

# Epidemiology and Pattern of Orthopedic Fractures among Two-Wheeler Accident Patients Admitted in a Tertiary care Hospital of North India

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**Abstract- Introduction:** Two-Wheelers have become one of the commonest modes of transport all over the world. Increased number of two-wheelers especially in urban areas is due to their low purchase cost, fuel efficiency, routine traffic jams and deficient parking places etc. There is one death every 4 minutes due to road traffic accidents in India that is why transport minister Nitin Gadkari has termed road traffic accidents as an EMERGENCY.

**AIM:** To determine the Epidemiological correlates and pattern of orthopedic fractures among two-wheeler accident patients in Jammu among various age groups.

**Methods:** In this prospective observational study details of all the two-wheeler accident cases admitted in Govt. Medical College, Jammu from 1<sup>ST</sup> January 2018 to 31<sup>ST</sup> December 2018 were recorded. All the patients presenting to our emergency department after suffering RTA on a two-wheeler and sustaining any fracture that demands admission irrespective of their age and sex are a part of this study. This data was analyzed using SPSS 16 (SPSS Inc. Chicago, IL, USA) and presented in suitable Tabular and statistical format (P <0.05).

**Results:** A total of 1260 patients were admitted for RTA on a two-wheeler with male female ratio of 978:282. Among these patients 718(56.98%) sustained more than 1 orthopedic fractures, 448(35.6%) patients sustained head injury and 109(8.6%) patients suffered from visceral injuries. A total no. of 1978 orthopedic fractures were diagnosed in these 1260 patients.

**Conclusion:** Two-wheeler accidents was found to be the most common cause of orthopedic fractures in 20-30 years of age group and appendicular fractures predominated axial fractures with upper limb fractures more common than lower limb fractures. Certain safety precautions taken by the riders and certain policies and actions by concerned departments can cause drastic decrease in these causalities. Hence these Two-Wheeler accidents related causalities need urgent multidisciplinary approach.

**Index Terms-** ORTHOPEDIC FRACTURES, TWO-WHEELER, TERTIARY CARE HOSPITAL, NORTH INDIA.

This morbidity and mortality is especially involving in those of productive age in developing world<sup>16</sup>. In 2017 Road traffic Accidents ranked ninth among the leading causes of disability adjusted life years lost (DALYs) and it has been predicted that it will rank as third cause of DALYs lost in 2020.

This study aims to identify epidemiological correlates and pattern of orthopedic fractures among two-wheeler accident patients. Two-Wheelers have become one of the commonest modes of transport all over the world. Increased number of two-wheelers especially in urban areas is due to their low purchase cost, fuel efficiency, routine traffic jams and deficient parking places etc<sup>4, 11, 12, 18</sup>. Despite being considered as dangerous mode of transport, two wheelers are preferred and cheap option for leisure and work especially in urban areas<sup>4</sup>. Two-Wheeler accident patients are 16 times more likely to die than someone in car accident and 3 times more likely to get injured<sup>3, 8</sup>. In developing countries like India some of the most likely road hazards which predispose for these two-wheeler accidents are: potholes, oil slides, puddles, road debris, uneven poorly maintain roads etc. Two-Wheelers are less stable than Four-wheelers and also lack certain protective properties like Airbags, Seatbelts, barrier between rider and road etc. These factors relate to the severity of two-wheeler accidents. Uttar Pradesh is a state with highest no. of deaths due to road traffic accidents, and Tamil Nadu has highest no. of road traffic accident related injuries in India.

As quoted by ndtv.com in road accident statistics in India over 1, 37,000 people were killed in road accidents in 2013 alone that is more than the no. of people killed in all our wars put together. 16 children die on Indian roads daily, 5 lives end on Delhi roads everyday. There is one death every four minute due to road traffic accident in India. Helmet use remains the effective strategy of reducing these mortalities. Pedestrian injuries are very common in two-wheeler accidents. Old age people involved in two-wheeler accidents suffer more severe injuries than young ones. Hence road traffic accidents especially two-wheeler accidents lead to significant socioeconomic impact on both household and national level<sup>1</sup>.

## I. INTRODUCTION

Road traffic accidents are among the top five causes of morbidity and mortality in South-East Asian Countries<sup>17</sup>.

## II. METHODS

In this prospective observational study after taking proper clearance from the hospital authorities details of all the two-

wheeler accident cases admitted in Govt. Medical College, Jammu from 1<sup>st</sup> January 2018 to 31<sup>st</sup> December 2018 were recorded. Proper well informed consent was taken from every patient or his/her guardian if the patient was below 18 years of age at the time of this study. All the patients presenting to our emergency department after suffering RTA on a two-wheeler and sustaining any fracture that demands admission irrespective of their age and sex are a part of this study. Recorded data includes: age, sex, profession, mode of trauma, predisposing factors, Injuries sustained. This data was analyzed using SPSS 16 (SPSS Inc. Chicago, IL, USA) and presented in suitable Tabular and statistical format (P<0.05).

III. RESULTS

A total of 1260 patients were admitted for RTA on a two-wheeler with male female ratio of 978:282. Among these patients 718(56.98%) sustained more than 1 orthopedic fractures, 448(35.6%) patients sustained head injury and 109(8.6%) patients suffered from visceral injuries. A total no. of 1978 orthopedic fractures were diagnosed in these 1260 patients (Table 1-7) (Figure 1-2).

**Table 1: Distribution of patients on Age (yrs), Number and Sex**

Age Group	No. of Patients	Male: Female
1-10	38	25:13
10-20	91	59:32
20-30	415	337:78
30-40	215	195:20
40-50	192	103:89
50-60	159	142:17
60-70	108	87:21
>70	42	30:12
Total	1260	978:282

**Table 2: Associated Injuries**

Injury	Number
Head injury	448
Visceral injury	109
No associated injuries	703

**Table 3: Predisposing Factors**

Factor	Number
Under Influence of Alcohol/ Drugs	191
High Speed	337
Learner	92
overloading	217

Performing Stunts/ Wheeling/ violation	Traffic	One rule	72
Bad road Condition			331

**Table 4: Types of Fractures**

Type	Number
Total Fractures	1978
Upper Limb Fractures	996
Lower Limb fractures	691
Axial Fractures	291
>1 Fractures	718

**Table 5: Frequency and Anatomical Distribution of Upper limb Fractures acc. to Age groups (in Years)**

Age	Clavicle	Prox. Humerus	Shaft Humerus	Distal Humerus	Elbow	DER	B/B Forearm	Hand
1-10	8	2	3	9	1	2	10	1
10-20	5	1	7	16	2	6	12	10
20-30	48	19	66	11	8	22	56	41
30-40	30	8	41	14	3	31	25	46
40-50	11	2	18	14	7	14	27	61
50-60	4	-	10	4	-	49	30	17
60-70	2	-	8	-	-	24	71	27
>70 yrs	8	1	1	2	1	6	11	2

**Table 6: Frequency and Anatomical Distribution of Lower limb Fractures acc. to Age groups (in Years)**

1-10 yrs	-	1	-	-	-	-	1	-	-
10-20	-	-	6	-	-	9	11	2	4
20-30	4	13	10	23	2	18	2	86	21
									44

Age	>70 yrs	60-70	50-60	40-50	30-40
Hip Dislocations	-	-	-	1	7
NOF	1	-	9	2	16
Intertrochanteric	2	5	14	4	8
Shaft of Femur	-	-	2	7	6
Distal Femur	-	-	-	-	1
Subtrochanteric	-	-	1	4	-
Patella	2	1	-	-	5
Proximal Tibia	-	-	1	1	2
Shaft Tibia	16	18	61	50	82
Distal Tibia	-	12	1	-	3
Foot & Ankle	1	6	22	33	27

Lumbosacral Spine							

Figure 1: Distribution of patients acc. to Age, Number & Sex

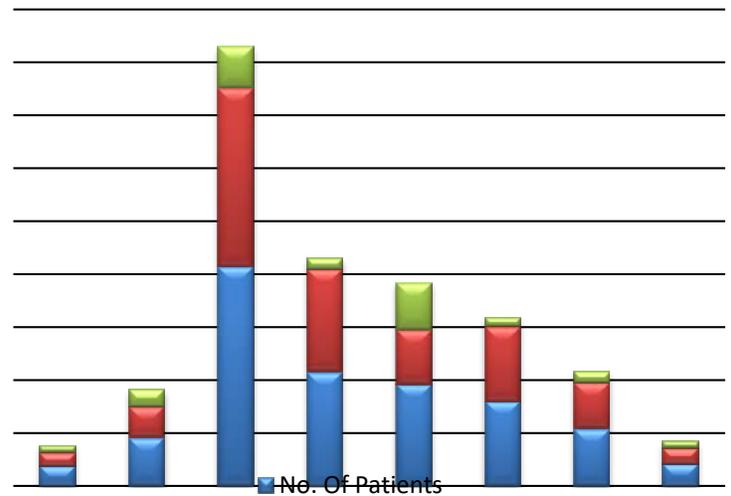
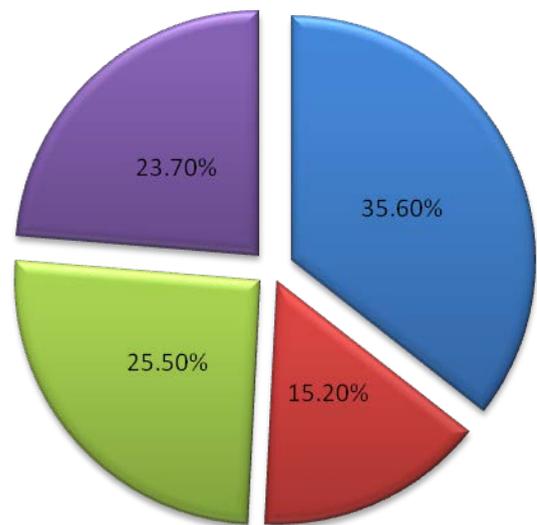


Figure 2: Occupation of Patients



■ Students ■ Buisnessman ■ Government Employee ■ Others

Table 7: Frequency and Anatomical Distribution of Axial Fractures acc. to Age groups (in Years)

Age	1-10	10-20	20-30	30-40	40-50	50-60	60-70	>70
Dorsal Spine								
Cervical Spine	1	-	8	16	20	18	7	12
		2	1	9	11	18	2	31

#### IV. DISCUSSION

Two-wheeler accidents was found to be the most common cause of orthopedic fractures in 20-30 years of age group and appendicular fractures predominated axial fractures with upper limb fractures more common than lower limb fractures. Fracture humerus (Prox. Middle & distal) was the most common fracture encountered in upper limb. Tibia fracture (Proximal, Middle & Distal) predominated in lower limb followed by fractures of Foot & Ankle. 55% of the lower limb fractures were open and only 18% of the upper limb fractures were open, tibial shaft fracture (68%) contributed to the maximum no. of open fractures in lower limbs. Students particularly in the age group of 20-30 with male predominance contributed the maximum no. of Two-wheeler accident admissions.

Helmet use remains the effective strategy of reducing these mortalities. Wearing helmet increases chances of survival by 42% for Two-Wheelers as per the study in United States. Times of India quoted on 14-08-2017 that about 28 Two-Wheeler riders died daily on Indian roads in 2016 for not wearing helmets. These deaths have increased from 21.6 per 100 accidents in 2015 to 29.1 in 2017. Two-Wheelers remain the most unsafe mode of transport both for riders and pedestrian. Transport ministry has taken initiatives like Anti-Lock Braking System in Two-Wheelers which may prove their worth by reducing causalities in near future. Speeding and overtaking remains the biggest cause of road crashes but still majorities of patients who reported to us blamed the road conditions for the same.

**Preusser et. al 1995** found that alcohol and excessive speed were common factors with Two-Wheeler crash involvement<sup>13</sup>.

**Rome and Senserrick 2011** study findings revealed that single vehicle crashes accounted for 43% of all Powered Two-Wheeler (PTW) fatalities<sup>14</sup>.

**Eustace et. al 2011** study revealed the risk factor related to severity/fatality of injury significantly increases when the following circumstances apply: Female Motorcyclist, use of excessive speeding, use of alcohol/drugs, riding without helmet, crashing on horizontal curves on graded segments<sup>5</sup>.

**Jou et. al 2012** study revealed that among Two-Wheeler the characteristics carrying a high risk of fatality were: Male sex, age above 60 yrs, not wearing helmet, driving after drinking, and not being appropriately licensed<sup>7</sup>.

**Seva et. al 2013** study found 3 variables to be significantly predictors of motorcycle crashes namely: age, driving behavior and junction type<sup>15</sup>.

Young males particularly in productive age group were found to have very high occurrence of Two-Wheeler accidents due to their more exposure to the external environment and risky activities they perform<sup>16</sup>. Students, Government employees, and Businessman are the most commonly affected people. Most common injuries are of upper limb followed by lower limb. Lower limb predominated in open fractures and fracture tibia was most common fracture among all i.e. due to direct transfer of energy to this part during Two-Wheeler crash. Very minimum no. of injuries occurred in below 10 and above 70 yrs of age group probably due to their limited exposure to the external environment.

#### V. CONCLUSION

Two-Wheeler accidents are leading cause of mortality and morbidity associated with Road traffic accidents that too in the most productive age group, but still their use can not be criticized or reduced due the convenience they provide. But certain safety precautions taken by the riders and certain policies and actions by concerned departments can cause drastic decrease in these causalities. Hence these Two-Wheeler accidents related causalities need urgent multidisciplinary approach. Mass education of general public, proper enforcement of traffic rules, improving the conditions of roads, new policies like Anti Lock Braking system introduction to be made compulsory etc will surely reduce the Two-Wheeler related accident causalities and also the socio-economical burden they impose on individual and national level.

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