

Caregiving Preparedness and Caregiver Burden in Omani Family Caregivers for Patients with Acquired Brain Injury

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ABSTRACT: Objectives: This study aimed to explore the caregiving preparedness and caregiver burden among Omani family caregivers (FCs) of patients with acquired brain injury (ABI). **Methods:** This prospective observational study was conducted at the neurology clinic at Khoula Hospital, Muscat, Oman, from April 2019 to December 2021. Data were collected from 119 FCs and their patients at the time of discharge from the hospital and 16 weeks post-discharge during follow-up care. The questionnaire comprised the Zarit Burden Index, the Preparedness for Caregiving Scale, the Short-Form-12 Health Survey, and a patient symptom scale. **Results:** The FCs were predominantly female (53.8%), and the mean age was 38.27 ± 9.11 years. Most patients had moderate to severe ABI (95.8%) due to stroke (56.3%) and trauma (30.3%). The most common patient symptoms were loss of muscle strength, speech problems, mood problems, memory loss, and change in behaviour. Most FCs were found to have low caregiving preparedness (58%) at discharge, and 19.1% were found to have a high level of caregiver burden at 16 weeks post-discharge. The length of time post-injury ($P < 0.01$), symptom severity ($P < 0.01$) and the FCs' physical and mental health status ($P < 0.01$ each) were found to be significant predictors of caregiving preparedness, whereas caregiver preparedness ($P < 0.01$), symptom severity ($P < 0.01$), and caregivers' mental health ($P = 0.028$) were seen as the predictors of caregiver burden. **Conclusion:** Omani FCs of patients with ABI tend to commence the caregiver role with inadequate preparation, and shortly after, a significant number suffer high caregiver burden. Interventions focusing on the caregiver's health and training in symptom management may improve the outcomes of FCs and patients.

Keywords: Acquired Brain Injury; Caregiver Burden; Caregivers; Family; Rehabilitation; Traumatic Brain Injuries; Oman.

ADVANCES IN KNOWLEDGE

- This is the first study to explore caregiving preparedness and caregiver burden in family caregivers (FCs) of Omani patients with acquired brain injury (ABI).
- The findings show that patients with ABI are discharged from the acute care setting to home when they are still physically dependent and with a high symptom burden.
- The FCs assumed the caregiving role in a state of low caregiving preparedness. In a period of 16 weeks post-discharge, up to 19% of the FCs report a high level of caregiver burden, despite initiating care in a state of good physical and mental health.

APPLICATION TO PATIENT CARE

- The findings indicate a gap in neurorehabilitation care for Omani patients with ABI and the need for caregiver support programmes to augment their efficacy and caregiving preparedness before resuming the caregiving role.
- Discharge planning for patients with ABI needs to be augmented with programmes to educate, train and support the family caregivers (FCs) to gain confidence in managing the patient's symptoms, general care, and personal health while at home.
- The uptake of caregiver burden in a short period of time post-discharge has significant implications for the caregiver and ABI patient outcomes; system-wide interventions such as home health services may help to address the gaps.

ACQUIRED BRAIN INJURY (ABI) IS RECOGNISED as a major contributor to the global burden of disability, death, and lifelong sequelae.¹ This includes any injury to the brain that is not congenital, degenerative, hereditary, or caused by the birth process but rather resulting from traumatic and non-traumatic causes. The non-traumatic causes of ABI include stroke, infection, and tumors. Conversely, traumatic brain injury occurs due to external force in the form of falls, traffic accidents, or violence injuring the brain with or without penetration of the skull.² Thus, ABI

leads to physical, physiological, cognitive, behavioural, social, and economic difficulties, with ramifications for the patient as well as their families.¹ Many individuals affected by ABI experience functional limitations, which may necessitate long-term care and support.³ In countries with less established healthcare systems, rehabilitation care is limited, and the support and care needed by patients with ABI are mainly provided at home by family members.⁴

The World Health Organization estimates that 60% of the ABI burden is due to road traffic accidents

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(RTA) and predicts that by 2030, RTA will be the 7th leading cause of death worldwide.^{5,6} Oman, where the current study was conducted, has a high rate of RTA, being rated 4th among the Gulf Cooperation Council countries and 57th worldwide for RTA injuries and deaths.^{5,7} Stroke is another major cause of ABI in Oman and is associated with a 25.4% and 30% cumulative mortality rate at 12 months and 24 months, respectively.⁸ The key factors fuelling the high rates of ABI in Oman include the high incidence of hypertension, diabetes mellitus, dyslipidaemia, obesity, sedentary lifestyles, and the aging population.⁸ Approximately 41.4% of all Omani stroke patients remain physically dependent after the acute phase, and 59% remain with a Modified Rankin Scale for Neurologic Disability score of greater than 2 after being discharged from the hospital.⁸

Due to the lack of robust neurorehabilitation and home care services in Oman, patients affected by ABI and related sequelae are directly discharged home (after acute hospital care), and the family members assume the caregiving role. The family member who takes on the primary responsibility of providing physical, emotional, and financial support to the ABI patient while at home is referred to as the family caregiver (FC).⁹ In Oman, there are currently no support systems for FCs; therefore, the FC assumes the caregiving role without any formal assistance from the healthcare system. Other studies report that this lack of support is associated with low preparedness and high caregiver burden among FCs of patients with ABI.¹⁰ On the other hand, education programmes for FCs have been found to improve caregiver preparedness and well-being.¹¹

The caregiver role requires tolerance and commitment to meet the ABI patient's needs related to personal hygiene, dressing, nutrition, communication, emotional support, mobility, and safety, especially for patients with minimal physical capabilities.¹² Therefore, the FCs play a vital role in the recovery, rehabilitation, and community re-integration of a patient with ABI.¹³ Thus, the lack of support for FCs can negatively impact a patient with ABI. Additionally, the demands of caregiving increase the tendency of self-neglect among FCs, which worsens as the ABI patients' home care needs become prolonged and arduous.¹⁴ Subsequently, the FC may become a hidden patient themselves.¹⁵

Studies from other countries demonstrate that the caregiving burden is relatively higher in the case of patients with ABI compared to patients with other conditions.¹⁰ Caregiving burden is a multidimensional phenomenon, with physical, psychological, financial, and social isolation aspects.¹ The FCs also have a burden

of inadequate information regarding future patient outcomes.¹⁶ One of the moderators of caregiver burden is the level of preparedness for the caregiving role. Caregiving preparedness is the caregiver's perceived ability to meet the care needs of the patient, as well as the ability to arrange for the patient and handle emergent situations.¹⁷ The FC may feel unprepared for the role due to personal factors and lack of skills.¹⁸ The fact that most ABI occurs unexpectedly allows no time for most FCs to learn new skills or adjust to the new roles.¹⁰

Caregivers with high caregiving preparedness tend to experience low caregiver burden, marginal strain, and mood disturbances; moreover, they also tend to have better self-care.¹⁷ A high caregiving preparedness is associated with low hospital readmissions and accelerated ABI patient recovery.¹⁷ Despite the contribution of FCs towards the rehabilitation and recovery of patients with ABI, no studies thus far have focused on their preparedness, caregiver burden, or health outcomes in the context of Oman. Thus, the current study aimed to explore the caregiver burden and preparedness of FCs of patients with ABI in the context of Oman. The study results will be used to plan a home-based, nurse-led programme to support ABI patients and their FCs.

Methods

This prospective observational study was conducted from April 2019 to December 2021 and included FCs of patients with ABI over a period of 16 weeks post-discharge. The FCs and patients were recruited at the time of discharge from the neuro-critical care unit (30 beds) and neurology ward at Khoula Hospital, Muscat, Oman. Patients were aged ≥ 18 years and admitted with a confirmed diagnosis of any type of ABI. To be included in the study, the patients with ABI had to be capable of stating their names and positively identifying their family members. Moreover, they had to have a Modified Rankin Scale for Neurologic Disability score of at least +1.

The FC was the family member (or relative) responsible for providing day-to-day care at home for the patient with ABI after being discharged from the hospital. The FCs were included in the study if they were: (1) identified by the patient as the main person who would be responsible for their care once discharged from the hospital; (2) Omani by nationality; (3) ≥ 18 years in age; (4) capable of speaking and understanding Arabic or English; (5) living in the same household as the patient with ABI; and (6) capable of providing written consent.

A purposive sampling approach was used to identify patients with ABI and their FCs. An interview questionnaire was used to collect data from the FCs. The questionnaire was comprised of the Short-Form-12 Health Survey (SF-12), the Preparedness for Caregiving Scale (PCS), the abridged Arabic version of the Zarit Burden Inventory (AZBI), and the ABI symptom severity scale. Moreover, the FCs' general health was measured using the SF-12. The physical and mental health scores range from 0–100, where 0 indicates the lowest level of health, and 100 indicates the highest level of health. Furthermore, the internal consistency and test-retest reliabilities of the SF-12 range from 0.67–0.82.¹⁹

The FCs' preparedness for caregiving was measured using the PCS.²⁰ The 8-item PCS assesses how well the FC is prepared for the demands of caregiving.²⁰ The responses are rated on a 5-point Likert scale ranging from 0 (not at all prepared) to 4 (very well prepared). Then, the item scores are summed to generate a total score (ranging from 0–32), where high scores indicate a high level of preparedness. The PCS Cronbach's alpha in the current study was found to be 0.98, which is consistent with the range of 0.88–0.95 reported in other studies.²⁰

The caregiving burden incurred while caring for the patient with ABI was measured using the AZBI. The AZBI has 12 items with a 5-point response Likert scale (ranging from 0–48), where high scores indicate a high caregiving burden.²¹ In this study, the AZBI Cronbach's alpha was determined to be 0.90, whereas other studies reported alpha's ranging from 0.74–0.81.²¹

The ABI patient symptom severity score was used to assess the presence and severity of symptoms commonly associated with ABI. The severity of the symptom was rated on a scale developed by the investigators, which ranged from 1 to 5 (1 = no difficulty, 2 = present but not bothered, 3 = mild difficulty, 4 = moderate difficulty, and 5 = severe difficulty). A total score was computed by generating the sum of all items (i.e. symptom burden). The Cronbach's alpha of the

symptom severity scale was determined to be 0.88.

The FCs were also informed that additional data regarding the caregiving burden would be collected during the patient's neurology clinic follow-up appointment at 16 weeks. The patients with ABI returned to the neurology clinic for follow-up care at least every 2 months. The caregiving burden data were collected during the second follow-up appointment (at 16 weeks) because this span of time ensured adequate experience and familiarity with the caregiving role and demands.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 23.0 (IBM Corp., Armonk, New York, USA). Descriptive statistics were used to summarise sample characteristics, patient symptoms, FCs' health status, caregiving preparedness, and caregiver burden. Pearson's correlations were used to determine the factors associated with caregiving preparedness and caregiver burden. Additionally, multiple linear regression analyses (the stepwise method) were conducted to establish the predictors of caregiving preparedness and burden. Multicollinearity was tested using the variance inflation factor and tolerance. A *P* value less than 0.05 was considered statistically significant.

The study was approved by the Research Committee of the hospital, the Ministry of Health in Oman, and the investigators' institutions (MH/DGKH/6/6/47/2020 and SQU/CON/DO.34/2019). The participants received explanations of the study procedures and signed the consent form before data collection. The investigators approached the charge nurses of units that admit patients with ABI to identify those scheduled for discharge. The nurses notified the study research assistant (a nurse) of the discharge time and when a family member could take the patient home. The research assistant screened the family member for eligibility before collecting data concerning the patient and caregiver characteristics, FC preparedness for caregiving, and health status at discharge.

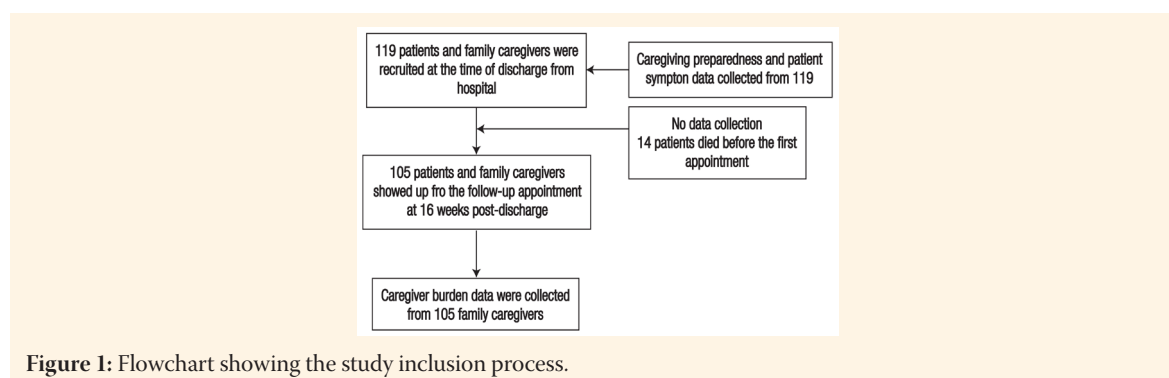


Figure 1: Flowchart showing the study inclusion process.

Table 1: Characteristics of the family caregivers and patients with acquired brain injury (N = 238)

Characteristic	n (%)	
	FCs (n = 119)	Patients (n = 119)
Gender		
Male	55 (46.2)	68 (57.1)
Female	64 (53.8)	51 (42.9)
Age in years		
18–38	66 (55.5)	18 (15.1)
39–59	50 (42)	22 (18.5)
60–80	3 (2.5)	59 (49.5)
≥81	-	20 (16.8)
Marital status		
Single	22 (18.5)	12 (10.1)
Married	93 (78.2)	71 (59.7)
Separated/divorced/widowed	4 (3.4)	36 (30.3)
Level of education		
≤High school	90 (75.6)	114 (95.8)
Associate degree/diploma	7 (5.9)	1 (0.8)
≥Bachelor's degree	22 (18.4)	4 (3.1)
Employment status		
Full-time	68 (57.1)	44 (37)
Part-time	9 (7.6)	6 (5)
Unemployed	42 (35.3)	69 (58)
Relationship to patient		
Parent	43 (36.1)	-
Spouse	13 (10.9)	-
Child	46 (38.7)	-
Sibling	14 (11.8)	-
Legal guardian	3 (2.5)	-
Has other family members who need care		
No	114 (95.8)	-
Yes	5 (4.2)	-
Cause of injury or patient diagnosis		
Trauma (e.g. MVA and assault)	-	36 (30.3)
Aneurysm	-	16 (13.4)
Stroke	-	67 (56.3)

Length of time since the injury occurred in days		
1–180	-	66 (55.5)
181–360	-	6 (5)
≥361	-	47 (39.5)
Glasgow coma scale on admission		
13–15 (mild)	-	5 (4.2)
9–12 (moderate)	-	62 (52.1)
8 (severe)	-	52 (43.7)
Glasgow coma scale at the time of discharge		
13–15 (mild)	-	103 (86.6)
12 (moderate)	-	16 (13.4)

FCs = family caregivers; MVA = motor vehicle accident.

Results

Out of the 119 participants recruited in the study, 105 (FCs and ABI patients) showed up for the second appointment at 16 weeks; the remaining 14 FCs did not attend the appointment because the patient died before the second follow-up appointment [Figure 1].

The mean age of FC was 38.27 ± 9.11 years, with the majority of them being female (53.8%) and either the parent (36.1%) or child (38.7%) of the patient. Moreover, 95.8% of them had no help at home with caregiving responsibilities. Most patients were male (57.1%), had a diagnosis of stroke (56.3%), and had a Glasgow coma scale (GCS) score equivalent to moderate or severe injury at the time of admission (95.8%) and mild injury at the time of discharge (86.6%) [Table 1]. The mean GCS scores at the time of admission and discharge were 8.43 ± 2.381 (severe injury status) and 14.25 (mild injury status), respectively.

At the time of discharge from the hospital, all patients with ABI had at least 7 symptoms [Table 2]. The most common and severe symptoms were inability to live independently (4.92 ± 0.44), loss of muscle strength, paralysis, limited physical mobility or poor coordination (4.68 ± 0.68), change in speech or difficulty in being understood (4.45 ± 1.10), mood problems (4.27 ± 1.09), loss of memory and concentration (4.25 ± 1.24) and changes in behaviour (4.08 ± 1.14). The mean symptom score of the patients was 38.14 ± 7.42 out of 45 possible points. Most patients (94.1%) had a very high symptom burden (total score ≥ 24) at the time of discharge, and no patient rated their symptoms as present but not bothered.

Overall, the FCs reported good physical (mean = 79.24 ± 24.08) and mental health (mean = $63.31 \pm$

Table 2: Symptom profile of acquired brain injury patients at the time of discharge

Symptom	Severity rating, n (%)				Mean \pm SD
	No difficulty	Mild difficulty	Moderate difficulty	Severe difficulty	
Ability to live independently	1 (0.8)	1 (0.8)	4 (3.4)	113 (95)	4.92 \pm 0.44
Loss of muscle strength, paralysis, limited physical mobility or poor coordination	2 (1.7)	2 (1.7)	26 (21.8)	89 (74.8)	4.68 \pm 0.68
Change in speech or difficulty being understood	8 (6.7)	9 (7.6)	15 (12.6)	87 (73.1)	4.45 \pm 1.10
Mood problems (including depression, anxiety, denial and frequent change in emotion)	7 (5.9)	16 (13.4)	27 (22.7)	69 (58)	4.27 \pm 1.09
Loss of memory and concentration	11 (9.2)	14 (11.8)	19 (16)	75 (63)	4.25 \pm 1.24
Changes in behaviour, aggression, anger, impulsiveness and others	8 (6.7)	24 (20.2)	29 (24.4)	58 (48.7)	4.08 \pm 1.14
Insomnia	13 (10.9)	24 (20.2)	27 (22.7)	55 (46.2)	3.93 \pm 1.29
Blurred or loss of vision	20 (16.8)	13 (10.9)	32 (26.9)	54 (45.4)	3.84 \pm 1.44
Loss of hearing or ringing in the ears	25 (21)	16 (13.4)	27 (22.7)	51 (42.9)	3.66 \pm 1.54

SD = standard deviation.

Table 3: Family caregivers' quality of life, caregiving preparedness, and caregiving burden

Variable	n (%)	Median	Mean \pm SD	SE
SF-12 Physical component summary (n = 119)				
Poor (≤ 50)	20 (16.8)	91.67	79.24 \pm 24.08	2.21
Good (≥ 51)	99 (83.2)			
SF-12 Mental component summary (n = 119)				
Poor (≤ 42)	11 (9.2)	65	63.31 \pm 15	1.38
Good (≥ 43)	108 (90.8)			
Caregiving preparedness (n = 119)				
Low (≤ 19)	69 (58)	16	17.52 \pm 9.29	0.85
High (≥ 20)	50 (42)			
Caregiving burden (n = 105)				
Low (≤ 24)	86 (81.9)	18	16.98 \pm 8.76	0.85
High (≥ 5)	19 (19.1)			

SD = standard deviation; SE = standard error of the mean.

15.0), low caregiving preparedness (mean = 17.52 \pm 9.29), and low caregiver burden (mean = 16.98 \pm 8.76) [Table 3]. At the time of discharge, the majority of FCs were in good physical (83.2%) and mental health (90.8%) but had low caregiving preparedness (58.0%). After 16 weeks of caregiving, 19.1% of the FCs had a high caregiver burden. The factors associated with caregiving preparedness and caregiver burden are

Table 4: Factors associated with caregiving preparedness and burden (n = 105)

Factor	Caregiving preparedness		Caregiving burden	
	r	P value	r	P value
Caregiving preparedness at the time of discharge from the hospital			-0.545	<0.01
FC mental health status at the time of patient discharge	-0.267	<0.01	-0.315	<0.01
FC physical health status at the time of patient discharge	-0.249	0.006	0.045	0.65
Glasgow's coma score at the time of discharge from the hospital	0.156	0.090	-0.227	0.020
Symptom severity score at the time of discharge from the hospital	-0.381	<0.01	0.427	<0.01
Length of time since patient injury in days	0.609	<0.01	-0.431	<0.01

r = Pearson's correlation; FC = family caregiver.

presented in Table 4, while the results from multiple regression analysis to determine the predictors of caregiving preparedness and caregiver burden are summarised in Table 5.

The final model explained a statistically significant amount of variance in caregiving preparedness: F (4, 113) = 29.81, $R^2 = 0.513$, R^2 adjusted = 0.496; $P < 0.01$. The length of time since the injury occurred ($P < 0.01$),

Table 5: Predictors of caregiving preparedness and caregiver burden

Factor	Unstandardised coefficient		t	P value	95% CI
	β	SE			
Caregiving preparedness (dependant variable)					
Constant	23.59	4.45	5.30	<0.01	14.76 to 32.41
Length of time since patient injury in days	0.01	0.00	5.99	<0.01	0.0 to 0.01
Symptom severity score	-0.28	0.09	-3.35	<0.01	-0.45 to -0.12
FC physical health status	-0.13	0.03	-4.11	<0.01	-0.20 to -0.07
FC mental health status	-0.20	0.05	-3.82	<0.01	0.10 to 0.30
Caregiver burden (dependant variable)					
Constant	18.996	5.174	3.67	<0.01	8.73 to 29.24
Caregiving preparedness	-0.37	0.08	-4.48	<0.01	-0.53 to -0.21
Symptom severity score	0.30	0.10	3.06	<0.01	0.11 to 0.49
FC mental health status	-0.10	0.05	-2.22	0.028	-0.19 to -0.11

SE = standard error; CI = confidence interval; FC = family caregiver.

symptom severity score ($P < 0.01$), FCs' physical health ($P < 0.01$), and FCs' mental health ($P < 0.01$) at the time of discharge were significant predictors of caregiving preparedness. These four factors explain 49.6% of the variance in caregiving preparedness.

Furthermore, the level of caregiving preparedness ($P < 0.01$), symptom severity score ($P < 0.01$), and the FCs' mental health status ($P = 0.028$) at the time of discharge were significant predictors of caregiver burden. The final model explained a statistically significant amount of variance in caregiving burden: $F(3, 100) = 20.57$, $R^2 = 0.382$, R^2 adjusted = 0.363; $P < 0.01$. These 3 factors explained 36.3% of the variance in caregiver burden. A 0.4-point increase in preparedness was associated with a 1-point decrease in the caregiving burden, a 0.1-point increase in the FCs' mental health status was associated with a 1-point decrease in the caregiver burden, and a 0.3-point increase in the patient's overall symptom severity was associated with a 1-point increase in caregiver burden.

Discussion

To the best of the authors' knowledge, this is the first study to explore caregiving preparedness and caregiver burden in Omani FCs of patients with ABI. The findings demonstrate that many ABI patients are discharged home when they are still physically dependent and with a high symptom burden. Moreover, the FCs tend to assume the caregiving role in a state of low caregiving preparedness. It is, therefore, not surprising that after 16 weeks post-discharge, up to 19.1% of the FCs reported high

levels of caregiver burden, despite initiating care in a state of good physical and mental health. These findings indicate a gap in neurorehabilitation care for patients with ABI in Oman, along with the need for FC support programmes to augment their efficacy and preparedness before resuming the caregiving role.

The uptake in caregiver burden in a short period of time post-discharge has significant implications for the ABI patient's outcomes, such as symptom management, recovery, hospital re-admission, survival, and the FCs' health and well-being, which should be investigated in future studies. Considering the absence of structured rehabilitation programmes, there is a need for structured pre-discharge interventions to educate, support and prepare the FCs for the caregiving role. Other studies show that structured caregiver education and training programmes increase preparedness, decrease caregiver burden and lead to better outcomes for patients with ABI.²² Strategies such as peer mentoring and peer support groups can also improve FCs' preparedness, mental health, and ability to handle caregiving stress.³

In other countries, patients with ABI and their families have identified specific needs during the transition from acute care to home.²³ These include patient and family education, discharge preparation, information about the patient's recovery roadmap, and linking pre-discharge care with post-discharge resources.²³ The provision of the above supportive measures empowers the FCs to approach care for patients with ABI in a better way and with a high degree of resilience.

The majority of ABI patients in the present study had at least 7 symptoms at the time of discharge, which is consistent with the findings of other studies.^{24,25} In previous studies, the patients with ABI had reduced symptoms after 6 months.^{24,25} In this study, symptom severity was assessed at the time of discharge from acute care, which highlights the need for longitudinal studies to evaluate the trajectory of ABI patient symptoms over time as well as the impact of the symptom burden on Omani FCs. A few studies recommend that reassuring the patients that their symptoms are manageable with proper treatment and regular exercise during the period of rehabilitation is a good approach.^{24,25} Unfortunately, in Oman, access to post-hospital rehabilitation is either intermittent or not available.

The predictors of caregiving preparedness included the length of time since the occurrence of the injury, symptom severity score, and the FCs' physical as well as mental health status. These 4 factors highlight the importance of preparing FCs in symptom management and personal health promotion and coping. This can be achieved when the patient with ABI is in acute care and residential rehabilitation. The predictors inform researchers that interventions that help the FCs gain confidence in managing the ABI patients' symptoms, FCs' personal health promotion, home healthcare services, and additional time in rehabilitation may enhance the caregiver's preparedness.

Up to 19.1% of the FCs reported severe caregiver burden at 16 weeks post-discharge; the predictors of caregiver burden included the level of caregiving preparedness, symptom severity score, and the FCs' mental health status at the time of discharge. This rate of burden is similar to that reported by other studies.^{23,26} For example, a study of FCs of stroke survivors conducted in Texas, USA, reported that 17% had moderate to severe caregiver burden, and the burden was associated with moderate to severe functional disability.²⁷ Other studies show that a high level of caregiving burden is associated with the patient's brain injury severity, low ability to perform activities of daily living, presence of a tracheostomy tube, and speech or swallowing disorders.^{1,3,11,12,28}

The present study, like previous ones, supports the observation that it takes time for the FCs to attain adequate preparedness or readiness to care for the patient with ABI at home.^{10,29,30} Therefore, supportive interventions and deliberate training for FCs are needed to shorten the time and reduce the challenges faced in the process of achieving preparedness. The FCs experience better health status when they receive support, teaching, home healthcare services,

and orientation to caring for patients with ABI at home.^{1,13,14} The current study was observational in nature; therefore, it could not implement the above interventions. Hence, it is recommended that interventional studies should be tailored to the Omani culture to address the unmet needs of FCs while caring for patients with ABI at home.

The study has certain limitations that need to be considered when interpreting its results, which include a small sample size, limited follow-up period (16 weeks), limited data about patient symptoms, and the participants' recruitment from a single site. Additionally, the sample was comprised of patients with ABI who had a high severity of deficits, which could have skewed the caregiver burden. Moreover, family caregivers tend to minimise their personal health problems in an effort to emphasise the primacy of the care and needs of the patient they are responsible for.

Conclusion

The FCs of ABI patients in Oman commence the caregiver role when they are in good health, but with inadequate preparation, a large number of them soon experience a high caregiving burden. The patients with ABI are discharged from acute care when they still have multiple severe symptoms associated with ABI, and this situation escalates the caregiver burden. Thus, the process of in-hospital care for patients with ABI should be augmented with interventions to enhance the FCs' caregiving preparedness and health outcomes of both the caregiver and the patient. Additionally, the healthcare system needs to be augmented with neurorehabilitation services as a way of improving patient outcomes and reducing the FC's burden.

AUTHORS' CONTRIBUTION

JKM, HR, and DJ conceptualised and planned the study. HR, WA, FA, and DJ collected the data and carried out measurements. JKM, HR, and DJ supervised the study and acquired the funding. JKM and ERL analysed and interpreted the data. JKM, HR, and ERL wrote the draft manuscript with critical feedback and help from DJ, WA, and FA. All authors were involved in the study investigation, and all discussed the results and approved the final version of the manuscript.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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