Journal of Clinical Orthopaedics and Trauma xxx (2017) xxx–xxx

Contents lists available at ScienceDirect

Journal of Clinical Orthopaedics and Trauma

journal homepage: www.elsevier.com/locate/jcot

Original article

Seasonal variation in orthopedic trauma patients—An experience from central India

Rajeev Shukla, Nikhil Jain*, Utkarsh Agarwal, Tanveer Sheikh, Ravikant Jain

Department of Orthopedics, SAMC & PGI, Indore, India

ARTICLE INFO

Article history:
Received 4 July 2017
Received in revised form 13 July 2017
Accepted 15 July 2017
Available online xxx

Keywords:
Admission
Emergency
Pediatric
Adults
Season
Trauma
Weather

ABSTRACT

Objectives: This study aims to determine the various epidemiological factors responsible for orthopedic trauma cases: how do weather patterns, month, season and public working schedule influence the daily frequency of orthopedic trauma.

Material and methods: This was a descriptive study performed in the Department of Orthopedics at a tertiary care centre in central India Participants: 7980 trauma cases reported in our study period. Study variables: Demographic characteristics of the cases, time, day, the month of injury and type of trauma and cause of trauma. etc. Statistical analysis: Proportions.

Results: In our study period from 2005 to 2016, there were total 7980 admissions, the annual incidence of trauma was 22.78%. RTA was the commonest cause of injury (46.85%). Most common age group affected was 11–40 year age group (64.06%), with the predominance of Male (67.40%) and rural population (72%). The commonest victims of trauma were labourer (37.66%). Maximum cases of trauma occurred during summer (58.9%). Fracture of upper extremity especially around Elbow was common which were 987 (26.41%) amongst which the fracture supracondylar humerus in pediatric age group was most common around 456. And in rainy season and winter season, there was the dominance of lower extremity fracture which was fracture around Ankle and Foot (i.e 557; 23.59%) and fracture of tibia bone (i.e 516; 27.4%) respectively.

Conclusion: Orthopedic trauma at a tertiary health care trauma center do vary significantly with the weather and are highest in the Summer season.

1. Introduction

Trauma represents a major epidemic of non-communicable disease in the present century. They are no longer considered accidental but are part of the price we pay for the technological progress. Orthopedic surgeons usually hypothesize how environment variables and public working schedule may influence orthopedic injury or trauma quantity, but only certain studies have formulated this.[1] Trauma has its own natural history and follows the same epidemic pattern as any other disease that is an agent, the host and the environment interacting together to produce injury or damage. They occur more frequently in certain age group, at certain times of day and the week and at certain localities, for example, a warm and sunny summer weekend may keep orthopedic trauma surgeons busy, while a cold winter day may yield a lighter workload. Several studies in the general surgery and orthopedic literature show adult trauma to be positively correlated with temperature.[2] While others have shown that rainfall can increase consults in the rainy season due to sledding accidents and slip on water.[3] Among the total disability-adjusted-life-years (DALYs), 13% were due to injuries. Among both children aged 5–14 years and young people aged 15–29 years, road traffic injuries are the second leading cause of trauma and death worldwide.[4] The mortality and economic losses imposed by morbidity resulting from injuries are largely preventable. However, the development of effective injury prevention efforts depends on reliable and detailed information on the incidence and pattern of injury. In developed countries, such data are available from vital statistics registers and health care records. However, such records are of limited value in developing countries. Many ill or injured persons in these countries never receive medical care from orthodox health facilities, and many deaths are not reported; making health records an incomplete source of data. Injury as a research problem has also been largely ignored in developing

* Corresponding author.
E-mail address: nikrockin23@gmail.com (N. Jain).

http://dx.doi.org/10.1016/j.jcot.2017.07.009
0976-5662/© 2017

countries.[5–7] The Injury is thus a long-overlooked health problem that deserves study. The purpose of this prospective analysis is to determine how weather patterns, season and public activity schedule influence the daily frequency of orthopedic trauma at a level 3 trauma center.

2. Materials and methods

The present study was conducted in Department of Orthopedics, at a tertiary health care centre, SAMC & PGI, Indore, M.P, India. with the approval from our institutional review board. Orthopedic trauma data were collected from our institutional database of the period 2005–2016. Inclusion criteria were injured patients of any age presenting to the casualty department, including mass causalities if any. A pretested trauma registry form was completed for all trauma patients with informed consent. However, if the patient was brought unconscious or disoriented, an attempt was made to collect the information from the patient's attendant. If there was no attendant or if consent was not given, the victim was excluded from the study. Basic demographic characteristics, time and date, nature and cause of injury, vital signs and outcome data were recorded. The collected data was entered into Microsoft Excel and analyzed.

3. Results

During the study period 2005–2016, there were 20600 orthopedic trauma consults in emergency room out of which 7980 trauma patients get admitted in Orthopedic ward.Most of the injuries were seen in 11–40 year age group (64.06%) of which 21–30 year age group suffered the maximum injuries (26.53%), cases >50 yrs contributed only 10.05% of total admission (Fig. 1). Most common mode of injury was road traffic accident in patients less than 75 years of age. Sex wise distribution was Male (67.4%) far outnumbered female (22.6%), the male to female ratio being 2.06:1 (Fig. 2). Victims from rural population were affected more than the urban population (72% Vs 28%). Laborers (37.66%) were the commonest victim of trauma followed by farmers (31.8%). Maximum cases of trauma occurred during summer (46.81%) followed by rainy and winter season (23.59% and 24.58% respectively) (Table 1). In summer season there were maximum trauma patients in emergency room and orthopedic ward amongst which Fracture of upper extremity especially Elbow were common which were 987 (26.41%) and the fracture supra-condylar humerus in pediatric age group were most common around 456. The reason being the school holidays and summer vacations of children. And in rainy season and winter season there was dominance of lower extremity fracture which were fracture around Ankle and Foot (i.e 557; 23.59%) and fracture of tibia bone (i.e 516; 27.4%) respectively (Table 2).

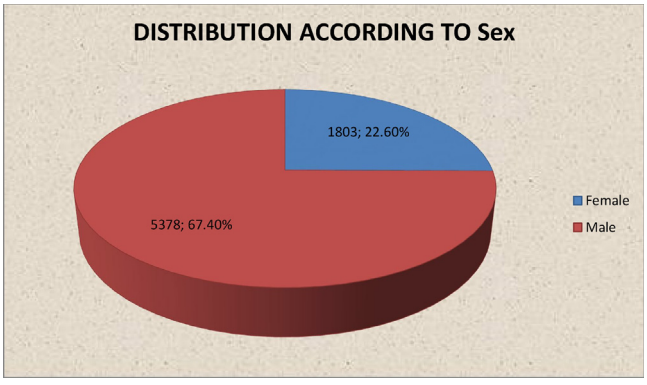

Fig. 1. Distribution according to Sex.

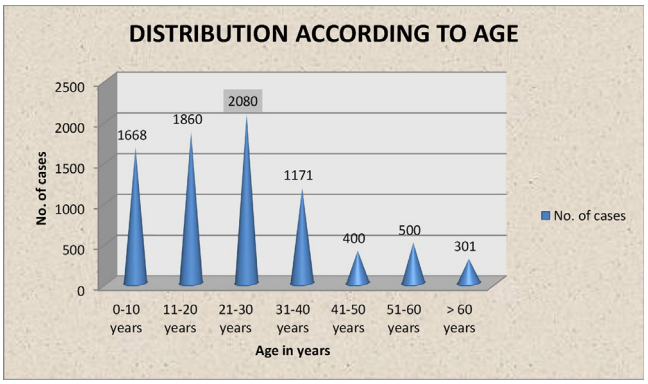

Fig. 2. Distribution according to age.

4. Discussion

To reduce the load of trauma is among the main dare for public health in the next century as injuries can be avoided and many effective master plans are available and can be used.[7] In the present study we found that annual incidence of trauma was 22.78% and there is increase in incidence of trauma in the same institute from 8.9% to 22.78% from 1981 to 2001, supports the WHO prediction that trauma will rise from 9th leading burden of disease in 1990 to third leading cause in 2020 worldwide.[8] Most of the injuries were seen in 11–40 year age group (64.06%) of which 21–30 year age group suffers the maximum injuries (26.53%), cases >50 yrs contribute only 10.05% of total admission. Similar findings were observed in other studies.[9–13] Higher incidence of major injuries among children (mainly supracondylar humerus fractures in summer) and youth emphasize urgent need of incorporating basic principles of accident prevention in the formal as well as non-formal education of children from the very beginning. It is also clear from above study that involvement of age group 21–30, which is the most productive group of society suggesting huge economic loss to the country. Male far outnumbered female, the male to female ratio being 2.06:1. Male predominance observed also by many authors [9,12–16] suggest that in our society males being the earning members of a family are subjected work related stress and more exposure to outside environment as compared to

Table 1
Seasonal variation of trauma.

Season	Month	Cases	Percentage	
Summer (*n*-3736)	march	622	7.79	46.81
	April	1028	12.88	
	May	1186	14.86	
	June	900	11.28	
Rainy (*n*-2361)	July	561	5.84	24.58
	August	982	10.22	
	September	420	4.38	
	October	398	4.14	
Winter (*n*-1883)	November	802	10.05	23.59
	December	432	5.41	
	January	309	3.87	
	february	340	4.26	

Please cite this article in press as: R. Shukla, et al., Seasonal variation in orthopedic trauma patients—An experience from central India, J Clin Orthop Trauma (2017), http://dx.doi.org/10.1016/j.jcot.2017.07.009