

# IMPAIRMENTS & ASSOCIATE COMPLICATIONS AMONG RANA PLAZA TRAGEDY VICTIMS: AN OBSERVATION AFTER 8 MONTHS OF COLLAPSE

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## ABSTRACT

**Background:** Incidences related to industrial catastrophe is one of the concerning substance in developing countries. With rapid industrialization, these incidences consequence to either death or wounded; and the victims suffer from several complications that hinder them in life situations. **Objective:** The purpose of the study was to find out the common impairments and associated complications among the victims of the Rana Plaza Tragedy after rehabilitation and explore the factor associated with complications among them. **Methodology:** This is a quantitative cross-sectional study design. Data were collected by conveniently sampling technique. **Results:** Most of the victims were in their 2<sup>nd</sup> decade of life; female were prominent 58.8%, most of them were married 71.8% with secondary education 57.7% and were garments worker 98.8%. The main causes of injury found falling object 61.2% and fated as fracture 52.9% in different extremities. Majority of the victims undergone conservative management 83.5%; Physiotherapy was an important element of management and internal fixation placed higher 10.6% in case of surgeries along with skin grafting, bone traction and amputation. Pain was the prime complication experienced in intermittent episode 44.7% at moderate intensity 60.5%. Joint stiffness 11.8%, swelling 2.4% and scar 15.3% were associated complications. Moreover, one-third of the victims had deterioration in muscle strength 16.5% and function 22.4% which has been found significant ( $p= 0.008$ ) reverse relation with physiotherapy interventions. **Conclusion:** A comprehensive rehabilitation program along with standard medical care can minimize the impairments and associated complications in victims with workplace catastrophe in a developing country.

**Keyword:** Impairments, Complications, Rana Plaza victims, Rehabilitation, Bangladesh.

## BACKGROUND

Bangladesh is one of the exported oriented country and day by day industrialization increasing. After 1970s the growth of industries are remarkable which provides around 2.8 million workers [1, 2, 3]. Industrialization creates congestion of building that increasing rapidly. The rising number of building is hazard-prone that leads to various kind of disaster [4]. According to WHO [5] “disaster is a sudden ecological phenomenon of sufficient magnitude to require assistance” but Rana plaza is not a sudden. Rana, owner of the building known very well about the sudden cracks that had appeared in the walls and foundations but Rana declared “Go to work. The factory has already been repaired” [3, 2]. After this declaration just half an hour later within deemed the worst garments factory disaster happened in the history on the date of 24 April 2013, the eight-story building came crashing down, claimed at least 1132 lives [3, 4]. Injured were around 319 who were admitted in different hospitals and received emergency

treatment [6]. Huge number of people died because of delayed response, lack of expertise and insufficient equipment [2]. A number of patients were affected by amputation, fracture, acute stress disorder and post-traumatic stress disorder [7]. Around 65-75% women were experienced with spinal cord injury [8]. Most of the people affected by post-traumatic disorder and it may impact on individual life, families and community [9]. A huge number of patients treated by various hospital like as Enam medical college hospital, Centre for the Rehabilitation of the Paralyzed (CRP), Combined Military Hospital (CMH) and National Institute of Traumatology & Orthopedic Rehabilitation (NITOR)-Dhaka [2]. Approximately 339 workers severely injured and they had undergone major operations. Regarding to monitoring team, workers have eight types of wounds which include hand injury leg injury, traumatized, severe backbone injury, head injury, pelvic fracture, crush injury and compartmental syndrome and others. Over 50 per cent female workers ended up with almost disabled hands and legs. In other words, these workers seem to have lost their earning ability by working in the industrial sector [10]. After the catastrophe tragedy of "Rana Plaza" in Savar, the CRP took initiative for the survivors. All members of MDT worked together and provided services to survivors and MDT team including physiotherapist, doctors, nurses, occupational therapist, counselor and social worker [11]. A comprehensive rehabilitation program along with standard medical care can minimize the impairments and associated complications of rana plaza victim. This study was aimed to find out the common impairments and associated complications among the victims of the Rana plaza tragedy after rehabilitation and explore the factor associated with complications among them.

## **METHODOLOGY**

### **DATA COLLECTION PROCEDURE**

This is a quantitative cross-sectional study design where sample is being chosen as conveniently. In this study data were collected by both structured and semi structured mixed type questionnaire from November 2014 to January 2015. Bengali version of question was used for easier understanding of the participant. Consent form and additional information has been provided with the questionnaire. A face to face interview was taken. The interview created opportunity to observe the facial expression and helped to determine whether the participant understands the questions or not. The pain is measured by Numeric Pain rating scale [12] or VAS (visual analogue scale) sale, muscular strength measure by Oxford Grade Scale [13], and functional limitation measured by Functional Independence Measure (FIM) [14].

### **SETTING AND PARTICIPANTS**

Data collected from the Madhab Memorial Vocational Training Institute (VTI) at center for the rehabilitation of the paralyzed (CRP), Savar. The injured workers got rehabilitation services from CRP and have been aided to get proper training for their livelihood after the injury. VTI provides training on computer skills, bee culture, mushroom production, tailoring, readymade garments (RMG) training and electrical work which is affiliated from National technical education board of Bangladesh. Study population was primarily all victims of rana plaza tragedy but according to inclusion and exclusion criteria we select conveniently about 85 samples from 339 subjects. Inclusion criteria were all age groups and both sexes, willing to participate and have no cognitive problem and the exclusion criteria were those participants who are not willing to give consent.

### **ETHICAL CONSIDERATION:**

The researcher gave the consent form to the subject and explained them. The subjects had the rights to withdraw themselves from the research at any times. The participant will also be informed or given notice that the research result would not be harmful for them. It would be kept confidential. Every participant has the right to discuss about his or her problem with senior authority. A research proposal was submitted to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for approval. This study followed the guideline of the WHO & BMRC guidelines. The participants should be assuring that the information will be kept strictly maintained the confidentiality.

### **ANALYSIS**

Researcher used descriptive statistical analysis by using statistical package for social science (SPSS) twenty version and chi-square test. Special findings were described through, pie chart, bar graph and table.

**RESULT:**

Table-1: Socio-demographic characteristics of the respondents (n=84)

Variable	Number (n)	Percentage (%)
<b>Age (mean <math>\pm</math>SD)</b>		
26.99 $\pm$ 6.9		
16-25 years	45	52.9
26-35 years	34	40
36-45 years	5	5.9
More than 46 years	1	1.2
<b>Sex</b>		
Male	35	41.2
Female	50	58.8
<b>Marital Status</b>		
Married	61	71.8
Unmarried	24	28.2
<b>Religion</b>		
Islam	75	88.2
Hindu	9	10.6
Christian	1	1.2
<b>Education</b>		
Illiterate	7	8.2
Primary education	29	34.1
Secondary education	49	57.7
<b>Occupation</b>		
Garments worker	84	98.8
Office worker	1	1.2

Among the 85 participants were between average age 26.99 $\pm$ 6.9 years and 52.9% (n=45) participants were between 16-25 years, 40% (n=34) participants were between 26-35 years. Male were 41.2% (n=35) and female were 58.8% (n=50). 71.8% (n=61) participants were married, 28.2% (n=24) participants were unmarried, 57.7% (n=49) participants had secondary education. In occupational status 98.8% (n=84) participants were garments worker and 1.2% (n=1) participants were office worker (Table-1).

Table 2: Injury type, cause and location (n=85)

<b>Cause of injury</b>		
Variable	Frequency (n)	Percent (%)
Falling object	52	61.2
Collapsed building	29	34.1
Fall From height	4	4.7
<b>Type of injury during admission</b>		
Soft tissue injury	28	32.9
Fracture	45	52.9
Dislocation	5	5.9
Peripheral nerve injury	1	1.2
Laceration	6	7.1
<b>Location of the injury</b>		
Upper limb	18	21.2
Lower limb	28	32.9

Spine	30	35.3
Others	9	10.6

Among 85 participants **cause of injury** was approximately 61.2% (n=52) participants were injured by falling object, 34.1% (n=29) participants were injured by collapse building, and 4.7% (n=4) participants were injured by fall from height. We also found **in type of injury** 32.9% (n=28) participants had soft tissue injury, 52.9% (n=45) participants had fracture, 5.9% (n=5) participants had dislocation and 7.1% (n=6) participants had laceration. **Location of injury found** 32.9% (n=28) had lower limb injury and 35.3% (n=30) had spine injury. 21.2% (n=18) participants had upper limb injury and 10.6% (n=9) participants had others injury (Table: 2).

Table-3: Types of treatment received by injured subjects (n=85)

Types of treatment	Number (n)	Percentage (%)
Conservative	71	83.5
Medication	52	62.2
Plaster of paris	18	21.2
Wound dressing	1	1.1
Surgical	14	16.6
Skin grafting	2	2.4
Bone traction	1	1.2
Internal fixation	9	10.6
Amputation	2	2.4
<b>Physiotherapy</b>		
Yes	66	77.6
No	19	22.4
<b>Session of physiotherapy</b>		
1-2 session	5	7.6
3-4 session	19	28.8
5-6 session	22	33.3
7-8 session	16	24.2
9 or more session	4	6.1
<b>Currently on physiotherapy</b>		
Yes	30	35.3
No	55	64.7

Among the 85 participants, approximately 83.5% (n=71) received conservative management, mostly 62.2% (n=52) medication; and 16.6% (n=14) participants took surgical management. 77.6% (n=66) participants received physiotherapy treatment as a part of rehabilitation management where approximately 7.6% (n=5) participants received 1-2 sessions, 28.8% (n=19) participants received 3-4 sessions, 33.3% (n=22) participants received 5-6 sessions, 24.2% (n=16) participants received 7-8 sessions and 6.1% (n=4) participants took 9 or more sessions of physiotherapy treatment. 35.3% (n=30) participants were continuing physiotherapy after 8 months of collapse (Table: 3).

Table-4: Associate complications after treatment (n=85)

<b>Complications after treatment</b>	<b>Number(n)</b>	<b>Percentage (%)</b>
Yes	77	90.6
No	8	9.4
<b>Pain after treatment</b>		
Yes	76	89.4
No	9	10.6
<b>Type of pain</b>		
Continuous	16	21.1
Intermittent	34	44.7
Occasional	26	34.2
<b>Severity of pain (by VAS)</b>		
Mild (VAS score 1-3)	25	32.9
Moderate (VAS score 4-6)	46	60.5
Severe (VAS score 7-10)	5	6.6
<b>Swelling</b>		
Yes	2	2.4
No	83	97.6
<b>Joint stiffness after treatment</b>		
Yes	10	11.8
No	75	88.2
<b>Scar</b>		
Yes	13	15.3
No	72	84.7

Among the 85 participants 90.6% (n=77) participants had complication after treatment and 9.4% (n=8) participants had no complication after treatment. Majority 89.4% (n=76) participants complained Pain, where 21.1% (n=16) participants had continuous pain, 44.7% (n=34) participants had intermittent pain and 34.2% (n=26) participants had occasional pain. 32.9% (n=25) participants had mild pain and 60.5% (n=46) participants had moderate pain and 6.6% (n=5) participants had severe pain. 2.4% (n=2) participants had swelling in lower limb. Joint stiffness was 11.8% (n=10) and 15.3% (n=13) had scar (Table: 4).

Table- 5: Impairments in functional activity (n=85)

	<b>Number(n)</b>	<b>Percentage (%)</b>
<b>Loss of muscle strength</b>		
Yes	14	16.5%
No	71	83.5%
<b>Loss of functional activity</b>		
Yes	19	22.4%
No	66	77.6%
<b>Mobility</b>		
Total assistance	2	10.0%

Maximal assistance	1	5.0%
Moderate assistance	2	10.0%
Minimal assistance	2	10.0%
Modified independence	13	65.0%

Among the 85 participants, 16.5% (n=14) participants had loss of muscle strength and approximately 22.4% (n=19) participants had loss of functional activity. In mobility 10% (n=2) participants were needs total assistance, 5% (n=1) participant was need maximum assistance, 10% (n=2) participants were need moderate assistance, 10% (n=2) participants were need minimal assistance, 65% (n=13) participants were modified independence (Table-4).

Table 6: Association between physiotherapy treatment & complications (n=85)

Variable	Category	Physiotherapy		Chi-Square	P value
		Yes	No		
Pain	1-3 mild	17	8	5.082	0.079
	4-6 moderate	40	6		
	7-10 severe	9	5		
Swelling	Yes	2	0	0.590	0.443
	No	64	19		
Joint stiffness after treatment	Yes	10	0	3.263	0.071
	No	56	19		
Scar	Yes	11	2	0.429	0.521
	No	55	17		
Loss of muscle strength	Yes	13	1	2.234	0.135
	No	53	18		
Functional impairments	Yes	19	0	7.044	0.008*
	No	47	19		

**\* P- value is significant**

From 85 participants total 77.64% (n=66) participants took physiotherapy. From the victims, 17 (20%) participants with mild pain, 47% (n=40) participants with moderate pain and 10.5% (n=9) participants with severe pain undergone physiotherapy service. 2.35% (n=2) participants had swelling; 75.2 (n=64) participants with no swelling, 62.3% (n=53) with loss of muscle strength and 55.2% (n=47) with loss of functional ability when received physiotherapy and we found significant association with physiotherapy (p=.008) (Table-6).

**DISCUSSION**

The idea of this study was to find out impairments and associated complications among the victims of the Rana Plaza tragedy after 8 months of collapse. This study found that the average age of the incidence of Rana Plaza tragedy was approximately 26.9 ( $\pm$  6.9) years (Table1). Similar study found in December 26, 2003 an earthquake occurred in the city of Bam in the south east of Iran and killed more than 40000 people and nearly 30000 were injured where the victims average age was 29 ( $\pm$ 11) year [15]. Our study found that female 58.8% is more affected than male 41.2% in Rana Plaza building collapse. Another study in 2008 found [16] an earthquake occurred in china where female 58% were more affected than male (42%). Our study found 52.9 % fractures, 5.9% dislocation, soft tissue injury 32.9%, 7.1% laceration occurred in Rana Plaza building collapse (Table2). Similar study [17] found in china where an earthquake affect 46% was fracture, 1% was dislocation, 14% was soft tissue injury, 8% was laceration. Our study found 21.2% participants had upper limb injury, 34% had lower limb injury, and 35.3% had spine injury (Table2). Nearly similar study found in china where after an earthquake upper limb injury was approximately 18%, lower limb injury was 30%, and spine injury was 14% [16]. In our study subject received conservative treatment 83.5% and 16.6% participants took surgical management. Among conservative treatment 62.2% took medication, 21.2% took plaster of Paris, and 1.1% took wound dressing (Table 3). A study [18] in Gujarat where maximum patient took surgical management such as wound debridement 25%, suturing 3%, skin graft 16%, internal fixation 27%, external fixation 1% and amputation 11%. Whereas conservative wound dressing 13%, pop 46% and only medication 33%. Pain was the prime complication experienced in intermittent episode 44.7% at moderate intensity 60.5%. Joint stiffness 11.8%, swelling 2.4% and scar 15.3% were associated complications (Table 4). Moreover, one-third of the victims had deterioration in muscle strength 16.5% and function 22.4% which has been found significant (p= 0.008) reverse relation with physiotherapy (Table 5 and 6). In some cases the complications are reduced after rehabilitation. Maximum functional recovery can be enhanced after

rehabilitation. Also, it is important to create awareness and training for industrial workers and policymakers about the extent of injuries; thus the extent of damages could be minimized in shorter and longer run.

### CONCLUSIONS

A massive disaster can occur any time and not necessarily need natural calamities. The study revealed a glimpse of suffering to a part of thousand wounded victims of Rana plaza tragedy. There is a massive risk of repetition of this type of disaster. The research opened an emerging necessity of rehabilitation services in disaster management; especially in rapid growing RMG sector. A larger scale follow-up study aiming to explore biopsychosocial impairments, complications and quality of life in community or factory setting can elicit more about the suffering of victims of industrial incidences in Bangladesh.

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