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7 **Predictors of Quality of Life among Omani Family Caregivers for**
8 **Traumatic Brain Injury Patients**

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15

16 **Abstract**

17 **Objective:** After acute care, the burden of caring for patients with traumatic brain injury
18 (TBI) is mainly shouldered by the family caregivers (FCs). We aimed to explore the quality
19 of life (QoL) of Omani FCs for patients with TBI. **Methods:** A total of 36 FCs and patients
20 with TBI were recruited from one hospital. Data was collected at discharge time and eight
21 weeks post-discharge in the period from April 2019 to December 2021. The SF-12 general
22 health survey and preparedness for caregiving scale were used to measure the caregivers'
23 QoL and preparedness, respectively. The disability rating scale and the TBI symptom scale
24 were used to measure the patient's disability and symptoms, respectively. Paired t-test and
25 multiple linear regression analysis were performed. **Results:** Most caregivers were the
26 parent (41.7%) or child (27.8%) of the patient with TBI. Overall the caregivers had good
27 physical QoL (PQoL) and mental health QoL (MHQoL) but low caregiving preparedness
28 at the time of discharge. At eight weeks post-discharge, there were significant
29 improvements in caregiving preparedness ($p < 0.01$), patient disability ($p < 0.05$), and

30 depreciation in caregivers' MHQoL ($p < 0.05$), but no change in the PQoL. The modifiable
31 predictors of PQoL were the caregiver's employment status and the severity of the patient's
32 sleep and mood problems. The predictors of MHQoL were caregiving preparedness, the
33 patient's inability to live independently, and the severity of mood and behavioral problems.
34 **Conclusion:** Omani FCs for patients with TBI experience a negative impact on QoL, and
35 this is correlated with the physical, emotional, and mental health symptoms of the patient.
36 **Keywords:** Caregiving, Family, Quality of Life, Caregiving Burden, Traumatic Brain
37 Injury, Caregivers' preparedness, Oman.

38

39 **Advances in knowledge**

- 40 • Most Omani family caregivers for patients with TBI have low caregiving
41 preparedness and are not ready to adequately meet the patient care needs when the
42 patient is discharged from the acute care hospital.
- 43 • Within a period of eight weeks, the family caregivers self-teach and improve their
44 abilities and caregiving preparedness as they spend more time with the patients
45 and in the caregiver role.
- 46 • The process of adapting to the caregiving demands negatively impacts the family
47 caregivers and is associated with a decline in the caregivers' mental health at
48 eight weeks post-discharge.

49

50 **Application to patient care**

- 51 • The study highlights the importance of discharge planning that ensures family
52 caregiver involvement, training, skilling, and support.
- 53 • There is a need for supportive care programs that ensure caregiver readiness for
54 caregiving responsibilities and personal health promotion while performing the
55 caregiver role.
- 56 • Further research focusing on family-centered interventional programs may help to
57 develop culturally sensitive and cost-effective programs for supporting, educating,
58 and empowering caregivers for patients with TBI.

59

60

61 **Introduction**

62 Traumatic brain injury (TBI) is an alteration in brain function or evidence of brain
63 pathology caused by an external force.¹ TBI is a significant cause of death or disability
64 with a wide spectrum of symptoms and sequelae.² One of the leading causes of TBI is
65 road traffic injuries arising from crashes and accidents (RTIs). Annually, approximately
66 1.3 million people succumb to death due to RTIs, and these (RTIs) are projected to be a
67 leading contributor to global fatalities by 2030.³ Reports by the World Health
68 Organization show that RTIs cause 3.55% of deaths in Oman, the age-adjusted death rate
69 due to RTIs is 12.63 per 100,000 population, and the country ranks 113th in the world for
70 the highest number of RTIs.⁴

71
72 In Oman, the RTIs are attributed to the rise in urbanization, nocturnal driving, speeding,
73 alcohol use, mobile phone usage, and vehicle ownership.⁵ The other causes of TBI
74 include unintentional falls, intentional self-harm, gunshots, violence, assaults, and
75 others.⁶ The increasing population of older adult Omanis that experience falls and other
76 forms of injuries has also been reported to be contributing to a rise in TBI.⁷ The patients
77 that survive the acute phase of TBI live with sequelae such as cognitive decline,
78 functional impairment, physical disability, psychological and behavioral disturbances,
79 and overall changes in personality.⁸ Irrespective of the severity of the injury, TBI is
80 associated with neurocognitive deficits such as amnesia, insomnia, mood disorders, and
81 others.⁹

82
83 In the acute phase, patients with TBI are managed in specialist trauma centers and are
84 later transferred to neuro-rehabilitation facilities. In countries where rehabilitation, long-
85 term care, and/or home care services are negligible, the family caregiver (FC) takes up
86 the responsibility for the patient's rehabilitation, home care, and reinstatement into society
87 when the patients with TBI emerge out of the acute phase. Trauma care is available in all
88 tertiary hospitals in Oman, but the country has one specialized tertiary neuro-trauma care
89 center and a ratio of 1.25 physiotherapists per 10,000 population.¹⁰ Therefore, access to
90 specialized neuro-rehabilitation facilities is feasible in urban settings but limited in other
91 locations, and this puts more burden on the shoulders of the FCs.

92

93 Caregiving is a multi-faceted role that leads the FCs to provide physical, psychological,
94 emotional, social, and financial support while simultaneously experiencing strain and
95 stress.¹¹ Due to a lack of well-established rehabilitation services¹⁰, Omani FCs for
96 patients with TBI are likely to assume caregiving roles without any support or training to
97 help them meet the new demands and responsibilities. Considering the physical,
98 cognitive, behavioral, and psychosocial sequelae of TBI, the FCs taking care of such
99 patients at home tend to be overwhelmed if they are not supported.¹²

100

101 Studies conducted in other countries and focusing on FCs for patients with TBI show that
102 family members assuming the caregiver role without any formal training and support
103 system experience a high caregiving burden, poor family functioning, poor mental health,
104 and emotional distress.¹³ The FCs also experience a lack of time for self-care, interrupted
105 life, poor physical health, social isolation, sleep disturbances, depression, exhaustion, and
106 anger.¹⁴ The most common physical symptoms among caregivers of patients with TBI
107 include low energy, trouble sleeping, digestive problems, back pain, and joint pain.¹⁵

108

109 A study conducted in Turkey showed that the caregiving burden is higher among FCs that
110 are older and unemployed or with financial difficulties, and both factors affected the care
111 given to the patient with TBI.¹⁶ One of a few studies that focused on Omani FCs of
112 patients with TBI found a limited availability of rehabilitative resources, lack of support
113 services for FCs, and utilization of personal religious faith and beliefs to cope with the
114 caregiving strain.¹⁷ Despite the problem of TBI in Oman^{4,7} and its impact on the family,
115 no study has focused on the QoL of Omani FCs of patients with TBI. Our study aimed to
116 explore the QoL of Omani FCs for patients with TBI and the predictors of QoL.

117

118 **Methods**

119 A cross-sectional design was used to collect data from FCs and patients with TBI at the
120 time of discharge from the hospital and at eight (8) weeks post-discharge (April 2019-
121 December 2021). The FCs and patients with TBI (participants) were recruited from one
122 hospital (Khoula Hospital). The patients were Omanis of age ≥ 18 years, with a confirmed

123 diagnosis of TBI, able to state their names, positively identify family members, and with
124 a minimum Modified Rankin Scale for Neurologic Disability of at least +1. The FCs
125 were any family member scheduled to provide regular day-to-day care at home for the
126 patient after discharge from the hospital. The FCs were included if they met the inclusion
127 criteria of being the main person responsible for the care of a patient with TBI at home;
128 Omani by nationality; the age of ≥ 18 years; able to speak Arabic or English; live in the
129 same household as the patients with TBI; and has no formal training as a healthcare
130 profession. A convenience sampling approach was used to identify patients with TBI and
131 their FCs. A convenience sampling technique allowed us to access patients with TBI,
132 which is a very hard-to-access population. Many studies of patients with TBI have used
133 samples ranging from 30 to 100 participants.¹⁸ A total of 36 FCs and their patients with
134 TBI were recruited for the study.

135

136 **Study Instrument**

137 An interview questionnaire (IQ) was used to collect data. The IQ was comprised of six
138 sections of the FC and patient demographic characteristics (see Table 1); caregivers' QoL
139 (SF-12 general health survey); preparedness for caregiving scale (PCS); the disability
140 rating scale (DRS); and the TBI symptom severity scale. The SF-12 Health Survey (SF-
141 12) has internal consistency and test-retest reliabilities ranging from 0.67 to 0.82.¹⁹ A
142 score of 50 and 42 have been recommended as a cut-off for the physical health QoL
143 (PQoL) and mental health QoL (MHQoL), respectively.¹⁹ The family caregiver's
144 preparedness to care for a patient with TBI at home was measured using the PCS.^{20,21} The
145 PCS has eight (8) items assessing preparedness in multiple domains of caregiving.^{20,21}
146 The participants' responses are rated on a 5-point Likert scale ranging from 0 (not at all
147 prepared) to 4 (very well prepared). The items are summed to generate total scores
148 (ranging from 0 to 32). High scores on the PCS indicate a high level of preparedness. The
149 PCS has a Cronbach's alpha of ≥ 0.88 ^{20,21} In the current study, the PCS Cronbach's alpha
150 at the time of discharge and eight weeks post-discharge were 0.94 and 0.96, respectively
151

152 The disabilities of patients with TBI were measured using the DRS. The DRS (8 items)
153 measures and tracks TBI disability from the state of coma to the community.²² The DRS

154 focuses on impairments, disabilities, and handicaps related to eye-opening,
155 communication ability, motor response, feeding, toileting, grooming ability, level of
156 functioning, and employability or level of handicap.²² The DRS total scores range from 0
157 (no disabling impairments) to 29 (extreme vegetative state). The total scores are further
158 classified as no disability (0), mild (1), partial (2-3), moderate (4-6), moderately severe
159 (7-11), severe (12-16), extremely severe (17-21), vegetative state (22-24), and extreme
160 vegetative state (25-29).²² The DRS has an inter-rater reliability of ≥ 0.97 .²² The DRS
161 was used when the patients were not under the influence of any mind-altering drugs or
162 influence of complications of a recent seizure. The Cronbach's alpha of the DRS at the
163 time of discharge and eight weeks post-discharge were 0.71 and 0.75, respectively
164

165 The TBI patient symptom scale was used to assess the severity of symptoms of sequelae
166 associated with TBI. The symptoms recorded include loss of muscle strength (paralysis,
167 limited physical mobility, or poor coordination); blurred vision or loss of vision; loss of
168 hearing or ringing in the ears; loss of memory and concentration; changes in speech or
169 difficulty being understood; mood problems (such as depression, anxiety, denial, and
170 frequent change in emotions); insomnia; changes in behaviors (aggression, anger, and
171 being impulsive); and ability to live independently. The severity of the symptoms was
172 rated on a scale (developed by the investigators) ranging from 1 to 5 (1= no difficulty, 3
173 = mild difficulty, 4 = moderate difficulty, and 5 = severe difficulty). The Cronbach's
174 alpha of the TBI patient symptom scale at the time of discharge and eight weeks post-
175 discharge were 0.90 and 0.91, respectively
176

177 **Data Collection Procedures**

178 The study was approved by the Research and Ethics Committees of the hospital and the
179 investigators' institutions. All the participants received a detailed explanation of the study
180 procedures and signed the consent form prior to data collection. The investigators
181 approached the charge nurses of units that admit patients with TBI to identify those
182 scheduled for discharge. During the in-patient period, all the patients with TBI are
183 followed by the neurology team and other teams according to medical care needs,
184 comorbidities, and complications. The medical team determines the discharge date and

185 time. The nurse assigned to the patient notified the study research assistant (a nurse) of
186 the time of discharge and when the FC was available to take the patient home.

187

188 On the day of discharge, the research assistant (RA) screened the FC and patient for
189 eligibility. On the day of discharge, the RA also collected time 1 data about the patient's
190 symptoms, the patient's level of disability, the caregiver's preparedness for caregiving,
191 and the caregiver's QoL. During the meeting (on the day of discharge), the FCs were
192 informed that additional data about caregiving preparedness, QoL, and the patient's
193 symptoms and disabilities would be collected when the patient is brought for the follow-
194 up appointment in the neurology clinic at eight weeks. Patients with TBI return for
195 follow-up care and review in the neurology clinic every two months. Data collection at
196 eight weeks post-discharge helped to ensure that FCs get a reasonable amount of time to
197 experience the caregiving demands. A total of 36 FC and patients with TBI were
198 recruited for the study at discharge time, but 35 FCs and patients showed up for the first
199 appointment at eight weeks. One FC did not show up because the patient died before the
200 first follow-up appointment (see Figure 1).

201

202 **Data Analysis**

203 Data were analyzed using Statistical Package for the Social Sciences (SPSS), version 23
204 (IBM Corp., Armonk, New York, USA). Descriptive statistics were used to describe the
205 TBI patients' symptoms and disabilities, the FCs' preparedness for caregiving, and QoL.
206 The paired t-test was used to examine the difference in patients' disability, FCs'
207 caregiving preparedness, PQoL, and MHQoL at the time of discharge and eight weeks
208 post-discharge. Multiple linear regression analyses (backward method) were used to
209 examine predictors of QoL. Multicollinearity was tested using the variance inflation
210 factor and tolerance. A p-value of ≤ 0.05 was considered to be statistically significant.

211

212 **Results**

213 A total of 36 FCs and their patients with TBI participated in the study at the time of
214 discharge from the hospital, and their characteristics are presented in Table 1. The mean
215 age of the FCs was 38.44 ± 9.23 years. The majority of FCs were female (52.8%), and the

216 parent (41.7%) or child (27.8%) of the patient with TBI. The mean age of patients with
217 TBI was 59.58 ± 20.57 years. The main causes of TBI were motor vehicle accidents,
218 falls, and assaults. The majority of patients were male (52.8%) and had a Glasgow coma
219 scale score (≤ 8) equivalent to severe injury at the time of admission (52.8%). The
220 average Glasgow coma scale score on admission and discharge was 7.92 ± 2.40 (severe
221 injury status) and 14.20 ± 2.32 (mild injury status), respectively.

222

223 **Symptom Profile of Patients at the Time of Discharge**

224 At the time of discharge from the hospital, all patients were found to have multiple
225 symptoms (see Table 2). The most severe symptoms were inability to live independently
226 (97.2%), loss of muscle strength, paralysis, limited physical mobility or poor
227 coordination (77.5%), mood problems such as depression, anxiety, denial, and frequent
228 change in emotions (66.7%), and loss of memory and concentration (63.9%). The mean
229 scores show that in this sample, the symptoms that were most common and severe to deal
230 with were the inability to live independently, loss of muscle strength, mood problems,
231 and change in speech or difficulty being understood by others.

232

233 **Change in Patient's Disability and Caregiver's Preparedness and Quality of Life**

234 The results in Table 3 show that overall the FCs had a good PQoL ($M= 71.91 \pm 25.69$)
235 and MHQoL ($M= 63.05 \pm 16.96$) and low caregiving preparedness ($M= 19.74 \pm 9.04$) at
236 the time of discharge. At eight weeks post-discharge, there was a significant
237 improvement in caregiving preparedness ($p < 0.01$) and patient's disability ($p < 0.05$). At
238 eight weeks post-discharge, there was a significant depreciation in the MHQoL ($p <$
239 0.05). There was a decrease in PQoL from 71.91 at discharge to 68.93 at eight weeks, but
240 this change was not significant.

241

242 **Predictors of Caregiver Quality of Life**

243 The results of the multiple regression analysis to determine the predictors of caregivers'
244 QoL are presented in Table 4. The significant predictors of the PQoL were the age of the
245 caregiver ($p < 0.001$), the age of the patient ($p = 0.013$), the caregiver's employment
246 status ($p= 0.001$), the severity of patient symptoms related to mood ($p= 0.003$) and

247 insomnia ($p= 0.025$). The final regression model showed that five factors were
248 responsible for approximately 56.4% of the variance in the caregivers' PQoL [$F (5, 29) =$
249 $9.80, p < 0.001, R^2 = 0.628, R^2_{\text{adjusted}} = 0.564$]. The significant predictors of the
250 caregivers' MHQoL were the caregiver's age ($p= 0.003$), the patient's age ($p < 0.001$),
251 caregiving preparedness ($p= 0.05$), the severity of the patient's mood problems ($p =$
252 0.001), behaviors problems ($p= 0.007$), and inability to live independently ($p= 0.034$).
253 The final model showed that the six factors were responsible for approximately 44.9% of
254 the variance in caregivers' MHQoL [$F (6, 28) = 5.62, p= 0.001, R^2 = 0.546, R^2_{\text{adjusted}} =$
255 0.449].

256

257 **Discussion**

258 Traumatic brain injury (TBI) is a common health problem in Oman, and the risk factors
259 are abundant due to the high percentage of youths in the population, the increasing
260 geriatric population, increasing urbanization, and motor vehicle ownership.^{7,23,24} Despite
261 the problem of TBI and associated sequelae, there has been no study about the QoL of
262 FCs caring for patients with TBI in Oman or the greater Middle East region. The majority
263 of other studies that have focused on FC in Oman included caregivers of cancer patients
264 and children with autism and found high caregiver burden and low QoL.^{25,26}

265

266 The findings of our study show that the FCs of patients with TBI were mostly female, the
267 parent or child of the patient with TBI, and assumed caregiving responsibilities for a
268 patient with TBI with severe injury (52.8%) and multiple severe symptoms. The
269 symptoms that were most common include the inability to live independently (97.2%),
270 loss of muscle strength, paralysis, limited physical mobility or poor coordination
271 (77.5%), mood problems such as depression, anxiety, denial, and frequent change in
272 emotions (66.7%), and loss or memory and concentration (63.9%). The FCs started the
273 caregiving responsibilities for patients with TBI while in good physical and mental health
274 but with low levels of caregiving preparedness.

275

276 The low level of caregiving preparedness could be due to inadequacies in discharge
277 planning and a lack of programs to prepare FCs for caregiving responsibilities before the

278 patient with TBI is discharged home. A similar study conducted in New South Wells
279 (Australia) found that the majority of caregivers (72%) for patients with TBI felt well
280 prepared or very well prepared overall for caregiving, especially in regard to the patient's
281 physical needs and responding to patient needs in an emergency.²⁷ The caregivers in the
282 New South Wells were least prepared to get help and information from the health system
283 and to deal with the stress of caregiving.²⁷ The caregivers in the Australian study had
284 been caring for the TBI patients for at least one year, and the country's healthcare system
285 has established discharge planning processes, neurorehabilitation facilities, and long-term
286 care facilities.²⁷ It is important to note that even in countries with highly established
287 healthcare systems FCs of patients with TBI have challenges related to caregiving stress
288 and seeking help and information from the healthcare system.

289
290 The findings of our study show that in a period of only eight weeks post-discharge, there
291 was significant depreciation in the caregivers' mental health QoL ($p < 0.05$). These
292 findings are closely similar to those of a study from Iran, which found that the QoL of
293 FCs of patients with spinal cord injury (SCI) was mainly poor in the mental health
294 dimension.²⁸ Consistent with our findings, a study conducted in the Netherlands showed
295 that the mean mental health score of FCs for patients with TBI significantly depreciated
296 from 63.07 at the time of discharge to 58.41 at eight weeks post-discharge.²⁹ The above
297 findings demonstrate that caregiving for patients with TBI is difficult and promptly
298 impacts the caregivers' QoL if support and interventions to increase caregiving
299 preparedness are not provided. Hence, the need for interventions to teach, support, and
300 increase the FCs' preparedness before the patients are discharged and across the
301 caregiving trajectory. Literature shows interventions focusing on skill building, peer
302 support, support groups, advocacy training, and other community-based services targeted
303 at the FC or dyad (FC and patient with TBI) improve health outcomes.³⁰

304
305 Our findings also show that at eight weeks post-discharge, there was a significant
306 improvement in caregiving preparedness ($p < 0.01$) and the patients with TBI disability (p
307 < 0.05) but no significant change in the FCs' physical health QoL. This shows that
308 without support or efforts by the healthcare system to prepare the FCs, caregivers use

309 inherent intuition, life experiences, and other resources to provide care to the patient with
310 TBI while also learning how to address the patient's needs and symptoms. This is likely a
311 very stressful and emotionally draining task that compromises mental health QoL. We
312 recommend more longitudinal studies of the resources FCs use to meet the needs of the
313 patient at home and to assess and monitor the health and health promotion practices of
314 FCs as they adjust to the demands of caring for patients with TBI beyond the eight weeks
315 period.

316
317 The significant modifiable predictors of the FCs' mental health QoL were caregiving
318 preparedness and the severity of the patient's symptoms related to mood problems,
319 change in behaviors, and inability to live independently. These findings are consistent
320 with those of other recent studies, which reported that the caregivers of patients with TBI
321 have low mental health QoL due to the patient's mental health issues and ongoing care
322 needs.^{31,32} The significant modifiable predictors of the physical QoL were the FCs'
323 employment status, the severity of symptoms related to mood problems, and insomnia.
324 These findings demonstrate that interventions focusing on training the FC to increase
325 caregiving preparedness, skills needed to care for the patient with TBI with behavioral
326 problems, home-based care-led health professionals such as nurses to assist with
327 symptom management and other community-based services may enhance the caregivers'
328 QoL and outcomes of the patients with TBI.

329
330 The findings of studies conducted among FCs of patients with TBI in the USA (mainly
331 veterans) show that caregivers report lower QoL in the mental health dimension than the
332 physical.^{28,31,32} The low mental health QoL is mainly attributed to factors such as
333 perceived social stigma regarding the sequelae of TBI, inappropriate behaviors of patients
334 with TBI, anticipated future financial problems, social isolation, unhealthy family
335 functioning, dissatisfaction with intimate relationships, responsibility overload, sleep
336 deprivation, and suppression of personal needs and emotions.^{28,31,32}

337
338 Regarding caregiving preparedness, the current study revealed that overall, the FCs had
339 low caregiving preparedness at the time of patient discharge from the hospital. At eight

340 weeks post-discharge, there was a significant improvement in the FCs' caregiving
341 preparedness. Similar findings have been reported by a longitudinal study conducted
342 among Danish FC of patients with TBI.³³ However, the FCs in the Danish study received
343 initial support from healthcare providers that helped patients with activities of daily
344 living.³³ Therefore, healthcare facilities in Oman must prioritize the implementation of
345 tailored pre-discharge teaching and education and other interventions to increase
346 caregiving preparedness and mitigate poor health outcomes among FC and patients with
347 TBI.

348
349 The study's findings need to be interpreted in view of its limitations, such as small
350 sample size (increase the risk of a type II error), convenience sampling, and lack of data
351 about caregiver outcomes of depression, anxiety, and coping. The sample was mostly
352 comprised of FCs caring for patients with severe TBI-related disabilities, and this limits
353 the generalizability of the results. Despite its limitations, the study highlights that
354 caregiving for patients with TBI promptly impacts the caregiver's QoL in the absence of
355 interventions to enhance support and preparedness. We recommend longitudinal and
356 interventional studies focusing on caregiver education, skilling, and support throughout
357 the caregiving trajectory. There is also a need for acute care hospitals to augment
358 discharge planning with interventions that enhance caregiver preparedness before the
359 patient is sent home. Nurses could implement such interventions through community-
360 based services such as home care, which can be tailored to the Oman culture and social
361 context.

362 363 **Conclusion**

364 This is the first study to explore the QoL of FCs of patients with TBI in Oman. The
365 Omani FCs of patients with TBI experience a negative impact on their mental QoL as a
366 result of assuming caregiving responsibilities. The modifiable predictors of QoL were the
367 caregivers' employment status and caregiving preparedness and patient symptoms related
368 to mood, insomnia, behaviors, and disability. The modifiable factors can be targeted to
369 enhance FCs preparedness and to mitigate poor health outcomes of the dyad (caregiver
370 and patients with TBI).

371 **Authors' Contribution**

372 DJ and JKM conceptualized and designed the study. ERL, DJ, and HR collected the data.
373 JKM analyzed and interpreted the data. All authors were involved in the study
374 investigation. ERL, DJ, HR, and JKM handled the project administration. JKM and DJ
375 drafted the manuscript. ERL and HR reviewed and edited the manuscript. JKM, DJ, and
376 HR supervised the study and acquired the funding. All authors approved the final version
377 of the manuscript.

378

379 **Conflict of Interest**

380 The authors declare that there is no conflict of interest.

381

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385

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Accepted Article

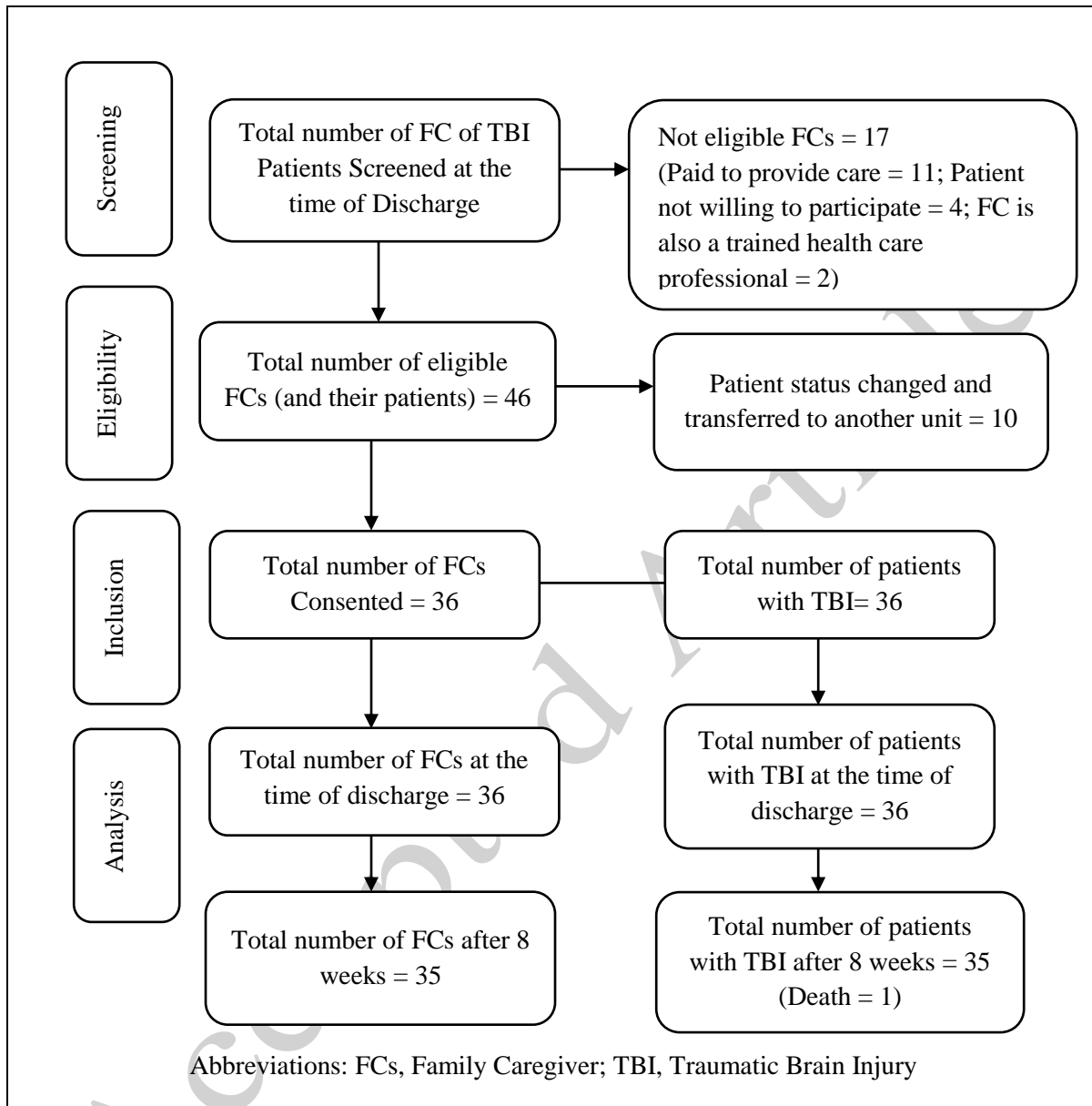


Table 1: Characteristics of the family caregivers and patients with TBI

Characteristic		FCs	Patients
		(n = 36)	(n = 36)
		%	%
Gender	Male	47.2	52.8
	Female	52.8	47.2
Age in years	18-40	69.4	25
	≥ 41	29.6	75
Marital status	Single	8.3	13.9
	Married	88.9	63.9
	Separated/divorced/widowed	2.8	22.2
Level of education	≤ High school	80.6	94.4
	≥ Post-secondary	19.4	5.6
Employment status	Full-time	61.1	36.1
	Unemployed	38.9	63.9
Relationship to patient	Parent	41.7	
	Spouse	16.7	
	Child	27.8	
	Sibling	11.1	
	Legal guardian	2.8	
Cause of injury or patient diagnosis	Fall		36.1
	Motor vehicle accident		50
	Assault		11.1
	Other forms of trauma		2.7
Glasgow coma scale on admission	9-12 (Moderate)		47.2
	≤ 8 (Severe)		52.8
Glasgow coma scale at the point of discharge	Mild (14–15)		64.2
	Moderate (9–13)		35.8

503 **Table 2:** Symptom Profile of Patients with TBI at the Time of Discharge

Symptom	Rating (n =36)				M ± SD
	No Difficulty	Mild Difficulty	Moderate Difficulty	Severe Difficulty	
	%	%	%	%	
Loss of muscle strength (paralysis, limited physical mobility, or poor coordination)	--	2.8	19.4	77.5	4.75 ± 0.50
Blurred or loss of vision	11.1	11.1	25	52.8	4.08 ± 1.30
Loss of hearing or ringing in the ears	19.4	11.1	16.7	52.8	3.83 ± 1.56
Loss of memory and concentration	8.3	16.7	11.1	63.9	4.22 ± 1.25
Change in speech or difficulty being understood	2.8	11.1	11.1	75	4.56 ± 0.91
Mood problems (include depression, anxiety, denial, and frequent change in emotion)	8.3	8.3	16.7	66.7	4.33 ± 1.20
Insomnia	22.2	8.3	13.9	55.6	3.81 ± 1.64
Changes in behavior (aggression, anger, impulsiveness, etc.)	13.9	11.1	22.2	52.8	4.00 ± 1.39
Ability to live independently	--	--	2.8	97.2	4.97 ± 0.17

504

505 **Table 3:** Changes in Patient Disability, Caregiver Quality of Life, and Caregiving Preparedness at 8 Weeks Post-discharge (n = 35)

Variable	level	n	M	SD	SEM	t	p-value	MD	95% CI
TBI patient's disability rating scale score	At the time of discharge	35	16.74	4.15	0.70				
	At eight weeks post-discharge	35	15.34	5.00	0.85	2.33	0.026	1.40	0.18-2.62
Family caregiver's caregiving preparedness	At the time of discharge	35	19.74	9.04	1.53				
	At eight weeks post-discharge	35	22.74	6.71	1.14	-4.33	< 0.001	-3.00	-4.41 - -1.59
Family caregivers' SF-12 Physical Quality of Life (PQoL)	At the time of discharge	35	71.91	25.69	4.34				
	At eight weeks post-discharge	35	68.93	27.66	4.68	1.02	0.316	2.98	-2.97 – 8.92
Family caregivers' SF-12 Mental Health Quality of Life (MHQoL)	At the time of discharge	35	63.05	16.96	2.87				
	At eight weeks post-discharge	35	58.41	17.98	3.04	2.11	0.042	4.64	0.18 – 9.11

506 SEM, standard error of the mean; MD, mean difference

507 **Table 4:** Predictors of Caregivers' Quality of Life at 8 Weeks Post-discharge

Dependent variable	Factor	Unstandardized Coefficient		<i>t</i>	<i>p</i> -value	95% CI
		β	SE			
Family caregivers' SF-12 Physical Quality of Life (PQoL)	Constant	152.26	23.69	6.43	< 0.001	103.81-200.71
	Family caregiver age (years)	-1.59	0.39	-4.14	< 0.001	-2.38 - -0.81
	Patient age (years)	0.44	0.17	2.64	0.013	0.10 – 0.78
	Family caregiver employment status	-13.27	3.66	-3.62	0.001	-20.75 - -5.78
	Severity of mood problems (depression, anxiety, denial, and frequent change in emotion)	-10.34	3.16	-3.27	0.003	-16.80 - -3.88
	Severity of insomnia	5.36	2.29	2.34	0.026	0.68 -10.04
Family caregivers' SF-12 Mental Health Quality of Life (MHQoL)	Constant	228.64	73.53	3.22	0.004	78.02 – 379.27
	Family caregiver age (years)	-0.94	0.29	-3.29	0.003	-1.53 - -0.36
	Patient age (years)	0.45	0.16	3.96	< 0.001	0.22 – 0.69
	Family caregiver's caregiving preparedness	0.59	0.29	2.02	0.050	0.00 -1.20
	Severity of mood problems (depression, anxiety, denial, and frequent change in emotion)	-11.61	3.18	-3.65	0.001	-18.13 - -5.09
	Severity of behavior changes (aggression, anger, impulsiveness, etc.)	8.33	2.86	2.91	0.007	2.47 – 14.20
	Severity of the inability to live independently	-13.39	14.04	-2.24	0.034	-60.16 - -2.63

508 CI, confidence interval; SE, standard error