

## Injury Pattern among Armed Forces Personnel during Military Activities

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### Abstract

**Introduction:** Physical training and physical fitness are required to accomplish military missions. Injuries have a great impact on the health and readiness of military personnel than any other category of medical complaints.

**Objective:** To find out the common types of injuries, causes of injuries and place of occurrence among the Bangladesh Armed Forces personnel during their military activities.

**Materials and Methods:** This cross-sectional descriptive study was carried out during the period of March to June 2012. A total of 101 serving Armed Forces Personnel who were injured during military activities and received indoor treatment from orthopedic, surgery, neurosurgery and officers' ward of CMH, Dhaka were selected. Data were collected in a semi-structured questionnaire through face to face interview.

**Results:** The mean age of the study population was 31.69 ± 6.7 years and ranged from 18 to 45 years. Among the cases, 83.2% were Army personnel, 9.9% were Navy and 6.9% were from Air Force. Most of the affected cases (55.5%) belonged to fighting arms, 19.8% from support arms and 5.0% from services arms. Maximum (26.7%) cases suffered from knee injury followed by 23.8% vertebral column related injury and 11.9% lower leg injury. Maximum (40.6%) cases sustained injury in training ground followed by 29.7% in the sports ground and 6.9% in operation area.

**Conclusion:** Injury is one of the major causes of morbidity among the members of Armed Forces. Careful study and analysis on training and operational activities of Armed Forces Personnel definitely will explore new dimension to prevent and combat this preventable health burden.

**Key-words:** Injury, Morbidity, Armed Forces Personnel, Military Activity.

### Introduction

An injury is the physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. The standard definition of an 'injury' as used by WHO is "injuries are caused by acute exposure to physical agents such as mechanical energy, heat, electricity, chemicals and ionizing radiation interacting with the body in amounts or at rates that exceed the threshold of human tolerance"<sup>1</sup>. Injuries may be categorized in a number of ways, commonly used categories are road traffic injury (RTI), industrial injury, household injury, sports injury and injury due to military activities. Distributions of the pattern of combat injuries are strongly dependent on the branch of military services and how the combat is fought<sup>2</sup>. The injury may occur due to different types of military activities like military operation, exercise, different games and athletic events, physical training, physical efficiency test, assault bayonet fighting, swimming and daily routine work. Like other diseases, the epidemiology of injury also categorizes the triads of host, environment and agent. Many precipitating factors are related to an injury. The vectors, in the context of injuries, are the carriers of energy like; firearms, automobiles, sources of electricity etc.

Injuries, unintentional or intentional, constitute a major public health problem, killing more than five million people worldwide annually and causing many more cases of disability. They account for 9% of global mortality, and are a threat to health in every country of the world<sup>3</sup>. Of the 5.1 million deaths from injuries globally, more than one-fourth are estimated to occur in the south-east Asia region<sup>4</sup>. Among US military personnel, injuries cause more deaths than any other diseases<sup>5</sup>. Evaluation of physical examination board data indicates that many chronic conditions leading to disability may result from service-related injuries<sup>5</sup>. Injury due to different military activities is a major cause of morbidity and financial burden to military. Injuries in general, have a greater impact on the health and readiness of the military than any

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other category of medical complaints. They are also a primary source of crowding in the military outpatient care system and increased pressure in indoor services. But historically, the injury problem has been neglected, largely because it was viewed as accidents or random events. In Armed Forces, the injury is directly proportional to the military activities<sup>6</sup>. It also varies between fighting and services group. The fighting group in Armed Forces receives more injury in comparison to support and service group. This study was Conducted out to find out the types of injuries, causes of injuries and place of occurrence among the Bangladesh Armed Forces personnel with a view to helping commanders and military policy makers to adopt appropriate measures to prevent and reduce the physical injury as well as its consequences.

**Materials and Methods**

This descriptive type cross-sectional study was carried out in the Combined Military Hospital (CMH), Dhaka between the periods of March to June 2012. The study population was uniformed armed forces personnel who received indoor treatment in the orthopedic, surgery, neurosurgery and officers' ward of CMH, Dhaka. Injuries only attributable to military activities were included. Injuries during leave at home and injuries due to personal reasons were excluded from the study. On the basis of research design and selection criteria of the sample, a total of 101 patients were selected during study period. The study was conducted after approval of research protocol from the Commandant and concerned departmental heads of CMH, Dhaka. The purpose of the study was explained to the respondents and a verbal consent was obtained from them. Data were collected through face-to-face interview and the respondents were given liberty to answer any query. Assurance was given to the respondents about maintaining anonymity and secrecy of their response. Collected data were computed and analyzed by software SPSS 19.0. Categorical data were expressed in frequency and percentage (%) and continuous data as mean ± SD.

**Results**

Among the 101 respondents 84 (83.2%) were from Army, 10 (9.9%) from Navy and rest 7 (6.9%) from Air Force. Respondents mean ± SD age was 31.69 ± 6.7 years and ranged from 18 to 45 years. Most of the cases (55.5%) belonged to fighting arms, 19.8% from supporting arms and 5.0% from services corps. Knee injury constituted highest number 27 (26.68%), followed by injuries related to vertebral column 24 (23.80%), lower leg injury 12(11.9%) and shoulder and arm injury 9(8.91%). Amongst 27(26.7%) knee injuries, 22(21.75%) belonged to ligament injury and 3(2.96%) were meniscus injury. Amongst 24(23.8%) vertebral column

related injuries, 21(20.83%) were disc lesion, 2(1.98%) were fracture spinal processes and 1(0.99%) was lumbosacral strain. Among 12(11.9%) lower leg injuries, 10(9.91%) were fracture tibia-fibula and 2(1.99%) were other types of injuries. Among the 9(8.9%) shoulder and arm injuries, 2(1.98%) were fracture clavicle, fractured scapula, and joint dislocation for each, 3(2.97%) were other types of injuries. In the 7(6.9%) ankle injuries, 4(3.95%) were fractures and 3(2.95%) were sprains (Table-I). Maximum 41(40.6%) sustained their injury in training ground followed by sports ground 30 (29.7%) and other places 16 (15.8%) (Table II). It was found that the games were the main events of injury that occurs in 30(29.7%) followed by physical training 26(25.7%), administrative duty 24(23.8%), exercise 15(14.9%) and 6(5.9%) during operation (Table-III). Maximum (43%) injuries held during playing football followed by Basketball (30%), Volley ball (10%), Hockey (7%), Boxing, athletics and others (10%).

**Table-I:** Distribution of injuries in different parts of the body and their types (n=101)

Site of Injury	Type Injury	Frequency	%
Ankle	Sprain	3	2.95
	Fracture	4	3.95
	Total	7	6.90
Knee	Meniscus	3	2.96
	Ligament	22	21.75
	Others	2	1.97
	Total	27	26.68
Lower leg	Fracture tibia/fibula	10	9.91
	Others	2	1.99
	Total	12	11.90
Elbow	Fracture	3	2.96
	Other	1	0.99
	Total	4	3.95
Head and face	Concussion	1	0.99
	Facial injury	4	3.96
	Total	5	4.95
Shoulder and arm	Fracture clavicle	2	1.98
	Fracture Scapula	2	1.98
	Shoulder joint	2	1.98
	Others	3	2.97
	Total	9	8.91
Forearm, wrist and hand	Fracture radius/ulna	4	3.96
	Joint injury	1	0.99
	Other	5	4.95
	Total	10	9.90
Vertebral column	Lumbosacral strain	1	0.99
	Disc lesion/prolapse	21	20.83
	Fracture vertebra	2	1.98
	Total	24	23.80
Pelvis and hip	Fracture femur	3	2.97

**Table-II:** Distribution of respondents by site of injury and place of occurrence. (n=101)

Site of Injury	Place of Occurrences					Total
	Operation area	Training ground	Sports ground	Barrack/ Mess	Others places	
	F (%)	F (%)	F (%)	F (%)	F (%)	
Ankle	-	2 (4.9)	3 (10.0)	1 (14.3)	1 (6.2)	7 (6.9)
Knee	-	16 (39)	8 (26.7)	1 (14.3)	2 (12.5)	27 (26.7)
Lower leg	2 (28.6)	5 (12.2)	3 (10.0)	2 (28.6)	-	12 (11.9)
Elbow	2 (28.6)	-	1(3.3)	1(14.3)	4 (25.0)	5 (4.9)
Head and face	-	-	1 (3.3)	-	1 (6.2)	9 (8.9)
Shoulder and arm	1 (14.3)	4 (9.7)	3(10.0)	-	-	-
Forearm, wrist and hand	1(14.3)	2(4.9)	4(13.3)	-	3 (18.8)	10 (9.9)
Vertebral column	1(14.3)	11(26.8)	6(20.0)	2(28.6)	4 (25.0)	24 (23.9)
Pelvis and hip	-	1(2.4)	1(3.3)		1 (6.2)	3 (2.9)
<b>Total</b>	7 (6.9)	41(40.6)	30 (29.7)	7 (6.9)	16 (15.8)	101 (100)

\* F = Frequency

**Table-III:** Distribution of respondents by different armed forces and military activities of injury occurrence. (n=101)

Military activities	Bangladesh Armed Forces			Total
	Army	Navy	Air Force	
	F (%)	F (%)	F (%)	
Operation	3 (3.6)	2 (20.0)	1 (14.2)	6 (5.9)
Exercise	12 (14.3)	-	3 (42.8)	15 (14.8)
Games	26 (30.9)	4 (40.0)	-	30 (29.7)
Physical training	24 (28.6)	2 (20.0)	-	26 (25.8)
Admin duties	19 (22.6)	2 (20.0)	3 (42.8)	24 (23.8)
<b>Total</b>	84 (83.2)	10 (9.9)	7 (6.9)	101 (100)

\* F = Frequency

### Discussion

Injury due to different military activities is a major cause of morbidity and financial burden to military. Injuries in general, have a greater impact on the health and readiness of the military than any other category of medical complaints. They are also a primary source of crowding in the military outpatient care system and also increase pressure in indoor services. But historically, the injury problem has been neglected, largely because it was viewed as accidents or random events. In Armed Forces, the injury is directly proportional to the military activities<sup>6</sup>. It also varies between fighting and services group. The fighting group in Armed Forces received more injury in comparison to support and services group. This may be due to nature of job and tougher training of the fighting group. A study on soft tissue injury of the knee due to military activities conducted by Zaman UIC<sup>7</sup>

showed that amongst the injured cases 34% were from fighting arms, 8% from supporting arms and 4% from services arms among others. Shahidullah M<sup>8</sup> conducted a study among the serving soldiers reporting sick for knee injury at CMH Dhaka found that 70.3% knee injury belonged to the fighting group and 29.7% from support and services group. The findings of the present study are not consistent to the above study results.

A study conducted by Khan NH<sup>9</sup> at CMH Dhaka found that knee injuries were highest in number 22.8%, followed by 16.6% forearm, wrist and hand injuries, 13% foot injury, 10% shoulder and arm injury, 6.7% lower leg injury, 5.7% patella and ankle injury each, 4.1% pelvis and hip injury, 3.6% spinal injury. Amongst 41(22.8%) knee injuries, 31(16.1%) belonged to ACL and 11(5.7%) collateral ligament injuries. Amongst 32(16.6%) forearm injuries 16(8.3%) were fracture radius ulna, 9(4.7%) carpal injuries; in 25(13%) foot injuries 15(7.8%) were toe and 4(2.1%) MT; in 21(10%) shoulder injuries 11(5.7%) were fracture clavicle, 3(1.6%) dislocation; in the 11(5.7%) ankle injuries 7(3.6%) belonged to sprain and 4(2.1%) belonged to fractures. A study conducted by Hauque S<sup>10</sup> at orthopedic center in CMH Dhaka showed amongst 165 patients, 9(5.45%) had ankle, 30(18.18%) knee, 4(2.24%) vertebral columns, 55(33.34%) upper extremity, 43 (26.25%) lower extremity and other part of the body were 24(14.54%) injuries. In a study conducted by Hawlader MAR<sup>11</sup> et al on evaluation of trauma management at CMH Dhaka found that musculoskeletal injuries were 86.22%. These studies are not absolutely similar to the present study. But all these studies revealed that musculoskeletal injuries are particularly prevalent in the military population. A study conducted by Khan NH<sup>9</sup> shown that the games were the main events of injury that occurred in 53(27.5%), followed by operation/exercise 50(25.9%), physical training 28(14.5%) and administrative duty 62(32.1%) which is almost similar to this study results. A study conducted by Shahidullah M<sup>8</sup> on knee injury at CMH Dhaka, found that 91.3% knee injuries took place at training and sports ground, 61.5% of his respondents sustain injury during training activities. A study done by Khan NH<sup>9</sup> revealed that about one fourth of cases 51 (26.4%) received injury in sport ground, 49(25.4%) in operation area, 40(20.7%) in training ground, 28(14.5%) in soldier barrack/officers' mess and 20(10.4%) in other place. These results partially confer with the present study, may be due to the time of data collection period was not same and training facilities were different.

### Conclusion

Injuries are the leading health problem in the military services. Sports and physical training activities are an area in which a substantial number of injuries can occur. These injuries not only create financial burden but also have impact

on the military personnel's morale, performance and service quality for the rest of their military careers. The high incidence of injuries place a substantial burden on the medical care delivery system and leads to loss of training days. Careful study and analysis in this regard will explore new dimension to prevent and combat this preventable health burden.

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