

Impairment and Functional Status of People with Disabilities Following Nepal Earthquake 2015

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ABSTRACT

Background

An earthquake of 7.8 magnitude with an epicenter at Gorkha on 25th April 2015 and a second earthquake of 6.5 magnitude with an epicenter at Sindhupalchowk on 12th May 2015 struck Nepal, killing more than 8,500 people and injuring over 18,500 individuals, and leading to various forms of disabilities.

Objective

To investigate the impairments and functional status of the earthquake victims through a survey.

Method

A survey was carried out in the catchment area of Bahuneapati and Manekharka outreach centers of Sindhupalchowk district and Gaurishankar outreach center of Dolakha district of Dhulikhel Hospital. These were some of the most earthquake affected areas. Physical disability was identified using a disability survey form given by the Ministry of Women, Children and Social Welfare, Government of Nepal. World health organization disability assessment schedule (WHODAS 2.0) was used to identify the level of disability.

Result

Twenty-nine persons with disability (PWD) at Bahuneapati, four PWD at Manekharka and two PWD at Gaurishankar and their catchment areas were identified. Level of disability was an average of 56%, with the majority of survivors having upper extremities fractures (27.6%), followed by lower extremities fractures (17.2%) and miscellaneous injury (17.2%). A few spinal cord injuries and head injuries were also identified.

Conclusion

The level of disability among the injured people was high. Therefore, an urgent need of physiotherapy rehabilitation is warranted to improve the quality of life of the earthquake victims.

KEY WORDS

Community, Disability, Nepal earthquake, Rehabilitation

INTRODUCTION

A natural disaster like earthquake is not only the cause of significant loss of life but also a source of mental, emotional and physical disabilities.^{1,2} Earthquake was the second leading cause of disability in Haiti and the most important cause of disability in earthquake-prone countries.³

An earthquake of magnitude 7.8, followed by another of magnitude 6.5, struck Nepal in April-May 2015, killing more than 8,500 people and injuring 18,500 others.⁴⁻⁷ According to the available sources, majority of injuries were fractures (70%), followed by spinal cord injuries (6%), head injuries (2%) and multiple injuries.¹ The ratio of injury to death was reported very high.⁵⁻⁸ This was consistent with the evidence from previous earthquakes in Iran-2003, Pakistan-2005, China-2008 and Haiti-2010.^{2,9-11}

Though the number of various disabilities has been reported in the literature, the exact levels of disability, impairment and functional status of the victims of Nepal-earthquake 2015 were not investigated.¹ To design a rehabilitation protocol, to determine the number of human resources required and analyze the economical aspect, detailed disability information on the earthquake victims is required. Without knowledge of the exact disability status of the injured people, rehabilitation can be neither appropriate nor effective. Therefore, this study focuses on investigating the disability status in terms of impairment and functional level of the earthquake victims a year after the earthquake.

METHODS

Dhulikhel Hospital is the only community hospital to connect most of the major earthquake-affected areas to the east of Kathmandu. The study was carried out through the earthquake-affected outreach centers of this hospital. A cross-sectional survey was carried out for six weeks one year after the earthquake, covering the catchment areas of Bahunepati and Manekharka of Sindhupalchowk district and Gaurishanker outreach center and its catchment area of Dolakha district. An ethical approval was obtained from the institutional review committee of Kathmandu University School of Medical Sciences. A written informed consent was obtained from the participants at the beginning of the study.

Initially, a local leader and/or a health worker were contacted to find out individuals with disability. Snowball sampling was performed, with existing study participants identifying future participants from among their acquaintances. Individuals with physical disabilities caused by the earthquake and who required rehabilitation were surveyed. People having difficulty understanding and communicating, individuals having complications due to co-morbidities, and people with disability prior to the earthquake were excluded from the survey. Three groups

of six Physiotherapy interns (two in each center) were trained for collecting data. Each group surveyed its area for two weeks.

Physical disability was identified using a disability survey form developed by Nepal Government, Ministry of Women, Children and Social Welfare. This form identifies persons with disability, and collects data on the causes of disability, rehabilitation facilities they are obtaining, and individual characteristics (e.g., education level), etc. After physical disability identification, a World Health Organization disability assessment schedule (WHODAS 2.0) was used to identify the level of disability. Permission for the use of WHODAS 2.0 was obtained from the World Health Organization for the study. WHODAS 2.0 has six domains with 12 items of functional activity. The total score of the scale is 60. For all six domains, WHODAS 2.0 provides a profile and a summary measure of functioning and disability that are reliable and applicable across cultures, in all adult populations. Its use in clinical, community and general population through either self-administration or interview has been established.¹² This tool is short, easy to administer and feasible to be applied in a community setting. WHODAS 2.0 has excellent psychometric properties. The overall, domain-level and item-level intra-rater reliability has been found to be 0.98, 0.93 to 0.96 and 0.69 to 0.89, respectively. The internal consistency measured using item-total correlation has been established as 0.59-0.94, which ranges between acceptable to very good.¹³ There is evidence that the WHODAS 2.0 content measures disability as defined by the International classification of functioning and shows good face validity.¹³ The concurrent validity has been established showing good correlations with the functional independent measures (FIM), World Health Organization Quality of Life measures (WHOQOL), the Medical Outcomes Study's 36-item Health Survey (SF-36) in different countries and populations.

The data has been analyzed using SPSS 19.00 version. The scoring, summing up and analysis have been done as per WHODAS-2 guidelines (simple scoring). The descriptive statistics have been analyzed for the overall sample as well as separately with respect to surveyed centers and injury type.

RESULTS

The survey data from three different areas Bahunepati, Manekharka and Gaurishankar have been analyzed separately. A total of 101, 72 and 26 persons with disabilities (PWD) were screened from Bahunepati, Manekharka and Gaurishankar, respectively. In total, 29 PWD at Bahunepati and its catchment area, four PWD at Manekharka and its catchment area and two PWD at Gaurishankar and its catchment area have been identified in the survey. The largest number of PWD has been found at the Bahunepati center. Thus, detailed analysis with respect to disability

percentage, injury type and WHODAS score has been done only for the data obtained from the Bahunepati center. Among the screened population from Bahunepati and its catchment area, disability due to earthquake is found to be 0.06%.

I. The disability analysis: Bahunepati and its catchment area

The disability percentage has been calculated as per the WHODAS 2.0 simple scoring guidelines. As mentioned in the table 1, the disability percentage ranged between 27% to 85% (average 56%). About 54% of the victims showed a disability percentage lower than that of the average. About 65% of the victims were males and their age was in the range of 9 to 70 years. The age range among the females was between 25 to 80 years.

Table 1. The disability percentage and level of disability

Code	Age/Gender	Total WHODAS score	Level of disability
B601	60/M	32.00	53%
B252	25/F	30.00	50%
B383	38/F	35.00	58%
B354	35/M	19.00	32%
B565	56/F	47.00	78%
B466	46/F	22.00	37%
B607	60/M	36.00	60%
B158	15/M	43.00	72%
B599	59/M	30.00	50%
B3210	32/M	23.00	38%
B4111	41/M	16.00	27%
B2212	22/M	33.00	55%
B4013	40/F	40.00	67%
B6214	62/M	42.00	70%
B6015	60/M	46.00	77%
B7016	70/M	27.00	45%
B8017	80/F	31.00	52%
B5012	50/M	33.00	55%
B6019	60/F	20.00	33%
B5520	55/F	34.00	57%
B6221	62/M	21.00	35%
B6522	65/F	39.00	65%
B7023	70/M	27.00	45%
B6724	67/F	51.00	85%
B925	9/M	35.00	58%
B3026	30/M	49.00	82%
B6527	65/M	26.00	43%
B5828	58/M	47.00	78%
Average		33.36	56%

Frequency analysis

The valid percentage as shown in the table 2 indicates that highest percentage (27.6%) of the survivors had UE injury

Table 2. The frequency and valid percentage of different injuries

Injury Type	Frequency	Percent	Valid Percent	Cumulative Percent
Head Injury	3	10.3	10.3	13.8
Lower Extremity (LE) Injury	5	17.2	17.2	31.0
Miscellaneous Injury	5	17.2	17.2	48.3
Multiple Injury	4	13.8	13.8	62.1
Spine/Spinal cord Injury	3	10.3	10.3	72.4
Upper Extremity (UE) Injury	8	27.6	27.6	100.0
Total	29	100.0	100.0	

followed by LE injury and miscellaneous injury. Multiple injuries and spine or spinal cord injuries were also seen in significant percentage as shown in table 2.

As shown in the frequency counts chart (fig 1), upper extremity injured victims were large in numbers, followed by lower extremity and miscellaneous injuries.

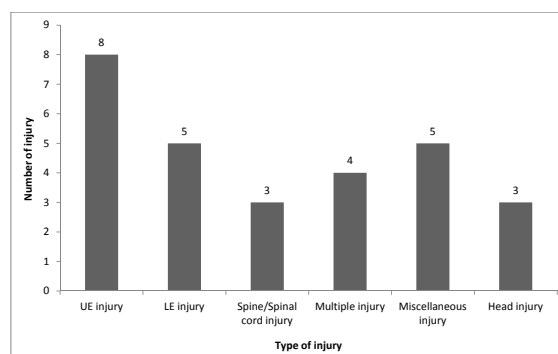


Figure 1. Frequency counts

II. Level of disability: At Bahunepati and its catchment area

The overall WHODAS 2.0 showed that the disability score was relatively low (mean score 33.36). The lower value of the standard deviation indicated that almost all victims belong to a similar level of disability. Clients with head injuries demonstrated a higher WHODAS score, i.e., 38.67 (between 32 and 49), followed by multiple injuries, i.e., 36 (between 21 and 46), and miscellaneous injuries, i.e., 36 (between 19 and 47). Higher WHODAS indicates lower functioning level, i.e, a higher disability level. Though the head injury victims were less in number, their disability level was found higher in this study. Among injury types, multiple injured victims had a varied level of functional level (standard deviation 11.15), followed by victims having upper extremity injuries (standard deviation 10.92).

III. Disability Analysis at Manekharka, Gaurishankar and their catchment areas

Very small numbers of victims were found in Manekharka (4) and Garishankar (2) centers. The percentage disability was in a low range (35-67%). Females were higher in

Table 3. The WHODAS 2.0 score for different injuries

Injuries	N	WHODAS Score			
		Minimum	Maximum	Mean	Std. Deviation
Head injuries	3	32	49	38.67	9.07
UE injuries	8	16	51	30.00	10.92
LE injuries	5	23	47	30.80	9.39
Spine/spinal cord injuries	3	26	42	32.67	8.33
Multiple injuries	4	21	46	36.50	11.15
Miscellaneous injuries	5	19	47	36.00	10.44
Total	28	16.00	51.00	33.36	9.78

Note: Miscellaneous injury consisted of rib #, clavicle #, and other injuries that are not specified during data collection.

number compared to males. All victims surveyed from these two centers had extremity injuries (UE = 4, LE =2). Since they acquired just extremity injuries, the disability percentage was relatively low. As the number of victims in those two centers was relatively low, we decided not to analyze the WHODAS score further.

DISCUSSION

The number of earthquake victims and disability percentage were relatively less in the Manekharka, Gaurishankar and Bahunepati. The reasons behind this might be: a) People with severe level of injuries were receiving institution-based treatment in different organizations in and around the capital city, b) Victims with minor injuries had regained their functions, c) A large number of victims might have migrated to other areas due to frequent aftershocks that occurred even during the study period, d) The sampling technique we adapted could not capture all the victims living in different parts of the district.

In this study, injured males were more than females, aged mostly above 60 years. According to Nepal Government, Ministry of Labor and Employment, the number of Nepali workers migrating to Middle-East countries is increasing every day, with the workers from Sindhupalchowk district topping the list.¹⁵ The majority of migrant workers are aged 20-30 years.¹⁶ With young people migrating for jobs to other countries, most households in rural Nepal are left with kids and the elderly. This might be one of the reasons why people above 60 years of age were affected most by the 2015 earthquake in Sindhupalchowk. Furthermore, it is well documented that disaster-related death rates among females are higher than those among males; this may be one of the reasons why more males remain disabled post disaster.¹⁷ Risk of injury also depends on what the people were doing, and where, at the time of earthquake.¹⁷ Nepal earthquake 2015 first struck at 12:56 pm, when most of the males were working in the fields while females were working at home. Hence, females at home were killed

Table 4. Affected part, number and level of disability

Code	Age/Sex	Affected area	WHODAS score	Level of disability
Manekharka				
M501	50/F	Right Humerus [#]	27	56%
M422	42/M	Right hand [#]	40	45%
M253	25/F	B/L leg [#]	40	67%
M374	37/F	Left elbow [#]	14	67%
Gaurishankar outreach center				
D241	24/F	Right arm [#]	21	35%
D242	24/M	Left leg [#]	21	35%

after the houses collapsed, whereas males in the fields might have just sustained injuries. This might be one of the reasons for the higher rate of disability among males.

A higher number of people sustaining fractures were documented in this study, which is similar to the injury profiles of victims of the Lushan earthquake with fracture (41.5%) as the most frequent injury.¹⁸ A study carried out by Michel D. Landry on Nepal earthquake 2015 had documented that fracture was the most prevalent case among the victims.¹ It was also reported that more than 50% of the victims in the Bam earthquake had fractures.¹⁹ The pattern of injuries among the victims of the Bam earthquake and the incidence of fractures among the patients treated in 14 hospitals after the Wenchuan earthquake was almost half the total number of injuries, i.e., 1,011 out of 2,148 patients.^{19,20}

This survey also revealed that the individuals who were disabled before the earthquake got other new disabilities because they might be have unable to remain in a safe area during or immediately after the earthquake and aftershocks. Therefore, individuals with a stroke or previous head injuries had other physical injuries too following earthquake.

Snowball sampling might be the limitation in catching up all the victims living in the wide geographical areas.

The outreach centers of Dhulikhel Hospital were selected as study centers on account of accessibility and cost effectiveness. Though those areas were some of most earthquake affected areas, there might be some bias in area selection.

Our study was limited to Sindhupalchowk district due to accessibility issues. We could have seen different data if we had surveyed earthquake victims in Gorkha district (the epicenter of the first earthquake).

CONCLUSION

One year after the massive earthquake, the number of people with disabilities was relatively less but the level of disability among them was high, which reflects an urgent need for physiotherapy rehabilitation to improve the quality of life of the injured.

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