Pattern of Orthopedic Trauma Injuries in Patients Attending Khalifa Gul Nawaz Teaching Hospital: A Retrospective Analysis

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Abstract

Objective: The present study aims to assess the pattern of orthopedic trauma injuries in patients admitted to the Orthopedic Department at Khalifa Gul Nawaz Teaching Hospital in Bannu.

Methods: This retrospective cross-sectional study was conducted at the Orthopedic & Traumatology Department of K.G.N. Hospital, KPK, from January 2016 to December 2016. Data were extracted from hospital records of 380 patients admitted for emergency orthopedic surgery due to fractures, lacerations, or both. While the patients with severe head injuries, requiring emergency neurosurgery, immediate abdominal surgery, presenting with a history of bone fractures prior to the present trauma, shifted to the intensive care unit (ICU), or expired in the emergency, were kept under exclusion criteria. The etiologies and frequencies of various orthopedic injuries as per the diagnoses were recorded using a structured questionnaire designed for the study purpose. The ethical review board of Bannu Medical College approved the study protocol. The collected data were statistically analyzed using Statistical Package for Social Sciences (SPSS) version 18.0. Qualitative data was presented using frequency and percentages while quantitative as mean and standard deviation.

Results: Out of the 380 cases admitted during the study, most were males (76.0%). Furthermore, these orthopedic trauma injuries were more common in individuals aged 21 to 50 years (66.8%) than in the other age groups. Road Traffic Accidents (RTAs) were the major etiological factor (49.2%), followed by falls from height (31.8%). Upper limb fractures were diagnosed in 46.2% of patients, and 53.6% had lower limb fractures. Isolated radius (14.4%) and femoral fractures (23.9%) were the most frequent diagnosis.

Conclusion: The present study provides a brief overview of the major etiologies and diagnoses for orthopedic emergencies. It is essential to identify the risk factors and strategize a prevention plan that should be the priority of the healthcare system to avoid morbidities and mortalities associated with orthopedic traumas.

Keywords: Traffic accidents, Accidental fall, Morbidity, Emergencies, Traumatology

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Introduction

Orthopedics is a diverse, complex medicinal field[1]; the orthopedic trauma involves injuries to the bony skeleton, including traumatic amputations, fractures, dislocations, connective tissue (sprain and strains), and soft tissue injuries (hematomas and contusions). The patients suffering from orthopedic trauma are prone to compartment syndrome, hemorrhage from fractures, osteomyelitis, septic arthritis, etc.

Orthopedic injuries can be categorized as traumatic and non-traumatic. Traumatic orthopedic injuries cause musculoskeletal system (joints, bones, tendons, ligaments, muscles, and nerves damage)[2]. The need and number of surgeries associated with orthopedic traumas have significantly increased in recent times, imposing individual disabilities, causing loss of work-days, and reduced social activities[3].

Globally, injuries associated with various kinds of trauma are considered the major cause of disab-

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ility and mortality. According to the World Health Organization (WHO), orthopedic injury is a commonly reported medical emergency acquiring attention[4]. Among these, road traffic accident (RTA) is determined as the major etiological factor; it is approximated that around 5 million people die from trauma injuries in response to road accidents[5]. In America, nearly 2.8 million people experience traumatic orthopedic injuries such as major fractures or amputations each year[6]. In Uganda, it is estimated that 50% of the injuries are due to road traffic collisions[7]. While a Kenyan study admitted 61% of victims of non-fatal road traffic crashes to the orthopedic wards in 2007[8]. A local study from Karachi-Pakistan, reports RTA as the major cause of traumatic orthopedic injuries, with a motorcycle being the most frequently involved vehicle[9]. Furthermore, studies generally show that orthopedic injuries predominantly affect younger male adults than their counterparts, with fractures being the most frequent diagnosis[10].

Despite abundance of epidemiological data on the nature of traumatic orthopedic injuries, there are only a few studies specifying the age associated effects, orthopedic injury types, and trauma etiology, especially in low and middle-income countries[9]. The situation in Pakistan is much worse, the increasing number of trauma victims due to RTA and lack of timely provision of appropriate medical care are immense challenges. Moreover, the presence of pre-hospital trauma care system in Pakistan is un-fortunate. Because of its high morbidity, complicated pathology, severe complication, poor prognosis, and high medical expense, orthopedic trauma has become a serious public health problem, specifically in Pakistan.

Clinical audits are essential for quality control, they aid in the systematic assessment and improvement of patient care. Such studies aid in highlighting disease patterns and presentation, providing baseline data for comparison with studies from other parts of the world. Therefore, this study intends to assess the pattern of traumatic injuries needing orthopedic operations attending Khalifa Gul Nawaz Teaching Hospital in Bannu.

Patients and Methods

This retrospective cross-sectional study was conducted at Department of Orthopedic and Traumatology, K.G.N. Hospital, Bannu, KPK from January 2016 to December 2016. We assessed the data of 380 patients admitted to the orthopedic ward for emergency orthopedic surgery due to fractures,lacerations and or fractures with lacerations.The records were keenly scrutinized and all the cases with severe head injuries, those requiring emergency neurosurgery, immediate abdominal surgery, those with a history of bone fractures (at least 6 months prior to the present trauma), patients transferred to the intensive care unit or died in emergency room were excluded from the study.

Ethical approval was obtained from the ethical review board of Bannu Medical College (Reference # 97/DiR&MJ/BMC/2020). The case's confidentiality was maintained, and ethical guidelines were followed. Patient's demographic and clinical data, information regarding the type of trauma,site of injury, duration, depth of the laceration,and presence of any neural or vascular injury were documented using a structured questionnaire by the researchers. Statistical analysis was performed on SPSS version 18.0. Frequency and percentages were used to present the categorical variables, while mean ± SD for all the continuous variables.

Results

During the study period, 380 patients were admitted to the study setting, and their records were studied. Among them, the male to female ratio was 3.17:1, i.e., the majority were males (76.0%). The mean age of the enrolled patients was 36.80 ± 1.56 years; most of them (66.8%) were between 21 to 50 years of age (Table 1).

The causes and frequent diagnoses observed among the patients admitted to the orthopedic ward are given in table 2. Most of these injuries were caused by road traffic accidents (RTA) (49.2%), followed by falls from height, physical assaults, rare incidences of firearm injuries, injuries related to natural disasters, animal-related burns,

and occupational injuries. In addition, 46.2% of patients had upper limb fractures and 53.6% of patients had lower limb fractures,isolated radius (14.4%), and fractures of the femur (23.9%) predominantly affected upper and lower limbs, respe-ctively.

Table 1. Patient characteristics (n=380)

Variables		N (%)
Age; years (Mean ± SD)		36.80 ± 1.56
Gender	Male	289 (76.05)
	Female	91 (23.94)
Residential area	Rural	281 (73.94)
	Urban	99 (26.05)
Age Group	0-20 years	16 (4.21)
	21-50 years	254 (66.83)
	≥ 50 years	110 (28.94)

Table 2. Etiology of trauma/injury and diagnosis at the outpatient orthopedic clinic

Variables			N (%)
Etiology		Road traffic accident (RTA)	187(49.21)
		Fall from height	121(31.84)
		Physical assaults/violence	44(11.57)
		Others*	28(7.36)
Diagnosis			
	Fracture of upper limbs	Hand	31(8.15)
		Humerus	24(6.31)
		Isloated raduis	55(14.47)
		Isolated Ulna	23(6.05)
		Double fractures of Radius and Ulna	21(5.52)
		Clavicle	12(3.15)
		Elbow	07(1.84)
		Scapula	03(0.78)
	Fracture of lower limbs	Femur	91(23.94)
		Knee	34(8.94)
		Pelvic	25(6.57)
		Foot	15(3.94)
		Ankle	13(3.42)
		Isolated fibula	09(2.36)
		Isolated tibia	07(1.84)
		Dislocation/Tarsometatarsal Dislocation	06(1.57)
		Double fractures of tibia and fibula	04(1.05)

*Firearm injuries, natural disasters, animal-related burns, occupational-related injuries.

Discussion

Based on the environmental, social, and demographic changes, the incidence and etiological factors of health problems usually vary from one region of the world to another. Therefore, it is essential to equip the healthcare facilities accordingly for effective and timely management[1,11]. Previous literature highlights the disproportionate gender-wise prevalence of orthopedic trauma, i.e., males are more likely to suffer traumatic orthopedic emergencies than females[12]. In the present study, the observed frequency of male vs. female patients admitted with orthopedic injuries was 76.05% and 23.94%, respectively, which is consistent with another similar study[13]. Pedan and Scrurfield revealed a high frequency of orthopedic injuries in males (75.1%) than in females (24.9%)[13]. Another study revealed a 7:3 male-to-female patient ratio attending the hospital setting with traumatic injuries i.e. these injuries were more frequently reported among young male adults. Similar findings were also found in a study conducted elsewhere[14]. This gender based variations might be because of the common risk taking behavior and practices of males as compared to females[9]. Furthermore, the males are found to be more involved in the outdoor activities in comparison to females.

In addition to gender, several studies report that most orthopedic traumas are observed in young and middle-aged adults. We observed the most frequent incidence of traumatic orthopedic injuries in individuals between 21 to 50 years of age, with a mean age of 36.80 ± 1.56 years. In support, Soleymanha et al. reported a higher frequency among those aged between 25 to 44 years (mean age 34.5 years)[12]. A few studies also report the highest frequency among young people[9]. This can be explained by the intensity of the energy and the reckless attitude associated with this age group; however, people tend to be more careful and ensure safety with increasing age. The increased number of severe road injury cases have been reported among motorcyclists. As per the literature, lower extremity fractures are the most common among motorcyclists, moreover, high rate of years

of life lost due to disability (YLD) has been observed among 57% under 29 years subjects[15]. In another recent study, the mean age of the patients was found to be 46.20 years[16]. In a study regarding the area-wise distribution, the number of patients with orthopedic trauma from rural and urban areas attending the setting for treatment was 77% and 23%, respectively[12] while in our study same proportion of patients was observed from rural and urban areas i.e. 73.94% and 26.05%, respectively. People involved in increased labor participation and those commuting on less safe means of transportation are at higher risk of road traffic accidents.

It was observed that the major reason for these orthopedic emergencies was road accidents (49.21%), followed by falls from height and physical violence. Among other causes of orthopedic trauma were fire-arm injuries, natural disasters, animal-related burns, and occupational injuries. Literature shows that road traffic accidents are the most common determinant of traumatic orthopedic injuries, with a prevalence of 63.6%[17]. Some researchers quoted a fracture prevalence of 29.4% associated with the road traffic accidents[18]. Another hospital-based observational study including the injury cases coming to the emergency department reported road traffic accidents (42%) as the commonest injury mode[19]. According to World Health Organization (WHO) report, 1.3 million people die from road accidents each year[20], and the observed death rate is 14.3 per 100,000 in Pakistan. A study from Iran reported car accidents, motorcycle accidents, and falls as the common cause of orthopedic injuries in the study group, observed in 43%, 31%, and 15%, respectively[21]. Other than that, there is an enormous burden on society in terms of death associated with non-fatal injuries, it is reported that around 20-50 million people suffer from non-fatal injuries annually. Most of these injuries cause disability, accounting for 34% of all years lived with disability.

Our study's results showed that fall from height was the second commonest cause of orthopedic injuries with a prevalence of 31.84% cases, which is nearest to a study in which falling was the highest cause of traumas with a frequency of 38.03%[22]. The high rate of traumatic injuries associated with falls might be due to vicinity i.e. presence of foothills and terrains nearby. Other than the urban population, the rural residents make their living from agriculture, gardening, and labor. Moreover, the climatic conditions, rain and slippery roads also increases the likelihood of falling. Another study with the similar study design to that of Joshi and Shrestha[19], also agreed to their findings that falling from the height is the most common cause of traumatic injuries even within the hospital premises or in external environment. Most of our villages are still deprived of motorable roads, and our villages are on mountainous landscapes; hence, it is not surprising to observe an extremely high percentage of fall-related injuries. In a recent study, fractures were the most common traumatic orthopedic injury type, with falls being the most common determinant of those injuries[18]. Our findings are similar to other studies conducted elsewhere[10,12,17]. A few studies also reported that following road traffic accident falls are the second most common cause of traumatic injuries. Highest frequency of traumatic orthopedic injuries related to falls are observed, i.e., 38.3% was reported by Soleymanha and colleagues[12]. Moreover, as documented by the World Health Organisation (WHO)[22] with age-related biological change i.e. with increasing age the chances of falls increase, a high incidence of falls are observed among individuals over 80 years of age. The predominance of fall related injuries among older population is mainly related to their environmental and personal factors including unsafe walking patterns such as taking excessively high or narrow steps, walking on slippery surfaces, darkness or excessive lighting, and presence of random objects on the surface.

We observed that the third common cause of orthopedic trauma was physical assaults/violence in 11.57% of cases. Similarly, a recent study found that the third determinant of traumatic orthopedic injuries was an assault in (15.3%) of patients[14]. A study by Manoharam and colleagues on the frequ-

uency of these injuries reported that incidence of assault was more frequent among the younger age groups patients with traumatic orthopedic injuries[23]. Other causes of orthopedic trauma, i.e; (Firearm injuries, natural disasters, animal-related burns, and occupational injuries) were also noted in our study, with the prevalence of 7.36% of patients. It has been reported that orthopedic trauma is frequently observed due to unattended animals on the streets. In addition, the lowest frequency was either related to gunshot trauma or bicycling as per the findings of one study[12].

Other than these, upper and lower extremity injuries are the most common non fatal traumatic injuries requiring hospitalization. Although more than one-third of those hospitalized are observed having serious limb-threatening injuries. In our study, most cases were presented with femur injuries (23.94%), also consistently reported by a similar study[12]. Among upper limbs, we observed fracture of isolated radius in 14.47%, followed by hand involvement (8.15%), supported by a study with similar findings[12]. In a study regarding the mechanism of limb injuries, the highest percentage of upper extremity injuries was found in bicyclists (64.7%). In comparison, the highest percentage of lower extremity fractures was found in pedestrians, followed by motorcyclists. Although the most frequent extremity fracture/dislocation rate was observed in 416 cases (43.2%)[24].

A double fracture involving the tibia and fibula or radius and ulna simultaneously, is a complex injury complemented by other severe soft tissue injuries in response to high-energy traumas[12]. The frequency of this kind of fracture in one study, i.e., 6.5% had double fracture of the radius and ulna; 3.3% had double fracture of tibia and fibula[12]. In our study, 5.5% cases were observed having double fracture of radius and ulna while 1.05% had double fracture of tibia and fibula. The difference in percentages may be due to variations in the sample sizes of the studies.

Among the other lower limbs, i.e., knee, pelvis, foot, ankle, isolated fibula, isolated tibia, and dislocation/tarsometatarsal dislocations were involved,i.e.,08.94%, 06.57%, 03.94%, 03.42%, 2.36%, 01.84%, and 01.57%, respectively while similarly, in a study, one case of pelvic injury was reported[25]. Among upper limbs, the hand was involved in 8.15% of cases in the present study. It is observed that the hand injuries tend to cause significant burden on the hospital emergency department. Moreover, it also possess financial and economic burden not only on the individual but also on the society, which is mainly due to the medical leaves causing work loss and increased medical expenses.

Social media and television could play a positive role in preventing injuries. These fatalities could be avoided by improving the road conditions, reducing manual labor, and provision of modern machinery. However, all of these seem unlikely with Pakistan's current financially unstable system. It is also reported that hand injury is quite common in Pakistan. Many occupations enhance vulnerability to hand injuries, which may be due to lack of training, unusual work tasks, overtime, personal worries, illness, malfunctioning equipment/materials, different work methods, and distractions. Other than that, the high prevalence of road traffic accidents is indicative of the lack of public awareness, negligence, and failed supervision. Furthermore, appropriate and timely diagnosis in the emergency ward is essential and can be very useful in avoiding associated morbidities. As known, the mortality rate is higher among patients with multiple concurrent fractures and soft tissue injuries.

Our study has a few limitations that must be considered; the primary among them was the retrospective nature and single-center approach. Furthermore, these orthopedic trauma injuries greatly affect the patient's quality of life which was not included in the studied outcomes. Therefore, the present study only presents a snapshot of the diagnosis of 380 cases admitted to the orthopedic ward. Future large-scale studies with multicenter prospective design are required to present the epidemiology of orthopedic problems and their effects on patients' quality of life in Pakistan.

Conclusions

In conclusion, most cases brought to the study site with orthopedic emergencies were primarily due to road traffic accidents followed by falls from height injuries. In the orthopedic diagnosis, isolated radius and femoral fractures were the most frequent problems. Moreover, young and middle-aged males had more frequent injuries than females.The information provided in the present in the present study will help formulate better saftey protocols and to strategize the management of orthopedic problems in a healthcare setting.

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