Mean FSS scores of 4 or more were categorised as having problematic fatigue. The FSS is a validated and reliable measure with a Cronbach's alpha of 0.88.²¹

Self-efficacy

The General Self-Efficacy (GSE) scale is a 10-item questionnaire shown to be effective at measuring one's beliefs of overall ability to succeed in specific situations.²² The degree of how much a family carer agreed with each statement was measured using a 4-point Likert-type scale (0=*not true*, 1=*hardly true*, 2=*moderately true*, 3=*exactly true*). Higher total GSE scores indicate higher self-efficacy.

Dependency

Carers were asked to quantify the level of dependence their family member with AMD had on them since their diagnosis using a 5-point Likert-type scale (1=*not at all dependent*, 2=*somewhat dependent*, 3=*moderately dependent*, 4=*very dependent*, 5=*extremely dependent*). Scores 3 or more were interpreted as an indication of high dependency on the family carer (1–2=*low dependency*, 3–5=*high dependency*).

Quality of life

Carer's rated their general quality of life (GQL) on a linear scale from 0 (*poor quality of life*) to 10 (*excellent quality of life*).

Care recipients with AMD

The National Eye Institute Visual Function Questionnaire-25 (NEI VFQ-25) was completed by care recipients, and is a reliable and validated tool used to measure status of vision-related health impairment most relevant to patients with chronic eye conditions.²³ Questions in the NEI VFQ-25 were used to determine the extent of how visual disability and symptoms negatively impacts the patient's ability to function, well-being and efficacy in achieving vision-related tasks. The NEI VFQ-25 is comprised of 12 subscales, assessing general vision, near and distance vision, vision-related difficulty with activities, vision-related driving problems, eye pain, colour vision, dependency, impact on social functioning, mental health and general health.²³ Scores recorded in the original response category for each question were recoded

to a scale between 0 and 100 in accordance with the NEI VFQ-25 scoring algorithm, with higher scores indicating greater vision-related well-being.

Statistical analysis

SAS statistical software (SAS Institute, NC, V.9.4) was used for the statistical analysis, including t-tests, χ^2 tests, F-test and logistical regression. We analysed caregiver burden as a categorical variable based on the previous literature by Zarit *et al*¹⁶ and the generalised logits model was used for carer burden, given that it is a three-level categorical variable.²⁴ A binary logistic regression was used for the study outcome of depressive symptoms as it is a two-level variable. For all models, a stepwise selection method was used.

Predictor variables assessed for both these study outcomes were: carer age, carer sex, carer GQL, carer GHS, fatigue severity, GSE, level of dependency on the carer, patient age, patient sex, patient GHS and patient NEI VFQ-25 scores. The CORR procedure was used to compute the Pearson correlations and Spearman rank-order correlations between the presence of depressive symptoms (CESD-10 score) and the following variables: patient age and sex, and carer variables (age, sex, GQL scores, FSS scores, carer and patient GHS, GSE, level of dependency on the carer and NEI VFQ-25 scores). The significance level was <0.05. Checks for multicollinearity did not return any confirmation of multicollinearity occurring.

RESULTS

AMD caregiving experience and health-related variables

The majority of family carers (91%) were aged 50 years and over, with family carers aged 65 years or older making up 54% of the sample. The proportion of females was 78% and 66% among family carers and care recipients with AMD, respectively. Of the 96 family carers in this study, 75% were the sole carer of the patients with AMD, with 43% reporting that the family member they cared for was highly dependent on them. Family carers played a considerable role in helping their relatives access medical care, with 91% accompanying their relatives to their ophthalmology appointments where the majority of relatives with AMD (79%) were receiving anti-VEGF injections. In terms of how often help was provided to relatives with AMD, 61% of family carers reported providing help for 7 days a week on average, with 45% reporting either spending >8 hours per day with them or living together with the care recipient. The main caregiving duties where carers provided moderate to high amounts of help included cooking (57%), cleaning (60%) and help with leaving the house (70%).

Substantial amounts of fatigue were experienced by 36% of family carers as indicated by scores of 4 or higher on the FSS, and a considerable degree of general health comorbidities was reported by 29% of family carers. The mean quality of life and GSE scores among the family

Table 1 Study characteristics of family carers stratified by degree of burden experienced as measured by carer sex, age, general health status, FSS scores, CESD-10 scores, GSE scores, GQL scores and care-recipient sex, age, general health status and NEI VFQ-25 scores (n=96)

Population characteristics	Degree of burden			P value
	No/little burden (n=41)	Mild burden (n=33)	Moderate-severe burden (n=21)	
Carer variables				
Female sex, n (%)	28 (68.3)	28 (84.9)	18 (85.7)	0.15
Age, years, mean (SD)	66.5 (15.6)	63.1 (13.1)	59.1 (10.4)	0.14
General health status Substantial comorbidity, n (%)	15 (36.6)	11 (33.3)	2 (9.5)	0.07
Fatigue severity scale score Problematic fatigue (≥4), n (%)	11 (26.8)	11 (33.3)	12 (57.1)	0.06
CESD-10 score Presence of depressive symptoms (≥10), n (%)	6 (14.6)	7 (21.2)	10 (47.6)	0.01
Total general self-efficacy scores, mean (SD)	33.0 (5.4)	32.7 (4.1)	31.0 (4.5)	0.32
Total general quality of life scores, mean (SD)	7.6 (1.7)	7.5 (1.8)	6.6 (2.0)	0.09
Patient variables				
Female sex, n (%)	25 (61.0)	20 (60.6)	17 (81.0)	0.23
Age, years, mean (SD)	81.0 (10.1)	84.5 (7.2)	85.4 (11.1)	0.15
General health status Substantial comorbidity, n (%)	19 (46.3)	15 (45.5)	14 (66.7)	0.25
Total NEI VFQ-25 scores, mean (SD)	62.7 (21.0)	53.6 (53.6)	30.6 (20.9)	<0.0001

Unadjusted P values from test of heterogeneity across the three burden categories.

CESD-10, Centre for Epidemiologic Studies Depression-10; FSS, Fatigue Severity Scale; GQL, General Quality of Life; GSE, Generalised Self-Efficacy; NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25.

carers in this study were: 7.3 (SD 2.0) and 32.5 (SD 4.9), respectively.

Burden analysis

More than half of family carers reported experiencing mild (35%) and moderate-severe (22%) burden due to their caregiving experience (table 1). Family carers of highly dependent relatives with AMD were more likely to experience moderate-severe and mild burden after multivariable adjustment: OR 8.42 (95% CI 1.88 to 37.60) and 4.26 (95% CI 1.35 to 13.43), respectively (table 2). Marginally significant associations were observed between the age and visual functioning of the care recipient with AMD and the level of burden experienced by family carers (table 2). Younger carer age, older care recipient

age, higher fatigue severity, high level of dependency on the carer and lower NEI VFQ-25 scores were significantly correlated with more carer burden (online supplemental table 1). No statistically significant correlations were observed between carer burden scores and carer sex, patient sex, carer GQL scores (quality of life), carer and patient GHS scores (GHS and carer GSE scores (data not shown)).

Depressive symptoms

Over one in five family carers (24%) demonstrated a significant presence of depressive symptoms as determined by the CESD-10 scale (ie, total score 10 or more). Table 3 shows that family carers with higher levels of fatigue were more likely to experience depressive symptoms: OR 3.47

Table 2 Association between selected family carer and care recipient with AMD variables with level of burden among family carers, presented as adjusted OR and 95% CI

Factors	Level of burden, OR (95% CI)*	
	Mild	Moderate-severe
Care-recipient age (each 1-unit increase)	1.03 (0.97 to 1.09)	0.99 (0.92 to 1.07)
NEI VFQ-25 score (each 1-unit increase)	1.00 (0.98 to 1.02)	0.96 (0.93 to 0.99)
High level of dependency on carer	4.26 (1.35 to 13.43)	8.42 (1.88 to 37.60)

*Logistic regression model (Generalised Logit Model) used the burden group 0–20 (no/little burden) as the reference category. AMD, age-related macular degeneration; NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25.

Table 3 Associations between selected variables and presence of depressive symptoms among family carers and care recipients with AMD, presented as adjusted OR and 95% CI

Factor	Presence of depressive symptoms, OR (95% CI)
Family carer	
Age (each 1-unit increase)	0.98 (0.93 to 1.04)
Female sex	0.58 (0.13 to 2.60)
General quality of life (each 1-unit increase)	0.60 (0.41 to 0.88)
Fatigue severity scale score (each 1-unit increase)	3.47 (1.00 to 12.05)
General self-efficacy (each 1-unit increase)	0.97 (0.86 to 1.10)
Care recipients with AMD	
Age (each 1-unit increase)	0.98 (0.90 to 1.05)
Female sex	1.29 (0.27 to 6.25)
General health status (each 1-unit increase)	1.84 (0.53 to 6.40)
NEI VFQ-25 (each 1-unit increase)	0.98 (0.95 to 1.01)

AMD, age-related macular degeneration; NEI VFQ-25, National Eye Institute Visual Functioning Questionnaire-25.

(95% CI 1.00 to 12.05). Conversely, each unit increase in family carer GQL scores was associated with 40% reduced odds of experiencing depressive symptoms: OR 0.60 (95% CI 0.41 to 0.88). Statistically significant negative correlations between carer CESD-10 scores and carer GQL and GSE scores and care-recipient NEI VFQ-25 scores were observed, and a significant positive correlation was shown between CESD-10 and carer FSS (online supplemental table 2). No statistically significant correlations were observed between CESD-10 and carer age and sex, patient age and sex, carer and patient GHS scores and level of dependency on the carer (data not shown).

DISCUSSION

This novel study shows that family carers experience substantial levels of burden, depressive symptoms and fatigue when caring for relatives with AMD. The findings from this study are consistent with other studies that demonstrated poorer well-being of family carers of relatives with AMD.¹¹ Older carers of relatives with chronic disease are themselves biologically vulnerable to disease and are at substantial risk of developing health problems themselves, with studies showing family carers who experienced strain during their experience of providing care to be at greater risk of increased psychiatric morbidity.^{25 26} This is also reflected by the finding that nearly a third of family carers in this study were providing care for their relatives with AMD while experiencing significant medical

morbidity themselves including, cardiovascular disease, cerebrovascular disease, kidney disease, arthritis and diabetes. The continuous nature and stresses of providing care, together with burdensome physical and emotional demands on a population already at risk of declining health outcomes is a significant area of concern, both due to declining health associated with the strain of providing care, and also because any compromise of carer health may in effect lead to inadequate provision of optimal care to the relative with AMD.^{11 27}

More than half of family carers of relatives with AMD reported experiencing mild or moderate-severe burden. In comparison, a cross-sectional study on caregiver burden for blind persons in India demonstrated a greater proportion of caregivers scoring ≥ 41 on the CBS (91.8%), that is, demonstrating substantial amounts of moderate to severe burden.²⁸ However, it is perhaps unsurprising that higher levels of burden were reported, given the more severe visual impairment of the population studied. Other areas of interest that should be considered for future research are differences in setting, availability of community support, socioeconomic status and cultural attitudes that may also influence perceived caregiver burden.²⁸

When compared with burden experienced by caregivers of patients with idiopathic Parkinson's disease, a greater proportion of family carers of patients with AMD experience moderate-severe burden (22%) than carers supporting family with early (10%) and late (~12%) stages of idiopathic Parkinson's disease.²⁹ In contrast, studies on caregivers for patients with stroke report higher levels of moderate-severe burden (~68%).³⁰ Interestingly, a recent study on family and unpaid carers of older persons revealed that carers were at greater risk of experiencing burden when caring for patients with dementia with or without substantial disability, but not for those patients with substantial disability in the absence of dementia.³¹ While patient functional impairment has been shown to be associated with higher levels of caregiver burden, this suggests that the additional challenges of caring for patients with dementia may be an issue that is not as relevant for the provision of care to patients with AMD.³²

The level of dependency that patients with AMD had on their family carers was independently associated with carer burden. This is in agreement with prior research by our group showing that family carers of patients with AMD that had high levels of dependency on them experience negative impacts such as high levels of emotional distress, as well as disruptions to their lifestyle and retirement plans.⁵ Moreover, a systematic review of depression and burden among caregivers of patients with visual impairment found that greater hours of supervision required and greater limitations in the patients' ability to carry out their activities of daily living, to be among the factors commonly associated with caregiver burden,³³ a finding reflected in our study. It is likely that a high level of dependency on family carers may negatively impact the relationship between the carer and care recipient. Higher levels of dependency by the care recipient could

be linked to loss of independence in the family carer due to a lack of time for one's own needs and leisure activities and this in turn could lead to feelings of burden.¹⁰ Moreover, carers have previously reported feelings of guilt from inability to provide the constant and necessary care, with some carers experiencing feelings of being manipulated by the care recipient.^{5 10} These feelings of burden due to the AMD caregiving experience can have profound implications on family carer health and well-being. Previous research conducted on the caregiving experience for elderly patients with chronic illnesses has demonstrated negative impacts on the carer's physical and psychological well-being, such as experiencing increased psychological distress, reduced engagement with preventative health behaviours and disruptions to employment and increased financial stress.^{5 10 34}

In contrast, around 1 in 10 family carers of relatives with AMD in this study experienced positive impacts of providing care, including feeling happier and more content with their lives, as well as feeling more optimistic and determined. It is possible that these differences of the caregiving experience among family carers may be related to pre-existing strong familial ties and/or relationships, or otherwise relationships that have strengthened since the need for family caregiving. Indeed, research into the role of partner relationship quality and reciprocity (ie, a mutual sense of fair exchange) has demonstrated benefits on caregiver well-being.^{35 36} Another study examining the role of reciprocity in providing care for persons with dementia, chronic physical disability/illness, frailty from ageing and intellectual disability showed an inverse relationship between reciprocity and self-esteem to caregiver burden.³⁶ These high-quality relationships may in fact provide the resources and means to alleviate the stress and burden that would otherwise be present during the provision of care.³⁶ As such, understanding the factors that determine relationship strength and how they can be targeted may be a potential area to address when aiming to improve equity in the family carer-care-recipient dynamic.

Over one in five family carers of relatives with AMD demonstrated a significant presence of depressive symptoms in our study, and this is substantially higher than the global prevalence rates of ~6%.³⁷ Higher rates of depressive symptoms (~35%) have also been demonstrated in previous studies of family carers of patients with vision loss, along with significant associations between depressive symptoms and younger carer age and poorer patient visual acuity.³⁸ High rates (40%) of caregivers reporting depressive symptoms were found in a study on family carers of patients with Alzheimer's disease.³⁹ Higher levels of fatigue were shown to be predictive of family carers experiencing depressive symptoms in our study. This is perhaps unsurprising, given that fatigue and its symptoms are well-known symptoms/predictors of major depressive disorder in the general population.⁴⁰ Studies on the emotional well-being of carers of patients with AMD have previously reported increased rates of

emotional distress, feelings of frustration, isolation and sadness.^{5 13 34}

Furthermore, poorer family carer quality of life was significantly associated with depressive symptoms. This association between quality of life and depressive symptoms is consistent with other cross-sectional and longitudinal studies involving older adults.⁴¹ Poor quality of life limits one's ability to carry out their social and occupational activities.^{42 43} Previous studies on caregiver quality of life have suggested that financial burden, lack of family/social support, distress and unmet needs are among the factors purportedly increasing the risk of depression and poor mental health outcomes.⁴⁴⁻⁴⁶

Strengths of this study include the collection of rich and extensive outcome and covariate data from patients with AMD and their family carers, as well as the use of several validated scales for the assessment of carer and patient variables such as burden, depression, fatigue and visual functioning. However, findings of this study should be interpreted with caution. Due to the relatively small sample size, it is likely that the study was underpowered to detect modest associations, as well as limiting the generalisability of the results. Similarly, in the analyses, small sample sizes accounted for large CIs, providing less precise estimates of effect. The use of other tools such as the Barthel index for the measurement of care-recipient dependency may have been potentially useful in providing a more accurate quantification of dependency. However, while this is a reliable measure of dependency, it is time consuming, given that direct observation of the person performing specific tasks is required. Also, we cannot discount residual confounding from factors that were not measured in our study such as the quality/strength of the carer-care-recipient relationship and other psychosocial measures such as spirituality and carer resilience. Moreover, the cross-sectional study design implemented was useful for investigating the relationships between various factors and health outcomes. However, this design limits our ability to draw conclusions about causality. Longitudinal and experimental analyses would allow for a better understanding of causality and the temporal interactions and relationships between variables in this study. As such, future studies of these types utilising larger population sets would be useful to affirm the findings of this study.

CONCLUSION

A substantial proportion of family carers of relatives with AMD experience significant burden and depressive symptoms. Family carers played a considerable role in the care of relatives with AMD, including aiding with access to medical care and assistance with care-recipient's ADLs. Levels of dependency and fatigue, as well as lower quality of life, were independently associated with higher levels of burden and/or greater odds of depressive symptoms in family carers. Further research is required to affirm these conclusions regarding these predictors of burden

and depressive symptoms in family carers of relatives with AMD.

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