Problem-Focused Coping Underlying Lower Caregiver Burden in ALS-FTD: Implications for Caregiver Intervention

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ABSTRACT

Objective: Amyotrophic lateral sclerosis (ALS) is a multisystem neurodegenerative disorder which includes cognitive and behavioural symptoms akin to frontotemporal dementia (FTD). Despite the necessity of caregiver intervention to assist with the management of cognitive and behavioural symptoms, there has been a lack of research on the topic. A focus on caregiver coping may offer a promising foundation to guide the development of interventions as part of ALS care. Accordingly, the aim of the present study was to examine the relationships between caregiver coping, psychological morbidity and burden of care in the context of ALS cognitive and behavioural symptoms.

Methods: Fifty-five patient-caregiver dyads were recruited from specialised ALS and FTD clinics. Specific coping strategies were examined using the COPE Inventory/Brief COPE and psychological morbidity and burden were assessed using the Depression, Anxiety, and Stress Scale–21 and Zarit Burden Interview. The relationship between coping, psychological morbidity and burden of care were analysed using univariate and multivariate methods.

Results: High-burden caregivers were more likely to be caring for patients with a diagnosis of ALS-FTD (p =.0001). Caregivers used problem-focused strategies (particularly planning) more frequently (M=71.4, SD=15.3) compared to emotion-focused (M=60.8, SD=12.3) and dysfunctional coping strategies (M=42.2, SD=8.6). A diagnosis of ALS-FTD (p=.0001) and problem-focused strategies (p=.024) emerged as significant predictors of caregiver burden. Caregiver anxiety, depression and stress were not predictive of caregiver burden (p=.151).

Conclusions: Timely provision of caregiver support optimising problem-focused coping strategies as part of multidisciplinary ALS care, particularly for caregivers of ALS-FTD patients may mitigate caregiver burden.

Keywords: Amyotrophic lateral sclerosis, frontotemporal dementia, caregivers, coping strategies, and burden.

INTRODUCTION

Increasing evidence indicates that amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD) represent parts of a clinico-pathological spectrum (1-4). Based on population studies, the incidence of cognitive and behavioural changes in ALS vary between 10-75%, with up to 14% of patients meeting the criteria for a diagnosis of concomitant frontotemporal dementia (FTD) (5, 6). Conversely, 10-15% of individuals diagnosed with FTD have concomitant ALS and another 25-30% will exhibit motor neuron dysfunctions that do not meet diagnostic criteria for ALS (7, 8).

Cognitive and behavioural changes inevitably place a heavy burden on ALS caregivers (9-14). In addition to dealing with patients' rapid physical decline, caregivers must also cope with cognitive and behavioural symptoms that entail additional responsibilities such as supervising, assisting with decision making (14), prompting or taking over tasks for patients', and maintaining treatment adherence (15). These responsibilities highlight the prominent role caregivers play in the management of ALS and hence the importance of providing timely support to optimise their well-being (16). Accordingly, understanding how caregivers respond to this potentially unexpected and highly stressful situation is central to improving their well-being and that of the patient. Indeed, examining the coping skills of ALS caregivers may enable clinicians to develop specific caregiver interventions to manage cognitive and behavioural symptoms.

Coping is the psychological process by which people manage stressful, anxiogenic or painful situations. Coping mechanisms have been traditionally divided into task-oriented, emotion-oriented and avoidance-oriented styles (17). Task-oriented coping refers to strategies aimed

at directly managing or changing the stressor (i.e., directly targeting the cause of the stress). In contrast, emotion-oriented coping includes strategies designed to regulate emotional reactions to stressors (i.e., focusing on how to respond to the source of stress) (17). Finally, avoidance-oriented coping is defined as strategies undertaken to avoid the source of distress and can be both emotion-focused and task-focused. Alternative taxonomies propose a dysfunctional coping style (18). In general, task-oriented coping strategies tend to be adaptive whilst avoidance is typically associated with worse outcomes such as increased anxiety. Emotion-oriented coping may be highly contextual as it has been linked with both positive and negative outcomes (18, 19).

Emerging evidence suggests that coping style plays a contributory role in ALS caregiver well-being. Emotion-oriented coping strategies (20), avoidance (21), maladaptive coping strategies such as denial and venting (22) and a passive coping style (23) have all been linked to an increase in burden and distress in ALS caregivers. Caregiver burden and depression are inextricably linked in ALS (24, 25), with depression more common among caregivers compared to patients over time (26). The role of coping in the context of cognitive and behavioural symptoms, however, remains unclear given that studies have typically included samples of patients without overt cognitive and behavioural symptoms. As such, the aim of the present study was to explore the relationships between caregiver coping, psychological morbidity and burden of care in the context of ALS accompanied by additional cognitive and behavioural symptoms. We hypothesised that burden would vary depending on the caregiver coping style and would be greatest among caregivers of patients with cognitive and behavioural symptoms.

METHODS

Participants

Fifty-five patients evaluated at specialist tertiary ALS and FTD clinics in Australia were recruited (Neuroscience Research Australia MND Research Clinic/Prince of Wales Hospital MND Clinic, University of Sydney ForeFront ALS/FTD Clinic and the FRONTIER FTD Research Clinic). Patients met current clinical diagnostic criteria for clinically definite or probable ALS (27, 28) and concomitant probable FTD (29). Diagnosis was established in line with current consensus criteria by a multidisciplinary team comprising of neurologists with expertise in ALS and FTD, psychologists, ALS clinical nurse consultant, and an occupational therapist. All participants underwent comprehensive clinical and neurophysiological investigation and neuropsychological assessment along with structural neuroimaging. Exclusion criteria included severe physical impairment, prior history of other neurological or psychiatric illness that would hinder participation, chronic alcohol or other substance abuse, and limited English proficiency. The primary caregiver was identified by the patient as his/her main informal caregiver (i.e., not paid for their services). Patients without informal caregivers available to complete the caregiver measures were excluded from the study.

Ethical approval was granted by the South Eastern Sydney Local Health District [11/103 (HREC/11/POWH/148); 10/126] and the University of Sydney Human Research Ethics Committees (2014/050).

Measures

Physical status: The revised version of the ALS Functional Rating Scale (ALSFRS-R) (30) is a 12-item measure of bulbar, fine motor, gross motor and respiratory functions. Each item is

rated on a four-point scale ranging from 0 (no function) to 4 (normal function) with a total score of 48 indicating normal function.

Global cognitive function: Global cognitive status was evaluated with the Addenbrooke's Cognitive Examination – III (ACE-III) or its predecessor (ACE-R) (31, 32). The ACE-III was administered to patients recruited from 2013 onwards. The ACE-III/ACE-R a brief multi-domain cognitive assessment designed to identify early cognitive symptoms in dementia and comprises five subscales measuring the integrity of the following cognitive abilities: orientation, memory, fluency, language and visuospatial. A total score below 88/100 indicated suspected dementia. ACE-III total scores were converted to equivalent ACE-R scores to enable comparison (33).

Behavioural changes: The Motor Neuron Disease Behavioral Scale (MiND-B) (34) is a nine-item informant-completed behavioural measure that evaluates the presence of apathy, disinhibition and stereotypical behaviour. Each item is rated on a scale of 1 (everyday) to 4 (no changes from normal behaviour). A score of ≤33 is indicative of subtle but definite behavioural or executive impairment (13, 34) based on the original consensus criteria for the diagnosis of frontotemporal cognitive and behavioural syndromes in ALS (35).

Caregiver psychological morbidity: The short version of the Depression, Anxiety, and Stress Scale–21 (DASS–21) (36) is a self-rated measure of depression, anxiety, and stress symptomatology with seven items tapping each emotional state. Each item is rated on a 4-point scale ranging from 0 (does not apply to me at all) to 3 (applies to me very much, or most of the time). Total depression, anxiety, and stress subscores range from 0 to 42, with

higher scores indicative of greater levels of depression, anxiety or stress. The cut-off scores reflecting different levels of stress, anxiety and depression are: stress (normal=0-10, mild=11-18, moderate=19-26, severe=27-34 and extremely severe=35-42), anxiety (normal=0-6, mild=7-9, moderate=10-14, severe=15-19, extremely severe=20-42) and depression (normal=0-9, mild=10-12, moderate=13-20, severe=21-27 and extremely severe=28-42).

Caregiver coping: The Brief COPE (37) was developed as a short version of the COPE Inventory (18). The Brief COPE is a 28-item measure of 14 different coping strategies. Each item is rated on a 4-point scale ranging from 1 (I haven't been doing this at all) to 4 (I've been doing this a lot). Three subscales reflecting dysfunctional, problem-focused and emotion-focused strategies are derived by summing the relevant component item scores and converting that sum to a percentage of the maximum possible score (Figure 1) (18, 38-40).

Caregiver burden: The short version of the Zarit Burden Interview (ZBI) (41) is a 12-item measure of perceived burden which has been used extensively to study caregiver burden in dementia. Each item is rated on a scale ranging from 0 (Never) to 4 (Nearly Always). Total scores range from 0 to 48, with higher scores indicative of greater levels of burden. A score of $\geq$17 is indicative of significant burden in dementia.

Statistical analyses

Data were screened and analysed using IBM SPSS Statistics for Macintosh, Version 26.0. Descriptive statistics including normality (using the Shapiro–Wilk tests interpreted in

conjunction with histograms, probability–probability plots and the values of skew and kurtosis) were examined to describe the characteristics of the sample and check for any gross violation of the assumptions underlying statistical tests used. A median split on the ZBI was used to classify caregivers with low (<13 ZBI total score) and high (≥13 ZBI total score) burden of care to minimise the probability of type II error due to highly unequal sample sizes based on the cut-off score for dementia (ZBI total scores ≥17). Demographic and clinical differences between low and high burden caregivers were analysed by independent sample t tests or Mann–Whitney U tests where appropriate. The relationship between caregiver coping strategies, psychological morbidity and burden were investigated using hierarchical multiple regression analyses, controlling for potential demographic and clinical confounders (to minimise overfitting the regression model). A *p* value of <.05 was considered statistically significant for all tests, with the exception of the Bonferroni corrections applied for multiple comparisons.

RESULTS

Demographic and clinical characteristics

The cohort of ALS patients consisted of 39 males and 16 females (N=55) with a mean age of 63.7 (SD=10.3) years. Approximately 33% of patients had concomitant FTD. The mean disease duration from symptom onset was 31.0 (SD=28.1) months, with a mean ALSFRS-R score of 38.9 (SD=7.6), indicative of mild-moderate disease. Caregivers had a mean age of 61.9 (SD=10.1) years and were predominantly patients' spouse (95%). The mean ZBI was 13.6 (SD=8.1), with a minority of caregivers (31%) indicating burden levels comparable to those reported in the literature in dementia caregivers (i.e., ZBI total scores ≥17).

Basic demographic (sex distribution, age, education level) and disease (disease duration, disease severity) were similar in the two subgroups of ALS patients (Table 1). In contrast, caregivers with high burden (based on median split on the ZBI) were more likely to be caring for a patient diagnosed with ALS-FTD compared to caregivers with lower burden, χ^2 (1,n=55) =7.2, p<.05. Cognitive impairment (U=127.0, z=-2.1, p<.05) and behavioural changes extending to disinhibition (U=167.5, z=-3.4, p<.02), apathy (U=131.0, z=-4.1, p<.02) and stereotypical behaviour (U=181.5, z=-3.3, p<.02) were also higher among patients of high-burden caregivers compared to those with low-burden caregivers (lower MiND-B scores reflect greater behavioural changes).

Coping, psychological wellbeing and burden

Overall, caregivers reported using problem-focused strategies more frequently (M=71.4, SD=15.3) than emotion-focused (M=60.8, SD=12.3) and dysfunctional (M=42.2, SD=8.6) coping strategies. There were no significant differences in problem-focused [t(51)=1.4, p=.181, two tailed], emotion-focused [t(50)=0.3, p=.750] and dysfunctional coping scores [t(50)=-.6, p=.584, two-tailed) between low- and high-burden caregivers, after applying a Bonferroni correction. Among the problem-focused strategies, caregivers used planning (M=78.2, SD=17.8) more frequently than active coping (M=75.7, SD=18.4) and instrumental support (M=65.3, SD=21.0). Low- and high-burden caregivers also did not differ on planning [t(52)=-.6, p=.540, two-tailed), active [t(52)=.7, p=.465 two-tailed) and instrumental coping scores [t(52)=1.4, p=.182, two-tailed), after applying a Bonferroni correction.

In addition, the majority of caregivers reported normal levels of stress (50%), anxiety (96%) and depression (70%). When present, symptoms of stress (42%), anxiety (2%) and depression (20%) were predominantly in the mild range (Figure 2).

Hierarchical multiple regression analyses were performed to determine the contribution of coping strategies to caregiver burden after controlling for the presence of cognitive and behavioural deficits. As such, ALS-FTD diagnosis was entered at Step 1 to take into account these deficits without overfitting the regression model. This model was significant and explained 15% of the variance in caregiver burden. After the entry of emotion-focused, problem-focused and dysfunctional coping strategies at Step 2, the total variance explained by the model as a whole was 31%, F (4, 47) = 5.3, p<.05. The three coping strategies explained an additional 16% of the variance in caregiver burden, after controlling for ALS-FTD diagnosis, R Squared change = .16, F change (3, 47) = 3.6, p<.05. In the final model, only ALS-FTD diagnosis (β = 0.6, p<.05) and problem-focused strategies (β = -0.4, p<.05) were statistically significant (Table 2).

Separate regression analyses were carried out to determine the contribution of psychological morbidity to burden. After controlling for ALS-FTD diagnosis, caregiver depression, anxiety and stress were found not be significant predictors of caregiver burden (R Squared change = .09, F change (3, 45) = 1.9, p<.05). Only, ALS-FTD diagnosis (β = 0.4, p<.05) was predictive of caregiver burden (Table 3).

DISCUSSION

Our study demonstrates that the presence of cognitive and behavioural symptoms in patients diagnosed with ALS is a major source of high caregiver burden. Indeed, caregivers of patients with ALS-FTD were three times more likely to report higher burden. In addition, a diagnosis of ALS-FTD, caregiver burden was further predicted by adopting less problem-focused strategies. As such, caregiver support specifically focusing on maximising problem-focused strategies, in addition to information on cognitive and behavioural changes, may be particularly beneficial as part of ALS care.

In dementia, cognitive and behavioural symptoms are well known variables that are particularly burdensome for caregivers (42). These findings parallel that of the growing research in ALS which shows the negative effects of cognitive and behavioural symptoms on caregiver personal time and health (10, 12, 43). Notably, apathy, disinhibition and executive impairment have been linked to greater caregiver burden (9, 10, 44-47), particularly the developmental (e.g. being unable to live their own life) and emotional (e.g., negative feelings towards the patient) aspects of caregiving (11).

As such, support for caregivers of ALS patients presenting with cognitive and behavioural symptoms is often recommended to assist with management of non-motor manifestations of the disease (48). Less is known, however, about the appropriateness and relevance of various types of interventions. Recommended strategies for caregivers of ALS patients with cognitive and behavioural symptoms are based on the general dementia literature. They typically focus on educating and helping caregivers adjust their expectations about patients' reduced capacity to perform day-to-day tasks as well as environmental modifications to

ensure patient's safety (e.g., hiding car keys from patient). Variables specific to ALS, however, present added challenges in implementing caregiver interventions and may have deterred previous attempts to develop interventions (49). Indeed, the rapid physical deterioration associated with ALS is likely to restrict the time and effort caregivers have available to implement specific strategies. In other words, management of cognitive/behavioural symptoms may be considered less pressing compared to increasingly disabling physical symptoms in this patient population. This highlights the importance of developing caregiver support that are specific to this population and can be easily integrated and generalised in ALS care settings.

Our results demonstrated that strategies focusing on optimising caregiver's problem-focused strategies may be especially beneficial. Here, caregivers most frequently utilised planning as a coping strategy which involves strategy-thinking about ways to solve a particular problem (37). Indeed, maladaptive coping strategies such as avoidance (21), defensiveness and a reactive coping style (23) as well as denial and venting (22) have been found to be associated with greater caregiver burden and psychological morbidity among ALS caregivers. In the present study, dysfunctional coping strategies, including avoidance, denial, self-blame, and other detrimental ways of coping such as substance abuse were also showed to contribute towards increased caregiver burden, although this did not reach statistical significance.

In FTD, caregiver interventions have been demonstrated to be helpful in reducing psychological morbidity. Provision of a 15-week group intervention to assist FTD caregivers with identifying modifiable and non-modifiable characteristics of stressors (cognitive

appraisal) and developing appropriate coping strategies was associated with reduced caregiver burden and distress associated with behavioural symptoms following the intervention (50). An intervention that focused on providing skills to caregivers to address behavioural changes was also found to benefit this population (51). Similarly, a 5-weekly individual intervention focusing on positive-emotion skill building for family caregivers of FTD patients had a beneficial effect on negative affect, burden, and stress (52). In the context of ALS-FTD, early intervention optimising problem-focused strategies with ALS-FTD caregivers delivered within a multidisciplinary care setting (e.g., initiating care management decisions and advance care planning with the ALS clinical nurse consultant early in the course of the disease) appears a promising avenue to help prevent an increase in caregiver burden (53).

Unlike previous reports (9-11, 43, 44), caregiver depression, anxiety and stress were not predictive of burden of care in the present study. This is perhaps not surprising as symptoms of depression, anxiety and stress reported by caregivers were predominantly within the normal or mild range in the present study. Stress has been shown to contribute to caregiver burden more so than depression and anxiety in ALS (45). Furthermore, recruitment of patients from specialised clinics may have introduced a sample bias whereby severely physically and cognitively and behaviourally impaired patients and their highly burdened caregivers were less likely to attend clinics, therefore underestimating the prevalence and impact of caregiver burden and distress. The low prevalence of ALS-FTD patients may have also resulted in lower rates of burden and psychological morbidity compared to that observed in dementia.

In dementia, evidence suggests that caregivers who are more depressed tend to report greater behavioural and psychological symptoms exhibited by patients (54). Such findings highlight the importance of caregiver variables in their evaluation of "role captivity" (caregiver feelings of being "trapped" in their role) and caregiver overload (e.g., fatigue and burnout) which are major factors underlying caregiver strain in dementia (55). Indeed, a limitation of the present study was that caregiver variables such as use of informal (e.g., assistance from other family members) and formal supports (e.g., psychological therapy, patient allied health and other therapy) which may have influenced caregiver reports of burden and distress were not examined. Future research incorporating assessment of support utilisation may minimise the potential effects of caregiver variables on ratings of psychological wellbeing and may shed further light on other sociocultural factors contributing to caregiver burden.

In conclusion, it is now well established that cognitive and behavioural symptoms are prominent non-motor manifestation of ALS, but there remains a lack of knowledge on specific caregiver support strategies to assist with the management of these symptoms. A focus on active planning delivered within a multidisciplinary care setting offers an avenue for ALS-FTD caregivers to proactively cope with cognitive and behavioural symptoms that will lead to improved care and reduce the risk of caregiver burnout.

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DISCLOSURE OF INTEREST

The authors report no conflict of interest.

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Table 1

Demographic and clinical characteristics of the study cohort stratified by caregiver burden level

	Low burden (n=28)	High burden (n=27)	*p* value
Patient			
Male	18 (33%)	21 (38%)	.421
Age (years)	64.7 (9.6)	62.6 (11.0)	.448
Education (years)	12.7 (3.1)	12.3 (3.3)	.695
Symptom duration (months)	21.0 (0.9-126.9)	23.0 (1.9-138.1)	.527
ALSFRS-R total score	43.0 (23.0-47.0)	35.5 (22.0-48.0)	.108
ALS-FTD diagnosis	4 (22)	14 (78)	.007*
ACE total score	89.7 (49.1-99.7)	80.8 (68.9-99.0)	.035*
MiND-B Disinhibition score	16.0 (4.0-16.0)	14.0 (6.0-16.0)	.001**
MiND-B Apathy score	10.0 (4.0-12.0)	6.0 (3.0-12.0)	.0001**
MiND-B Stereotypical score	8.0 (3.0-8.0)	5.0 (2.0-8.0)	.001**
Caregiver			
Male	10 (18%)	15 (27%)	.228
Age (years)	60.9 (9.0)	63.0 (11.2)	.437
Education (years)	11.0 (9.0-17.5)	13.0 (6.0-18.0)	.139
DASS-21 Depression score	4.0 (0.0-14.0)	8.0 (0.0-38.0)	.107
DASS-21 Anxiety score	0.0 (0.0-12.0)	2.0 (0.0-8.0)	.104
DASS-21 Stress score	6.0 (0.0-32.0)	12.0 (2.0-42.0)	.060

Abbreviations: ACE = Addenbrooke's Cognitive Examination; ALSFRS-R = ALS Functional Rating Scale- Revised; ALS-FTD = amyotrophic lateral sclerosis-frontotemporal dementia; DASS-21= Depression, Anxiety, and Stress Scale–21; MiND-B = Motor Neuron Disease Behavioural Scale.

Data represent the mean (SD), median (minimum-maximum), or n (%).

*p<.05

**p<.02 (Bonferroni correction)

Table 2

Hierarchical multiple regression analysis predicting caregiver burden from coping style

	B	*SE B*	β	*p*
Step 1				
Constant	11.4	1.3		.0001
ALS-FTD diagnosis	6.7	2.2	0.4	.004*
Step 2				
Constant	7.3	7.1		.309
ALS-FTD diagnosis	8.6	2.2	0.5	.0001*
Emotion-focused strategies	0.1	0.1	0.2	.244
Problem-focused strategies	-0.2	0.1	-0.4	.024*
Dysfunctional coping strategies	0.2	0.1	0.2	.060

Abbreviations: ALS-FTD = amyotrophic lateral sclerosis-frontotemporal dementia

*p<.05

Table 3

Hierarchical multiple regression analysis predicting caregiver burden from psychological morbidity

	B	*SE B*	β	*p*
Step 1				
Constant	11.4	1.3		.0001
ALS-FTD diagnosis	6.7	2.3	0.4	.005*
Step 2				
Constant	8.2	1.9		.0001
ALS-FTD diagnosis	6.5	2.3	0.4	.007*
Caregiver depression	0.1	0.2	0.1	.703
Caregiver anxiety	-0.1	0.6	-0.02	.920
Caregiver stress	0.3	0.2	0.3	.247

Abbreviations: ALS-FTD = amyotrophic lateral sclerosis-frontotemporal dementia

*p<.05

Figure 1

Title: The Brief COPE (Carver et al., 1997)

Legend: The Brief COPE items divided into three subscales: emotion-focused, problem-focused, and dysfunctional coping strategies

Figure 2

Title: ALS caregiver psychological morbidity

Legend: Proportion of ALS caregivers reporting different levels of depression, anxiety and stress.