

ORTHOPEDIC CASE BURDEN AT NUNUKAN HOSPITAL: FOCUS ON TRAUMA CASE

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Abstract: Incidence of orthopedic case is quite high in Nunukan Hospital, most of them need both non-operative and surgical intervention due to congenital, debridement, fracture, rupture of tendon and blood vessel, even amputation. Until now, data orthopedic case profile especially trauma case in Nunukan Hospital is not available. Also, the urgency of having an orthopedic surgeon is unbearable which unavailable in Nunukan, this made the management can't be done comprehensively and as soon as possible. The aim of this research was to describe the incidence of orthopedic case at Nunukan hospital as basic data for further research. This Retrospective Study was conducted at Nunukan Hospital, North Kalimantan – Indonesia. The data is collected by using logbook and medical records during January 2016 - April 2017. Total of 231 cases were obtained. Male patients accounted for 73.6% (170 patients) and Female was 26.4% (61). The age ranged from 1 day to 82 years old. There are 8-21 cases happened per month (average: 14 cases). Based on case category, trauma occurred for 88.7% (205). Five top diagnoses are; Close Fracture happened for 44.6% (103 cases), followed by Open Fracture 17.7% (41 cases), Lacerated wound 11.3% (26 cases), Traumatic Amputation 7.4% (17 cases) and CTEV 7.4% (17 cases). Most pathology within the period located in Foot for 29.9% (69). The multiple fracture, vascular, and soft tissue injury were observed. Orthopedic fractures were the most common injuries among patients with 88.7% in Nunukan Hospital from January 2016 to April 2017. There are 14 cases happened for each month with most of the patient were adult. Most of injuries happened at foot region.

Keywords: incidence; orthopedic case; trauma; and Nunukan Hospital.

INTRODUCTION

Orthopedics ward admissions range variety of cases, from relatively healthy patients admitted for deformity corrections to those with fractures, multiple trauma, tumor, or chronic illnesses. These cover a whole spectrum of ages, complication and added medical co-morbidities. Managing these illnesses or injuries were hard, could lead to surgical and medical complications with mortality being one of them. The pattern of mortality and morbidity reflects the burden of disease in a particular community. This pattern expresses geographic variations between communities and countries. Quoted figures for mortality in orthopedics and trauma varies with lower figures in the advanced world.¹⁻³

In the year 1998/1999, there were 3.8 million acute admissions in hospitals throughout the United Kingdom and acute admissions for orthopedics and trauma patients constituted 8% of these.⁴ Centralized data of this nature are not available in Indonesia, but, to the best of our knowledge, there are few report on pattern of mortalities among orthopedics and trauma admissions in our country.

Nunukan Hospital located in Nunukan Regency in North Kalimantan of Indonesia. Nunukan Regency has an area of 14,247.50 km² with 193,390 populations. It is located 136 km from the Capital City of North Kalimantan, Tarakan. The transportation available is via speedboat, airplane, or vehicle, ranging for thirty minutes to 2,5 hours to get to Tarakan from Nunukan, or vice versa.⁵

Incidence of orthopedic case is quite high in Nunukan Hospital, most of them need both non-operative and surgical intervention due to congenital, debridement, fracture, rupture of tendon and blood vessel, even amputation. Until now, data orthopedic case profile in Nunukan Hospital especially

trauma case is not available. Also, the urgency of having an orthopedic surgeon is unbearable which unavailable Nunukan. Any management of orthopedic cases would be handled by general surgeon which made the management can't be done comprehensively and as soon as possible. The aim of this research was to describe the incidence of orthopedic case at Nunukan hospital for the basic data for further research.

RESEARCH METHODS

This Retrospective Study was conducted at Nunukan Hospital, North Kalimantan – Indonesia. The data is collected by using logbook and medical records during January 2016 - April 2017. Inclusion criteria included all patients brought into both of emergency and nonemergency department as orthopedic consultation. Patients with incomplete registered information and data were excluded from the study. Variables included age, gender, location of fracture, presence of open or closed fractures, concomitant soft tissue, vascular injuries and management were recorded, tabulated and analyzed by using statistical software.

RESULT AND DISCUSSION

Total of 231 cases were obtained. There are 8-21 cases happened per month (average: 14 cases). Male patients accounted for 73.6% (170 patients) and Female was 26.4% (61). Men were predominantly injured at a ratio of 3:1 (Table 1 and Figure 1). In an American study, another similar result was also found,⁶ which also reported the gender difference that males are much more likely to get injury than females, especially among adults and the elderly. Our study was consistent with previous studies. Table 1 and Figure 1 demonstrate that males are much more likely to be killed in a road traffic injury than females.

The age ranged from 1 day to 82 years old. Average age at time of injury was 26.0 years. Most of the patient were adult, ranged from 21 to 40 years old with total of 76 patients (31.4%). (Table 2 and Figure 2). Study in the USA, 5,838 admissions of an academic Level I trauma center registered over 10 years were reviewed and showed that there were 19.4% patients were 14 years old or less, 64.1% who were 15 to 55 years old, 7.2% were 56 to 65 years old, and 9.3% older than 65 years.⁶ Another National Trauma Databank study during a 5-year period revealed that there were 4,095 patients

(32.9%) ≤14 years, 3,806 (30.7%) 15 to 35 years old, 3,413 (27.5%) 36 to 55 years old, 688 (5.5%) 56 to 65 years old, and 427 (3.4%) >65 years old. The overall mortality was 3.7% and ranged from 2.4% in the age stratum of ≤14 years to 12.2% in the stratum of >65 years.⁷ A cross-sectional study in India showed majority of the victims were in the age group of 18–37 years.⁸ In Africa, a retrospective analysis of nonfatal road traffic crash victims still showed that the age group of 15–44 years was the most affected (81.9%).⁹

Table 1. Case per month

Gender	Jan-16	Feb-16	Mar-16	Apr-16	May-16	Jun-16	Jul-16	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16
Male	12	14	11	9	11	10	8	9	12	8	15	6
Female	3	2	7	5	3	1	0	5	3	5	5	4
Total	15	16	18	14	14	11	8	14	15	13	20	10

Gender	Jan-17	Feb-17	Mar-17	Apr-17	Total
Male	7	12	17	9	170
Female	6	2	4	6	61
Total	13	14	21	15	231

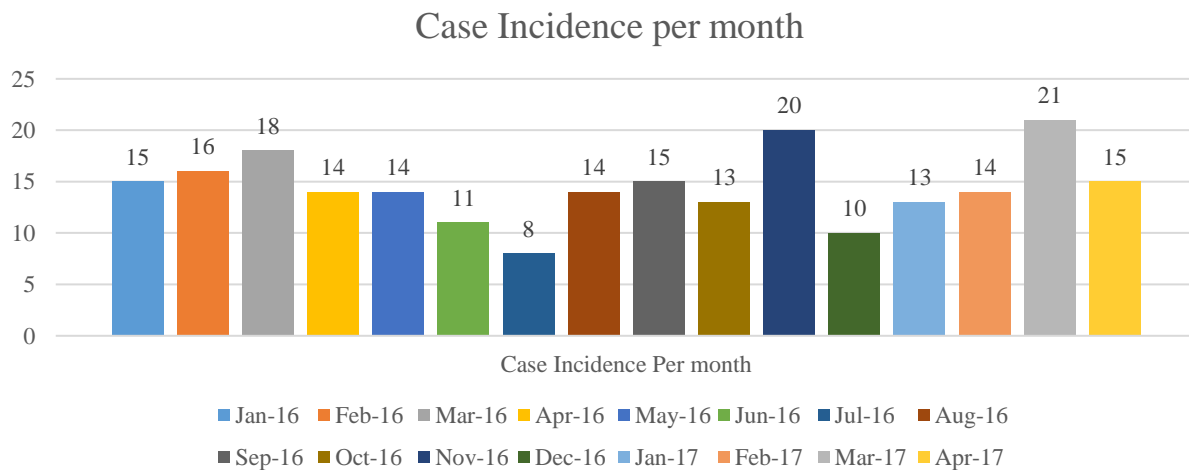


Figure 1. Case per month

Table 2. Age Distribution

	<1 month	1 month – 1 year	2 – 5 years	6 – 10 years	11 – 20 years	21 – 40 years	41 – 65 years	>65 years	Total
Σ	11	7	8	21	54	76	49	5	231
%	4.5	2.9	3.3	8.7	22.3	31.4	20.2	2.1	100

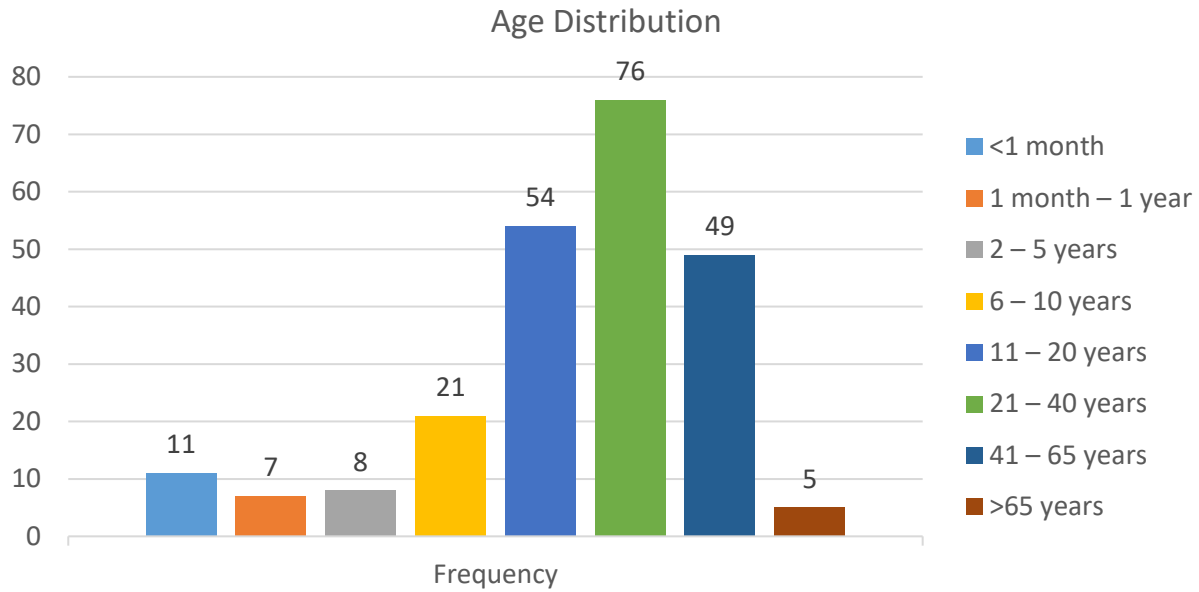


Figure 2. Age Distribution

Based on case category of this study, trauma case occurred for 88.7% (205 cases) and non trauma case occur 11.3% (26 cases). Five top diagnoses are; Close Fracture happened for 44.6% (103 cases), followed by Open Fracture 17.7% (41 cases), Lacerated wound 11.3% (26 cases), Traumatic Amputation 7.4% (17 cases) and CTEV 7.4% (17 cases). (Table 3; Table 4; Figure 3; Figure 4). A cross-sectional study in India showed that fractures were the most common injury among the victims of nonfatal road traffic accidents.⁸ In Africa, a retrospective analysis of nonfatal road traffic crash victims still showed that the most common injuries were fractures (69.0%).⁹

Of all trauma case (205 cases), road traffic injures (RTIs) are responsible for a substantial proportion of deaths and injuries and are responsible for reduced quality of life

than most human diseases. Motorcycle collisions in road traffic are a significant cause of mortality and morbidity among adults age. Study in the United States, the rate of injuries related to motorcycle collisions is among the highest of developed countries.¹⁰ In 2004, study of motor vehicle accidents were the leading cause of death among individuals between the ages 3 years and 33 years.¹¹ It was also found that Per vehicle mile traveled, motorcycle riders are eight times more likely to be injured than drivers of other vehicles.¹⁰ Nowadays, motorcycle use is becoming more popular and the numbers of users are rapidly increasing. Society also incurs a tremendous loss of productivity because injuries occur predominantly in young, working-age individuals.¹² Human behavior factors, vehicle factors, and road factors contribute to the causation of road traffic crashes.¹³

Table 3. Category of Disease

Category	Frequency	%
Trauma	205	88.7
Non Trauma	26	11.3
Congenital	17	7.4
Metabolic Disease	5	2.2
Oncology	2	0.9
Infection	1	0.45
Vascular	1	0.45
Anomaly		
Total	231	100

Category of Disease

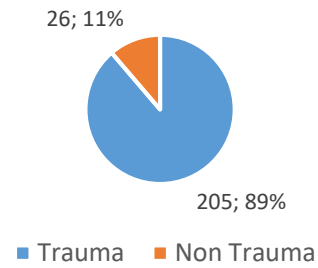


Figure 3. Category of Disease Chart

Table 4. Main Diagnosis in Orthopedic Case

Trauma related Diagnosis			Nontrauma related Diagnosis (Congenital, Metabolic, Oncology, Infection, and Vascular Anomaly)		
Diagnosis	Frequency	Percent (%)	Diagnosis	Frequency	Percent (%)
Close Fracture	103	44.6	CTEV	17	7.4
Open Fracture	41	17.7	Diabetic Ulcer	4	1.7
Lacerated Wound	26	11.3	Tumor	2	0.9
Traumatic Amputation	17	7.4	Aneurysm	1	0.4
Dislocation	12	5.2	Gout Arthritis	1	0.4
Nail Injury	3	1.3	Soft Tissue Infection	1	0.4
Contracture	2	0.9			
Electric Injury	1	0.4			
Total	205	88.7%		26	11.3%

Main Diagnoses

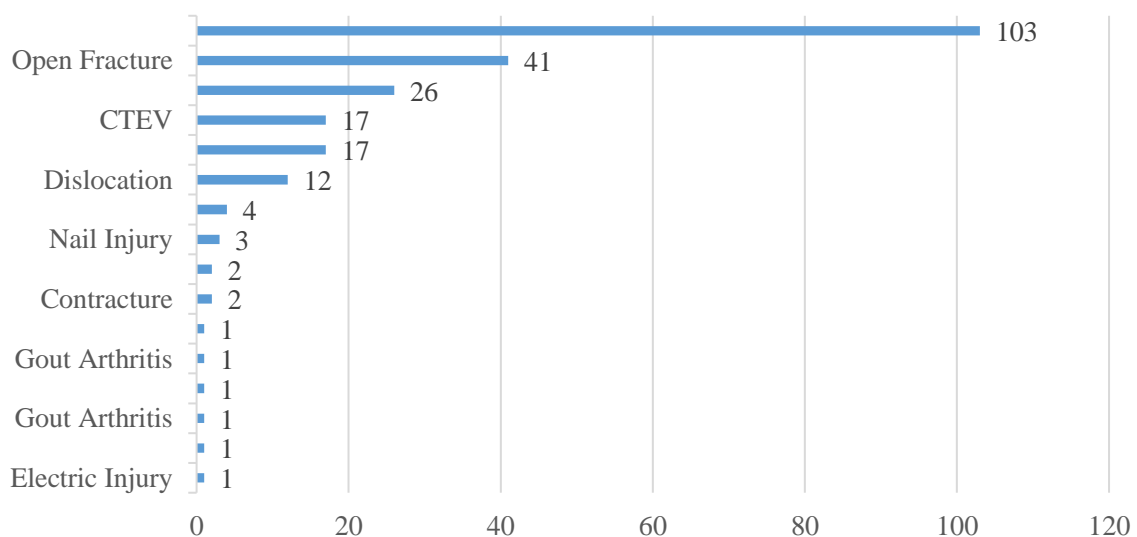


Figure 4. Main Diagnoses in Orthopedic Case Chart

This study found pathology in lower extremities (53.2%) had a higher rank rather than upper one (46.8%), with most common site of pathology involved the foot (69 of 231 case) (Table 5 and Figure 5). In correlation with this report, multiple studies have shown that between 30% and 70% of nonfatally injured riders sustain lower extremity injuries.¹⁴⁻¹⁷ Of these injuries, fractures are most frequent and have the most severe outcomes, in terms of permanent disability, economic costs, and return to work.¹⁵⁻²² In this study we found foot injury was common rather than the other, but in different studies among fractures, the tibia is the most common site of injury, followed by the femur, foot, and patella.¹⁷ In Africa, a retrospective analysis of nonfatal road traffic crash victims still showed the tibia/ fibula being the most fractured bones (30.3%).⁹ Another hospital-based study of 450 cases admitted due to traffic accidents in India revealed that the most common type of injury was fracture (49.33%) and the most common

site of fracture was lower limb (48.2%), and several risk factors such as age, sex, type of vehicle, use of alcohol, absence of driving license, nonuse of helmets, and casual attitude are associated with increased occurrence of road traffic accidents²³

Many Studies have demonstrated that owing to the nature of most motorcycle injuries, the lower extremities are at increased risk for trauma because of their position in regards to the motorcycle.¹⁷⁻²⁰ Commonly, motorcycle collisions that do not involve the driver being ejected from his or her vehicle will include a lower extremity intimately involved or trapped under the motorcycle during or after the accident.¹⁷ Motorcycle drivers and passengers do not differ in their risk for lower extremity injury.¹⁷ Men predominantly were injured in our study, corresponding with the national motorcycle registry, which shows men owning and riding the majority of motorcycles.

Table 5. Location of Pathology

Regio	Location	Frequency	Subtotal	Percent	Precent Total
Lower extremities	Foot	69		29.9	
	Lower leg	36		15.6	
	Ankle	7		3.0	
	Upper leg	6	123	2.6	53.2%
	Knee	3		1.3	
	Buttock	1		0.4	
	Hip	1		0.4	
Upper extremities	Hand	46		19.9	
	Forearm	42		18.2	
	Upper arm	8	108	3.5	46.8%
	Shoulder	6		2.6	
	Clavicle	4		1.7	
	Elbow	2		0.9	
Total			231		100%

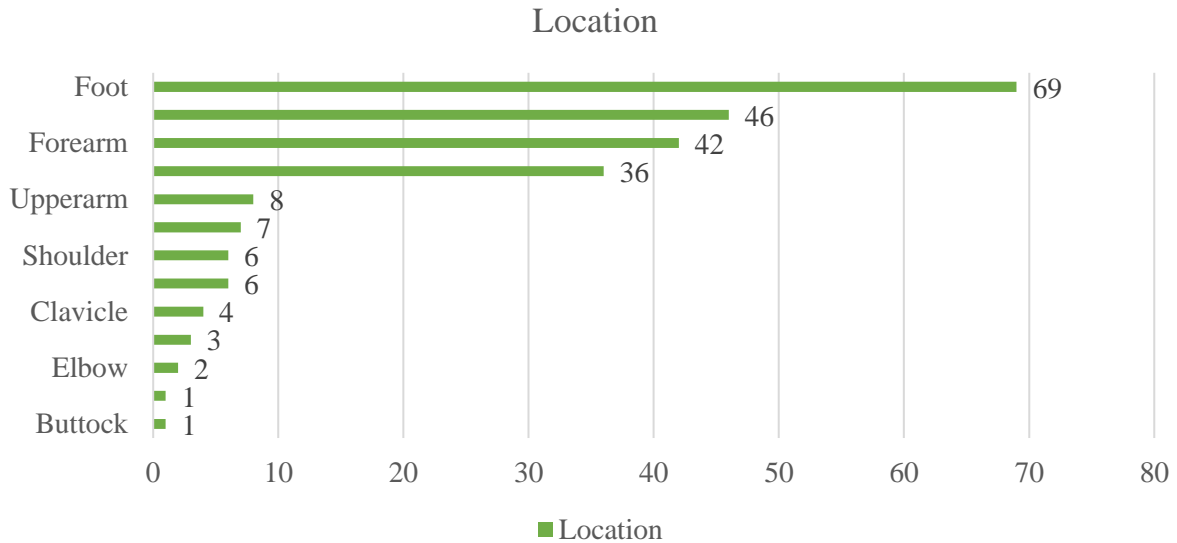


Figure 5. Location of Pathology

Table 6. Distribution Multiple Fracture, Vascular and Soft Tissue Injury

	Multiple Fractures		Vascular Injury		Soft Tissue Injury	
Trauma Patients	Yes	43 patient	Yes	29 patient	Yes	50 patient
(n= 205 patients)	No	162 patient	No	176 patient	No	155 patient
Total	205					

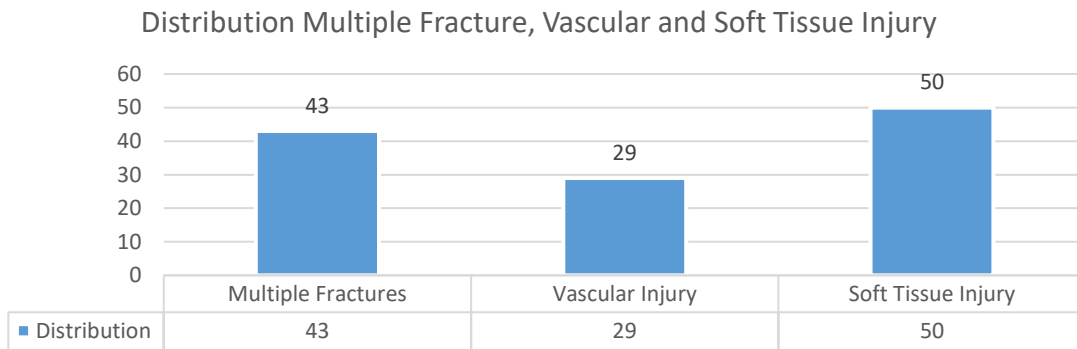


Figure 6. Distribution Multiple Fracture, Vascular and Soft Tissue Injury

This study found there were associated injury occurred after trauma. There are 43 patients (20%) sustained multiple fractures, 29 patients (14%) for vascular injury (vein and/ or arterial rupture), and 50 patients (32%) for soft tissue injury (tendon rupture and/ or muscular tear) (Table 6 and Figure 6). For management of surgical for trauma case,

the details and distribution had shown at Table 7. Open reduction had done for 38.1% of cases. Close reduction for 33.1%. Amputation management had done for 8%.

This study still provide some weakness. Including the mechanism of injury, protective equipment worn during crash, and length of hospital stay.

Table 7. Distribution of Management of Traumatic Case

Management	Frequency	Percent
Open Reduction	78	38.1
Open Reduction (only)	70	
Open Reduction (with tendon rupture)	5	
Open Reduction (with dislocation)	2	
Open Reduction (with tendon rupture + dislocation)	1	
Close Reduction	68	33.1
Close Reduction (due to fracture)	34	
Close Reduction (with reposition due to dislocation)	34	
Repair	25	13.1
Repair (Soft Tissue Injury)	16	
Repair (Vascular Injury)	3	
Repair (Soft Tissue and Vascular Injury)	6	
Amputation	18	8.0
Amputation (only)	17	
Amputation (with proximal open reduction due to fracture)	1	
Reposition (Dislocation only)	8	3.9
Debridement (Nail or/and Skin only)	6	1,9
Reconstruction (Skin Flap/Graft)	2	0,9
Total	205	100,0

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The authors declared this study used personal funding.

CONCLUSION

Orthopedic fractures were the most common injuries among patients with 88.7% in Nunukan Hospital from January 2016 to April 2017. There are 14 cases happened for each month with most of the patient were adult. They were frequently associated with other injuries especially multiple fracture, vascular and soft tissue injury. A significant relation to male gender, and adult age patterns was observed. It also was found that lower extremities injuries (especially foot region) were higher than upper.

REFERENCE

1. Ahmed E, Chaka T. The Pattern of Orthopaedic Admissions in Tikur Anbessa University Hospital Addis Ababa. *Ethiopian Medical Journal*. 2005; 43: 85-91.
2. Bhattacharyya T, Lorio R, Healy WL. Rate of and Risk Factors for Acute Inpatient Mortality after Orthopaedic Surgery. *Journal of Bone & Joint Surgery*. 2002; 84: 562-572.
3. Tan HB, McDonald DA, Matthews SJ, Giannoudis PV. Incidence and Causes of Mortality Following Acute Orthopaedic and Trauma Admissions. *Annals of the Royal College of Surgeons of England*. 2004; 86: 156-160.
4. Department of Health. Hospital In-Patient Data Based on Hospital Episode Statistics. Cited at: <http://www.doh.gov.uk/hes/> (Accessed August 7th, 2018)

5. Badan Pusat Statistik Kabupaten Nunukan. Kabupten Nunukan dalam angka 2018. Nunukan: Suvi Sejahtera; 2018.
6. Demetriades D, Murray J, Martinetal M. Pedestrians injured by automobiles: relationship of age to injury type and severity. *Journal of the American College of Surgeons*. 2004; 199(3): 382–387.
7. Lustenberger T, Inaba K, Talving P et al. Bicyclists injured by automobiles: relationship of age to injury type and severity a national trauma databank analysis. *The Journal of Trauma*. 2010; 69(5): 1120–1125.
8. Ganveer GB, Tiwari RR. Injury pattern among nonfatal road traffic accident cases: a cross-sectional study in central India. *Indian Journal of Medical Sciences*. 2005; 59 (1): 9–12.
9. Gichuhi K. Injury pattern among non-fatal road traffic crash victims. *East African Orthopaedic Journal*. 2007; 1: 23–25.
10. Beck LF, Dellinger AM, O’Neil ME. Motor vehicle crash injury rates by mode of travel United States: using exposure-based methods to quantify differences. *Am J Epidemiol*. 2007; 166: 212–218.
11. Paulozzi LJ. United States pedestrian fatality rates by vehicle type. *Inj Prev*. 2005; 11: 232–236.
12. Amin NH, Jakoi A, Katsman A, Harding SP, Tom JA, Cerynik DL. Incidence of Orthopedic Surgery Intervention in a Level I Urban Trauma Center With Motorcycle Trauma. *J Trauma*. 2011; 71(4): 948–951
13. Pan RH, Chang NT, Chu D, et al. Epidemiology of Orthopedic Fractures and Other Injuries among Inpatients Admitted due to Traffic Accidents: A 10-Year Nationwide Survey in Taiwan. *The Scientific World Journal*. 2014; 2014: 1-7.
14. Lin MR, Kraus JF. A review of risk factors and patterns of motorcycle injuries. *Accid Anal Prev*. 2009; 41: 710–722.
15. Bachulis BL, Sangster W, Gorrell GW, Long WB. Patterns of injury in helmeted and nonhelmeted motorcyclists. *Am J Surg*. 1988; 155: 708–711.
16. Kraus JF, Peek C, McArthur DL, Williams A. The effect of the 1992 California motorcycle helmet use law on motorcycle crash fatalities and injuries. *JAMA*. 1994; 272: 1506–1511.
17. Peek C, Braver ER, Shen H, Kraus JF. Lower extremity injuries from motorcycle crashes: a common cause of preventable injury. *J Trauma*. 1994; 37: 358–364.
18. Aare M, Von Holst H. Injuries from motorcycle and moped crashes in Sweden from 1987 to 1999. *Inj Control Saf Promot*. 2003; 10: 131–138.
19. Ankarath S, Giannoudis PV, Barlow I, Bellamy MC, Matthews SJ, Smith RM. Injury patterns associated with mortality following motorcycle crashes. *Injury*. 2002; 33: 473–477.
20. Craig GR, Sleet R, Wood SK. Lower limb injuries in motorcycle accidents. *Injury*. 1983; 15: 163–166.
21. MacKenzie EJ, Shapiro S, Moody M, Siegel JH, Smith RT. Predicting posttrauma functional disability for individuals without severe brain injury. *Med Care*. 1986; 24: 377–387.
22. Clarke JA, Langley JD. Disablement resulting from motorcycle crashes. *Disabil Rehabil*. 1995; 17: 377–385
23. Thomas V, Lavanya S. Epidemiologic profile of road traffic accident (RCT) cases admitted in a tertiary care hospital -a retrospective study in Hyderabad, Andhra Pradesh. *International Journal of Medical and Pharmaceutical Sciences*. 2013; 3: 30–36.

