

Functional Outcome and Community Reintegration of Survivors Following Disasters: A Community-based Survey in Pakistan

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Abstract

Objective: The objective of the study is to evaluate functional outcomes and community reintegration of disaster survivors in Pakistan. **Methods:** This was a cross-sectional descriptive study of community-based participants at the Armed Forces Institute of Rehabilitation Medicine, Pakistan. The medical records were screened for eligibility of adults with disaster-related disability. Participants were interviewed in ambulatory clinics using validated measures: Neurological-Trauma Impairment Scale (NIS-Trauma), International Classification of Functioning, Disability, and Health-Generic Set, Community Integration Measure (CIM), Community Integration Questionnaire (CIQ), and EuroQol 5-Dimension 5-Level. **Results:** Participants were ($n = 117$, mean age = 35 years) with postdisaster injury up to 17 years; the majority had spinal cord injury ($n = 62$; 53%) and amputations ($n = 44$; 38%). At assessment, 80% were independent with mobility (with aids) and 29% with everyday living activities. They reported ongoing fatigue (54.7%), altered sensations (51.28%), and pain (50.43%), but fewer problems with mood and emotions. The impairment severity negatively impacted community activities (NIS-Trauma vs. CIQ: $P < 0.001$). As impairments improved with time (NIS-Trauma vs. time since injury: $P = 0.003$), so did community reintegration (time since injury vs. CIQ: $P < 0.001$) and perceived health status (time since injury vs. EuroQol; $P = 0.001$). **Conclusion:** Many participants reported various ongoing disability-related issues; however, majority were dependent with everyday living activities and well adapted in the community. Further robust studies are needed for evaluation of longer-term impact of the disability in disaster victims for the comprehensive healthcare in the community.

Keywords: Community integration, disability, disaster, functional outcome, quality of life, rehabilitation

INTRODUCTION

The United Nations Office for Disaster Risk Reduction defines disaster as “a serious disruption of functioning of a community or a society causing widespread human, material, economic, or environmental losses which exceed the ability of the affected community or society to cope using its own resources.”^[1] Disasters cause significant mortality and long-term physical disability, including traumatic brain injury (TBI), spinal cord injury (SCI), limb amputation, peripheral nerve injury (PNI), crush, and/or musculoskeletal injury.^[2-4] Importantly, psychological problems (e.g., posttraumatic stress disorder [PTSD]) may affect a person’s functional capacity, cognition, and participation.^[5,6] It is estimated that more than 700 major natural and/or technological hazards were reported annually in the last four decades, affecting over 270 million people globally.^[7-9] The associated costs

exceed \$100 billion/year, with a significant socioeconomic burden on the affected region or country.^[3]

Pakistan is one of the most disaster-prone countries in the world. According to the World Disaster Report in 2003, 6037 people were killed and 8,989,631 were affected due to various forms of disasters in the period between 1993 and 2002 in Pakistan.^[10] The 2005 Pakistan earthquake resulted in 73,000 deaths and 126,000 injures.^[11] In the last decade, the World Health Organization (WHO) established the

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Emergency Response Framework, including the integration of rehabilitation professionals into Emergency Medical Teams, to acknowledge the integral role of medical rehabilitation in disaster management.^[12,13] Evidence from studies conducted during disasters (e.g., earthquakes in 2005 Pakistan, 2010 Haiti and 2008 China) demonstrated the effectiveness of rehabilitation programs following different types of injuries in disaster settings.^[12-14] Although there is no standardized tool for the measurement of disability in disaster settings, frequently, the WHO International Classification of Functioning, Disability, and Health (ICF) tool is often used to classify disability for health-related states to facilitate communication across disciplines worldwide.^[15]

Currently, a limited number of studies explore longer-term outcomes (beyond 4 years) in disaster survivors. Previous studies conducted in 2008 Sichuan earthquake evaluated functional outcomes for people with fractures and amputations at 27 months and 4 years, respectively.^[16,17] The findings showed that functional outcomes among amputees improved over time; however, the quality of life (QoL) and life satisfaction remained unchanged. Illiterate survivors and lower limb amputees were particularly at risk of low life satisfaction due to increased psychological issues and restrictions in physical mobility impacting participation.^[17] Another study conducted in disaster victims with fractures, 27 months post-Sichuan earthquake, reported improved activities of daily living (ADLs) and life satisfaction.^[16] The longer-term management of disability and function in many other disaster-related trauma populations is not well studied.^[18] Active surveillance of affected individuals following a disaster can provide critical information to prevent longer-term morbidity and mortality and for comprehensive health management, policy, and planning.^[19] This study, therefore, evaluates the current disability and functional status of community-based survivors of disasters in Pakistan – a developing country, with limited health resources.

METHODS

Study design

This was an exploratory, cross-sectional, community-based descriptive study.

Participants and settings

The study was approved by the Ethical Review Committee of Army Medical College, in affiliation with the Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi, Pakistan, and the Rehabilitation Flying Faculty of the Royal Melbourne Hospital (RMH), Australia. The research team included rehabilitation physicians, nurses, and allied health professionals (from AFIRM), who underwent a 2-day training workshop before study commencement, provided by a rehabilitation physician from RMH. The training sessions included education/training in the study assessment methods and data collection. Patient medical records at AFIRM were screened before recruitment for eligibility based on the selection criteria. Those eligible were invited to participate

in the project during their routine outpatient clinic review at AFIRM. The recruiting research team member explained the study further to all eligible participants (and/or their carers). Individual written consent was obtained from all eligible participants before study commencement. All participants were de-identified and given a participant identification number.

Selection criteria

Participants were screened by a rehabilitation physician at AFIRM. Those included were those aged >18 years, who had sustained an injury in a disaster (natural or artificial), who were hospitalized with a confirmed disability within the previous two decades, and who were able to provide informed consent. Patients were excluded if they suffered from a disability not caused by a disaster event and/or were unable to provide informed consent due to cognitive or language impairment, psychiatric illness, or medical illness.

Data collection

A face-to-face interview (approximately 45 min each) was conducted in the medical rehabilitation clinic, using a structured format. A data collection form [Appendix 1] was used to capture data on sociodemographic and medical information, disaster and injury details, current cognitive status, and functional ability. Functional outcomes and health-related QoL and community integration measures were obtained using standardized validated instruments (see Measures below). The assessor did not prompt patients but provided assistance for those who had difficulty answering questions. Appropriate rest breaks were provided during these interviews. The data collection form and measures were translated into the local language (Urdu), by qualified translators from the AFRIM, if required, and approved by local research staff and AFIRM ethics committee before the commencement of the study. All assessments were filed securely and opened at the time of entry into the excel database by an independent data entry officer.

Measurement

Neurological-Trauma Impairment Scale

The Neurological-Trauma Impairment Scale (NIS-Trauma)^[20] assessed trauma-related impairments. The functional impairment severity (rated 0–3) across 23 domains is mapped onto the ICF, with an additional domain allocated to a category listed as “others”. The total score ranges from 0 to 113.^[20]

International Classification of Functioning, Disability, and Health (ICF) Generic Set

The Rasch-analyzed ICF Generic Set was used to document function and disability with seven categories: energy/drive functions, emotion, sensation of pain, carrying out daily routine, walking, moving around, and remunerative employment. The ICF set contains qualifiers, rated 0 (no problem) to 10 (complete problem).^[15,21,22]

Community Integration Measure

The Community Integration Measure (CIM),^[23] a ten-item patient-centered questionnaire, uses words used by participants without making any assumptions about the relative importance

of particular relationships or activities. It requires administration time of 3–5 min and a basic literacy level.^[23]

Community Integration Questionnaire

The Community Integration Questionnaire (CIQ)^[24] evaluated participant domestic and community participation relevant to home integration, social integration, and productive activities. Subtotal scores are provided for each category, and secondary weight scores based on whether or not these activities are performed jointly with others and the nature of the other persons.^[24]

EuroQol 5-Dimensions 5-Level

The EuroQol 5-Dimension 5-Level (EQ-5D-5L) instrument^[25] was used to evaluate overall QoL in five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has five levels (none, slight, moderate, severe, and extreme problems), and the EQ visual analog scale records participant’s self-rated health on a visual analog scale as a quantitative measure of health.^[25]

All assessments were secured and filed at AFIRM with specific study ID codes for each participant. Only de-identified copies were kept at the Department of Rehabilitation Medicine RMH and opened only at the time of data entry (by independent data entry officer) for analyses. Access was password protected and used only by primary investigators.

Data analyses

Data were entered into a Microsoft Excel database and analyses were done using IBM SPSS Statistics Package Version 21 (Chicago, IL, USA) SPSS 12 for Windows. Double data entry avoided errors. Descriptive analyses of the study population were based on data distribution. Continuous variables were presented as mean (standard deviation [SD]), and categorical variables were analyzed using frequency distributions. A series of correlation analyses was performed to describe the factors affecting functional outcome, community reintegration, and QoL in relation to disability and impairment and to identify those factors associated with scores on these scales.

RESULTS

Of the 121 eligible participants, 117 were recruited and included in the final data analyses ($n = 4$ excluded due to incomplete data). Study duration was 12 months: November 2018 to December 2019. Meantime since disaster-related injury was 2.3 years (SD: 3.2; range: 1 month to 17 years). Mean age of the participants was 35 years (SD: 10.9; range: 18–72 years), and all were male, members of the Pakistani Armed Forces, and had received inpatient and/or outpatient rehabilitation at the AFIRM postdisasters. The majority had SCI ($n = 62$; 53.0%), followed by limb amputation ($n = 44$; 37.6%), TBI (graded as mild, moderate, or severe, based on structural imaging, initial level of consciousness, Glasgow coma scale, and duration of posttraumatic amnesia)^[9] ($n = 5$; 4.3%), fractures ($n = 4$; 3.4%), PNI ($n = 1$; 0.9%), or others ($n = 1$; 0.9%) [Table 1]. From a TBI

perspective, participants who were still requiring outpatient rehabilitation follow-up were those with moderate-to-severe TBI. Participants with mild TBI tend to recover within 3–6 months following the injury; therefore, these cohorts of patients were not captured in the study.

Injuries were sustained by participants (as military staff) involved in various disaster relief-related activities [Figure 1]. These included mine blasts ($n = 36$; 31.0%), operational motor vehicle accidents ($n = 33$; 28.5%), falls ($n = 20$; 17.2%), firearms ($n = 18$; 15.5%), and/or impact from heavy objects ($n = 5$; 4.3%). Four events were unspecified accidents that occurred during disaster relief activities ($n = 4$; 3.4%).

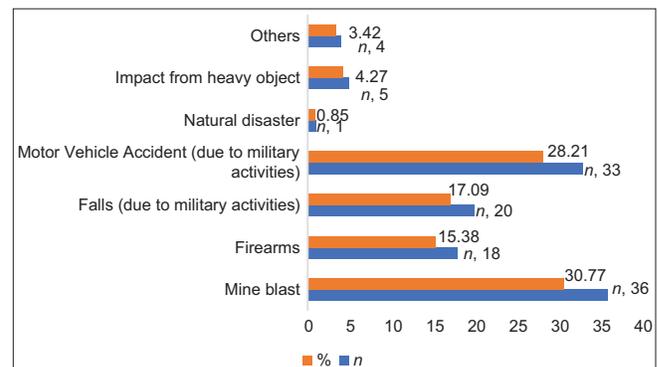


Figure 1: Disaster-related events resulting in primary injuries sustained by participants ($n = 117$) ($n =$ total number; % = percentage)

Table 1: Demographics at the time of assessment ($n = 117$)

Characteristics	Unless stated otherwise, n (%)
Age, years (mean±SD, range)	35±10.9, 18-72
Male	117 (100)
Injury details	
SCI	62 (53.0)
Amputation	44 (37.6)
TBI	5 (4.3)
Fracture	4 (3.4)
PNI	1 (0.9)
Others	1 (0.85)
Time since injury	
<12 months	62 (54.7)
12 months or more	53 (45.3)
4 years or more	25 (21.4)
Carer support required	93 (79.5)
Occupation	
Employed (full-time/part-time/contract)	85 (80.3)
Unemployed	17 (14.5)
Student	4 (3.42)
Retired	9 (7.7)
Not in labor force	2 (1.7)
Home service/s (e.g., personal/domestic assistance)	73 (62.4)

n: Total number, SD: Standard deviation, SCI: Spinal cord injury, TBI: Traumatic brain injury, PNI: Peripheral nerve injury

At the time of assessment, just over half of the participants ($n = 64$; 54.7%) sustained an injury in the previous 12 months. The time since injury was more than 12 months for 53 participants (45.3%) and more than 4 years for 25 participants (21.4%), with one participant being 17 years postinjury [Table 1].

Following acute management, 97 participants received inpatient rehabilitation (82.9%), 104 (88.9%) were discharged home following hospital stay, and 13 (11.1%) to alternative accommodation (different residence from previous).

Medical comorbidities and current medical issues

The majority of the participants (91%) had no medical comorbidities before the injury sustained during a disaster.

Table 2: Neurological and trauma impairments of participants ($n=117$)

Impairments	Score
Total NIS-Trauma score (mean±SD, range)	15.10±9.4, 0-41
NIS (mean±SD, range)	9.35±6.74, 0-26
Trauma Impairment Scale (mean±SD, range)	5.75±3.56, 0-15
Total motor score (mean±SD, range)	5.18±4.05, 0-20
Motor function, n (%)	100 (85.47)
Tone/range, n (%)	51 (43.59)
Sensation, n (%)	60 (51.28)
Perceptual function, n (%)	6 (5.13)
Speech and language, n (%)	3 (2.56)
Cognition, n (%)	3 (2.56)
Behavior, n (%)	19 (16.23)
Mood, n (%)	38 (32.48)
Seeing and vision, n (%)	4 (3.42)
Hearing, n (%)	2 (1.71)
Pain, n (%)	59 (50.43)
Fatigue, n (%)	64 (54.70)
Seizures, n (%)	1 (0.85)
Bladder dysfunction, n (%)	56 (47.86)
Bowel dysfunction, n (%)	53 (45.30)
Skin integrity, n (%)	23 (19.66)
Nutritional status, n (%)	9 (7.69)
Substance abuse, n (%)	16 (13.68)
Fracture, n (%)	
Left upper limb	2 (1.71)
Right upper limb	3 (2.56)
Left lower limb	9 (7.69)
Right lower limb	2 (1.71)
Pelvis	0
Spine	56 (47.83)
Skull/facial	5 (4.27)
Ribs	5 (4.27)
Limb loss, n (%)	44 (37.61)
Vascular, n (%)	4 (3.41)
Chest/abdomen, n (%)	3 (2.56)
Comorbid conditions, n (%)	7 (5.98)
Others, n (%)	1 (0.85)

n : Total number, NIS: Neurological Impairment Scale, SD: Standard deviation

At the time of assessment, 89 (76%) participants reported no active medical issues [Figure 2].

Premorbid and current level of function

Most participants resided with family ($n = 116$, 99.2%). At assessment, 93 (79.5%) were independent with mobility with/without aids and 34 (29.1%) with ADLs. Most, 73 (62.4%), required carers' assistance for ADLs. Many had not returned to driving ($n = 104$, 89%), 85 (80.3%) were on some form of alternate employment (e.g., part-time, full-time, contract), 17 (14.5%) were unemployed, 4 (3.4%) were students, and 9 (7.6%) were retirees [Table 1].

Neurological impairments

Overall mean total NIS-Trauma score was 15.10 (range 0–41; SD: 9.40), which reflected relatively mild focal impairments [Table 2]. However, many reported various difficulties, including motor issues (85.59%), fatigue (54.70%), sensory dysfunction (51.28%), pain (50.43%), bladder (47.86%) and/or bowel (45.30%) problem, muscle tone/range of movement (43.59%), limb loss (37.61%), and mood dysfunction (32.48%)

Current level of community participation and psychological well-being

Participants reported good adjustment to community living after sustaining disability postdisaster (CIM total mean = 37.52; total range = 12–50) [Table 3]. However, scores for the composite CIQ, total score (mean = 8.50; range = 0–24), home integration (mean = 1.29; range = 0–5), social integration (mean = 4.84; range = 0–12), and productivity (mean = 2.38; range = 0–7), reflected the negative impact of disability on participant home and social roles and community integration. Participants reported problems with moving around (mean item score = 8.85), employment (mean item score = 7.25), walking (mean item score = 6.32), carrying out daily activities (mean item score = 5.74),

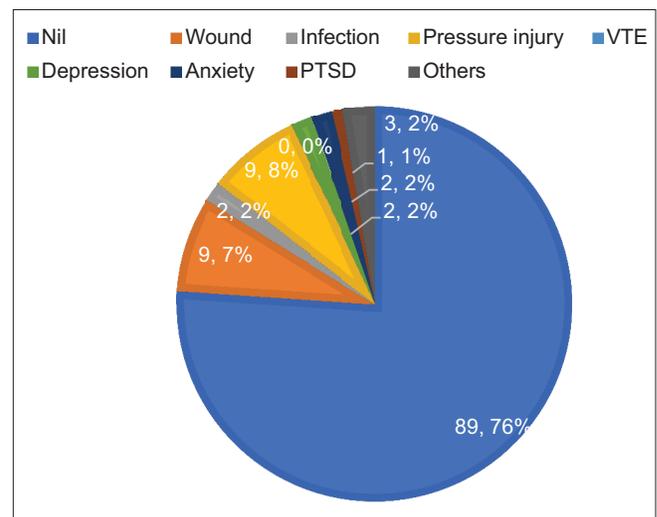


Figure 2: Current medical issues experienced by participants ($n =$ total number; % = percentage)

Table 3: Descriptive statistics for measurement scales (n=117)

Scales (range)	Score (mean±SD)
CIM total (12-50)	37.52±9.83
CIQ Total (0-24)	8.50±6.12
Home (0-5)	1.29±1.43
Social (0-12)	4.84±3.29
Productivity (0-7)	2.38±2.31
EQ-5D-5L	
Mobility (1-5)	3.47±1.66
Self-care (1-5)	2.98±1.47
Usual activities (1-5)	3.09±1.51
Pain/discomfort (1-5)	2.14±1.11
Anxiety/depression (1-5)	2.05±1.15
Health status (0-100)	61.19±26.66

CIM: Community Integration Measure, CIQ: Community Integration Questionnaire, EQ-5D-5L: EuroQol 5-Dimension 5-Level instrument, SD: Standard deviation

energy/drive (mean item score = 5.05), and fewer problems with pain (mean item score = 3.38) or emotions (mean item score = 3.32) [Table 4].

Pearson correlation was used to explore the relationship between disaster-related impairments (NIS-Trauma scores) and community reintegration (CIM and CIQ). There was a medium, negative correlation between the two variables (NIS-Trauma and CIM: $r = -0.46$, $n = 117$, $P < 0.001$, NIS-Trauma and CIQ: $r = -0.51$, $n = 117$, $P < 0.001$), with high levels of impairment associated with poorer community reintegration. The relationship between time since injury (in years) and impairments (NIS-Trauma), community reintegration (CIM and CIQ), and QoL (EuroQol) was investigated using Spearman's rho correlation coefficient. There was a small, negative correlation between time since injury and impairments ($\rho = -0.27$, $n = 117$, $P = 0.003$) and a positive correlation between time since injury and community re-integration (event duration vs. CIM: $\rho = 0.21$, $n = 117$, $P = 0.025$, time since injury vs. CIQ: $\rho = 0.48$, $n = 117$, $P < 0.001$), with longer time since injury associated with fewer impairments and improved community reintegration. The findings also showed that the longer the time since injury, the better the participants' perceived health status, $\rho = 0.31$, $n = 117$, $P = 0.001$.

DISCUSSION

This study evaluated the disability, functional outcomes, and community reintegration status of community-based disaster survivors in Pakistan. To our knowledge, this is the first study to evaluate longer-term outcomes of those with physical injuries (up to 17 years postinjury/event), sustained in disasters. The participants were members of the Pakistani Armed Forces, who were among the first responders in disasters. The military provides life-long free medical/rehabilitation care to all injured soldiers (and their families). At the time of follow-up, although most participants (80%) were independent

Table 4: Distribution of response options using the International Classification of Functioning, Disability, and Health Generic Set and mean item score at assessment (n=117)

ICF item	0, n (%)	1, n (%)	2, n (%)	3, n (%)	4, n (%)	5, n (%)	6, n (%)	7, n (%)	8, n (%)	9, n (%)	10, n (%)	Mean (severity)
Energy and drive functions	23 (19.49)	6 (5.08)	11 (9.32)	6 (5.08)	8 (6.78)	11 (9.32)	6 (5.08)	4 (3.39)	9 (7.63)	8 (6.78)	25 (21.18)	5.05
Emotional functions	38 (32.20)	12 (10.17)	7 (5.93)	6 (5.08)	11 (9.32)	14 (11.86)	6 (5.08)	6 (5.08)	7 (5.93)	4 (3.39)	6 (5.08)	3.32
Sensation of pain	43 (36.44)	6 (5.08)	5 (4.24)	4 (3.39)	7 (5.93)	18 (15.25)	7 (5.93)	14 (11.86)	8 (6.78)	4 (3.39)	1 (0.85)	3.38
Carrying out daily routine	20 (16.95)	11 (9.32)	3 (2.54)	8 (6.78)	3 (2.54)	9 (7.63)	6 (5.08)	3 (2.54)	6 (5.08)	11 (9.32)	37 (31.36)	5.74
Walking	26 (22.03)	10 (8.47)	3 (2.54)	1 (0.85)	1 (0.85)	2 (1.69)	4 (3.39)	2 (1.69)	5 (4.24)	2 (1.69)	61 (51.69)	6.32
Moving around	7 (5.93)	2 (1.69)	1 (0.85)	1 (0.85)	0	2 (1.69)	1 (0.85)	3 (2.54)	3 (2.54)	2 (1.69)	95 (80.51)	8.85
Remunerative employment	17 (14.41)	7 (5.93)	5 (4.24)	3 (2.54)	1 (0.85)	6 (5.08)	2 (1.69)	3 (2.54)	5 (4.24)	5 (4.24)	62 (52.54)	7.25

ICF: International classification of functioning, disability and health, n: Total number

with mobility (with or without aids), many (62%) still required carers for ADLs. Participants also reported ongoing problems in moving around, walking, and performing ADLs, remunerative employment, and energy/drive. Persons with ongoing rehabilitation review (>5 years) included those with SCI and amputations, who required longer-term follow-up to prevent complications (pressure injury, bowel/bladder complications, and prosthetic prescription). As expected, the severity of impairments had a negative impact on community reintegration. Further, the longer the time since the injury, the better the perceived health status and community reintegration.

There are very few studies reporting the outcomes of physical injuries sustained in disaster settings, whether among community survivors or first responders. Previous studies on the 2008 Sichuan earthquake of fracture and amputee survivors evaluated outcomes up to 27 months and 4 years, respectively.^[16,17] Findings from Li *et al.* suggested that although functional outcomes in amputees improved over time, the QoL and life satisfaction did not change.^[17] Zhang *et al.* followed up trauma fracture victims of the 2008 Sichuan earthquake and demonstrated that physical rehabilitation improved ADLs and life satisfaction 27 months post-Sichuan earthquake.^[16] These findings are not comparable to our study as the study cohort and follow-up period were different. Consistent with both Sichuan studies, the current study participants reported improved functional outcomes over time, as well as their perceived QoL. This could be attributed to a longer recovery time frame (up to 17 years compared to 4 years in the Chinese survivors), regular follow-up, and supportive mechanism from the military, resulting in better community adaptation postdisaster.

A retrospective study by Gray *et al.* in the US evaluated longer-term functional outcomes of rehabilitation in veterans with multitrauma or TBI sustained in combat or noncombat situations and reported significant functional gain on discharge from hospital, with improvements maintained at 3 months and 8 years postdischarge.^[18] At the 8-year follow-up, >50% were employed/receiving education, and 100% were living in a noninstitutionalized setting.^[18] The positive outcomes and community reintegration of participants were likely attributed to the supportive healthcare system provided for veterans in the US. In comparison to the current study in Pakistan, the US study participants were mainly TBI survivors. In Pakistan, the military provides comprehensive free life-long care to injured soldiers and their families; therefore, a better functional outcome could be expected for them compared to the general civilian population.

Most published studies of community or first-responder survivors of natural disasters and accidents, e.g., Scandinavian Star Ferry disaster, Enschede fireworks disaster 2000, Hurricanes Katrina and Rita 2005, Great East Japan Earthquake 2011, Super Typhoon Haiyan 2013, floods in Kashmir 2014, and Nepal earthquake 2015, have focused mainly on psychological outcomes.^[26-32] All studies report adverse

mental health outcomes, which may be exacerbated by other disaster-related stressors, such as financial instability, physical injury, and perceived life threat.^[30]

Older survivors' spirituality and attitude were significant predictors of their ability to cope after Typhoon Haiyan and access to medical and psychological support were found to be important for first responders' continued health after Hurricanes Katrina and Rita.^[33,34] A study by Feder *et al.* (2013) evaluated 200 earthquake victims in Northwestern Pakistan demonstrated that positive religious coping skills accounted for lower levels of posttraumatic stress symptoms, anxiety, and depression among a diverse population.^[35] A systematic review by Smith-MacDonald *et al.* included 43 studies of low-moderate quality examined the relationship between spirituality and mental well-being in postdeployment veterans, mainly from the US. The results showed that spirituality had a favorable effect on PTSD, depression/anxiety, anger/aggression, suicide risk, and QoL in veterans.^[36] Pakistan is a religious country, where 97% of the population is Muslim. It has been suggested that the daily routine of Islamic religious practice may assist in recovery from trauma-related mental health problems.^[37] This could explain why negative emotional or psychological impact of injury was not prominent in this study sample.

Social support mechanisms are reported to be vital for the well-being of disaster victims.^[26] A study by Thoresen *et al.* showed that 26 years after the Scandinavian Star Ferry disaster, survivors showed markedly elevated anxiety and depression levels and reduced perceived social support, which may result in negative changes in the individual's social skills or network.^[26] In contrast to these findings, the current study showed that perceived health status and community reintegration improved over time. This may be related to recovery not only from the injury itself and access to medical care but also be due to extensive support provided by the military in terms of vocational retraining and community/family supports, resulting in better adaptation to disability enhancing successful community reintegration.

This study has some limitations. First, the study cohort included only members of the Pakistani Armed Forces who received rehabilitation follow-up at the AFIRM, which limits the generalizability and validity of these findings to the general civilian population. The study cohort treated at AFIRM, the tertiary military rehabilitation center, represents the wider population of the armed forces disaster survivors in Pakistan. We acknowledge that the civilian disaster-related injuries were not included in this study, as data collection systems/registries in general government hospitals are in development. Second, as expected, the time since injury was wide due to the inclusion of all consecutive disaster victims from the follow-up clinic. Reporting bias was minimized by extracting the disaster- and injury-related data from the medical records. Further, all questions were limited to the participant's current situations and issues. Many other important outcomes (e.g., caregiver stress/burden, financial

implications, psychological issues, and risk of substance abuse) were not explored. This was beyond the scope of this study. Further, participants with worse outcomes may have had more difficulties responding to the questionnaire; however, the outcome measures used were broad and expansive.

Advances in disaster management and medical technologies have shifted longer-term rehabilitation management to ambulatory and community setting.^[38] Understanding the impact of disaster-related disability in the longer term is crucial, especially in countries where rehabilitation services are not well developed. Any rehabilitation program aims to minimize disability and successful community reintegration of survivors.^[39] Therefore, regular and longer-term evaluation of the disaster survivors' disabilities is crucial. These findings provide insight into strategies required to fulfill healthcare and other unmet needs of disaster survivors and to assist future disaster-related healthcare planning, service delivery, and health policy development. Future research studies should be extended to those with other health conditions and to include the pediatric population and women, in coordination with government hospitals and different healthcare organizations. The ICF Generic Set has been shown to be generally applicable in assessing functioning across health conditions and contexts and because it is freely available, it may be particularly useful in low-resource countries.^[40]

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Conflicts of interest

There are no conflicts of interest.

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APPENDIX

Appendix 1

Project Title: Longer-term outcome of survivors following natural disasters: A community survey

Location: Armed forces Institute of Medical Rehabilitation, Rawalpindi, Pakistan

Community Rehabilitation Data Collection Instrument for Disaster Settings

Please answer the following questions or circle the best response or answer if appropriate.

Date of Assessment: ____ / ____ / ____

Patient Details

Study identification number			
Initial		Age	
Gender	Male/female	Contact number	
Address			
e-mail			
Major diagnosis	Traumatic brain injury Mild/Moderate/Severe Open/Closed injury Burns Location: Superficial partial/Deep partial/Full thickness Others (<i>Please specify</i>):	Spinal cord injury Level: Complete/Incomplete Amputation Level	Fracture/Multitrauma Open/Closed injury Location Peripheral nerve injury/Crush injury
History of presenting complaint	Description of event: Date of event: Name of treating hospital (acute): Date of hospital admission: / / to / / Inpatient rehabilitation: Yes/No If yes, please specify name of rehabilitation hospital: Date of rehab inpatient admission: / / to / /s Number of episodes of community rehabilitation: Discharged destination:		
Surgical history (include date and episode/s)			
Current medications	Medication: Yes/No If yes, please specify: Analgesia/Antibiotics/Anticoagulants/Antihypertensive/Antidepressants/Antipsychotics/Oral hypoglycemic agents/ Others (<i>please specify</i>):		
Substance use	Substance use: Yes/No If yes, please specify: Alcohol (current OR past)/nicotine (smoking) (current OR past)/illicit drugs (current OR past) Others (<i>Please specify</i>):		
Current medical issues	Wound/Infection/Pressure injury/Venous thromboembolism/Depression/Anxiety/Posttraumatic stress disorder Other (<i>Please specify</i>):		
Comorbidities	Hypertension/Ischemic heart disease/Chronic obstructive pulmonary disease/Asthma/Mental health condition/ Diabetes, if yes, please specify blood sugar level:		
Social history	Lives with: Alone/Partner/Children/Parents/Friends Current accommodation: Private residence/Residential Aged Care Facility (nursing home)/Supported residential service (community group home)/Homeless Others (<i>Please specify</i>): Home set-up: Single-story house/Double-story house/Apartment/Elevator access/Steps OR Flight of stairs/Shower recess/ Shower over bath/Toilet - outside OR inside Others (<i>Please specify</i>): Premorbid mobility: Independent/Assistance required/Mobility devices Premorbid ADLs: Independent/assistance required/mobility devices Carer required: Yes/no		

Contd...

Contd...

Functional status	Occupation: Employed/Unemployed/Retired/Student/Not in labor force/Self employed Profession: Education: None/Primary/Secondary/Tertiary Driving Yes/No Services required? Yes/No If yes, please specify: Mobility: Independent/Assistance required/Mobility devices ADLs: Independent/Assistance required/Assistive devices Cognition: Intact/impaired, please specify:
Current rehabilitation intervention	Medical/Nursing/Physiotherapy/Occupational therapy/Social work/Speech therapy/Dietetics/Clinical psychology/ Neuropsychology/leisure Others (<i>please specify</i>):
Does the patient require any further rehabilitation intervention or services?	Yes/No If yes, please specify:
Referral required?	Yes/No If yes, please specify:
Review required	Yes/No If yes, please specify:

Details of Assessor:

Name: _____

Qualification: _____

Signature: _____