

## Epidemiology of road traffic accidents: - A Prospective study At a Tertiary University Hospital in Addis Ababa Ethiopia

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**Background:** Road traffic injuries (RTIs) are major but neglected public health problems. Without appropriate action, by 2020, road traffic injuries are predicted to be the third leading contributor to the global burden of disease and injury. Most of the projected increase in road traffic crashes will occur in low- and middle-income regions of the world, Ethiopia is one of countries with the highest fatality rates worldwide. The road fatality rates have grown by a quarter in the some African countries like Ethiopia. The main objective of this study was to determine the epidemiological characteristics and outcomes of RTIs presenting at Tikur Anbassa Hospital (TAH) in Addis Ababa Ethiopia.

**Methods:** All 210 patients involved in Road traffic crashes (RTCs) and seen at the Emergency surgical department at TAH over a one month period were included in the study. Patients aged under 13 years were excluded from the study. Data were collected by preformed questioners and was analyzed using statistical tool EPI info 2000.

**Results:** The peak incidence was in the 21 – 30 years age group and accounted for 40% of cases. There was a preponderance of males who accounted for 67.6% of victims. There were 6 deaths giving 2.9% case fatality rate. Two of the deaths occurred on arrival while the other four died while receiving treatment. Eight (3.8%) of the cases were admitted and 37 (17.6%) were referred for admission at other hospitals. One hundred six (50.5%) of the victims had major injury while 104(49.5%) had minor injury. There were 5 cases of moderate head injuries and 14 cases of severe head injuries with 4 cases of vertebral fracture. Closed extremity fractures were 37 (24.2%), compound single fractures were 10(4.3%) and multiple fracture (either closed or compound) occurred in 15 (7.6%). Majority, 147(70.4%), of victims were from Addis Ababa. About 1 in 20 (5.2%) of the accidents happened on the highway. Vast majority of injuries were sustained by pedestrians 140(66.7%). Majority of patients presented to the OPD within 4 hours 120 (57.4%). Most of the injuries occurred during day time 151(71.9%). Hundred and thirty-one patients (62.4%) presented primarily to TAH. Majority of the drivers who caused the accidents were in the age group of 25 – 35 accounting for 39.5% of injuries. Commercial vehicles have caused the majority 72(34.3%) the injuries.

**Conclusion and Recommendation:** Road traffic crashes are major public health problems in Ethiopia. There are lots of injuries requiring subspecialty treatment due to RTCs requiring the need of specialized treatment centres and specialists. There is a need of trauma centres in the country including the capital city with beds and equipment and personnel to handle the increasing RTC victims. There is need a lot to be done to improve awareness of the public both to the drivers and pedestrians about the safe use of roads and vehicles.

## Introduction

Road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. Of all the systems with which people have to

deal every day, road traffic systems are the most complex and the most dangerous. Worldwide, an estimated 1.2 million people are killed in road crashes each year and as many as 50 million are injured. Projections indicate that these figures will increase by about 65% over the next 20 years unless there is new commitment to prevention.

Every day around the world, more than 3000 people die from road traffic injury. Low-income and middle-income countries account for about 85% of the deaths and for 90% of the annual disability adjusted life years (DALYs) lost because of road traffic injury. Projections show that, between 2000 and 2020, road traffic deaths will decline by about 30% in high-income countries but increase substantially in low-income and middle-income countries. Without appropriate action, by 2020, road traffic injuries are predicted to be the third leading contributor to the global burden of disease and injury<sup>1</sup>.

Most of the projected increase in RTAs will occur in low- and middle-income regions of the world, due to the rapid growth in motor vehicle numbers increasing exposure to risk factors such as speed and alcohol, and exacerbated by inadequate enforcement of traffic safety regulations and public health infrastructure<sup>2</sup>. The sub-Saharan African counties represent 11% of world population and only 4% of motor vehicles but contribute to 11% of the road traffic accidents. The annual road fatality has actually in the decrement in the developed countries but it is still ascending in the developing ones<sup>3</sup>.

The highest fatality rates (deaths /100000 vehicles) worldwide occur in Africa – Ethiopia, Uganda, and Malawi whilst fatality risk (deaths /100000population) is highest in disparate group of countries Thailand, Malaysia, South Africa and Saudi Arabia<sup>3</sup>.

The road fatality rates have grown by a quarter in African countries with large population size like Ethiopia, Nigeria, Kenya and Tanzania. Drivers accounted for a much larger share of road fatalities in South Africa and Zimbabwe than in Ethiopia and Zambia. Pedestrian accounted to the most frequently reported road fatality type in all the countries except for Botswana and Malawi where passenger deaths dominated<sup>2</sup>.

The nationwide figure in Ethiopia indicates that 40% of victims of RTAs are pedestrian and 50% passengers but the figure for pedestrians increases to 79% in Addis. In Ethiopia one out of four RTAs victims are females with similar severity of injury and 5% of the drivers killed in RTAs in Ethiopia were women. Out of all accidents registered in Ethiopia Addis Ababa accounts about 60% or around partly because the city has great contact with other regions of the country through its different gates on a daily basis.

Out of the registered motor vehicles of Ethiopia the large majority is found in the capital city Addis Ababa which is about 77% and this is the other reason why the city takes higher shares of the accidents. Addis Ababa experience about 700 RTAs per month, 1800 people died while 7000 were disabled in Ethiopia in the year 2003 due to RTAs and death rate is 136/100000 vehicle and hence Ethiopia is losing 20 million USD annually as a result of RTAs<sup>2</sup>. Most of the figures found here are collections of data from the Ethiopian traffic reports. Only few studies are done to evaluate the actual causes of deaths, major injury types and some other epidemiological data which may assist in the programming and implementation of the preventive strategies.

The main objective of this study was to assess the epidemiological characteristics of injuries and outcomes of patients presenting from road traffic accidents at emergency surgical OPD of a tertiary university Hospital [Tikur Anbessa Hospital (TAH)] in Addis Ababa Ethiopia. The specific objectives were to assess the incidence of mortality secondary to Road traffic crashes

(RTC), to evaluate the incidence of major injuries requiring hospitalization secondary to RTC and to appraise the incidence of musculo-skeletal injuries with bone fractures secondary to RTC presenting to TAH.

Other specific objectives were to determine the types of Vehicles involved in the Road traffic crashes time laps between the occurrence of Road traffic accidents and presentation to TAH primarily or after referral and the associated epidemiological factors which might contribute to the worsening of the effect of road traffic accidents or increase the frequency of accidents

### **Patients and Methods**

This was a prospective study conducted at TAH from March 1<sup>st</sup> 2008 – March 31<sup>st</sup> 2008. All patients presenting to the emergency adult surgical OPD with Road traffic accident injuries for the specified one month period were included in this study after getting consent from every patient who was conscious and stable attendants when otherwise a preformed questionnaire was filled by physicians which includes demographic data place of injury, mechanism of injury, time of presentation, type of injury and severity and the final outcome at the surgical OPD . The study was conducted at TAH which is the center where most of the RTAs are brought primarily and also a lot of patients are referred after first line treatment has been given at the other hospitals because of lack of specialist care for the treatment of most injuries but especially head and orthopedic injuries. Hence most cases of road traffic accident victims usually end up referred to TAH surgical emergency OPD. The data were run and analyzed in to EPI info 2000

In this study, Road Traffic crash injuries [RTI]refers to all injuries involving motorized or un motorized vehicles, major injuries were any injury that includes fracture of one or more bones or any injury that requires admission and/ or surgery; severe head injury were head injury with Glasgow coma scale of 8 or below, moderate head injury were head injury with Glasgow coma scale of between 9 and 12 while mild head injury were head injury with Glasgow coma scale of 13 or above.

### **Results**

There were a total of 210 victims brought to the emergency surgical OPD of TAH in the study period. The most commonly involved age groups were the 21 – 30 and the 31 -40 years of age which accounted for 40% and 19% respectively (Table 1). One hundred forty two (67.6%) of victims were males. Most of the drivers who caused the crashes were in the age group of 25 – 35 accounting for 39.5% of injuries (Table 2). The next common being age less than 25yrs. There were three cases of hit and run. Taxi's as a whole take the major share of the injuries with commercial public transport minibuses 56(26.7%) and other small public taxi's 16(7.6%). Automobiles have caused 38 of the accidents, while Medium sized trucks and buses account for 26 and 15 of the accidents respectively.

There were 6 deaths (2.9%) out of the 210 registered RTCs making it 2.9% case fatality rate. Two of them were death on arrival and the other four died while on treatment. Eight cases were admitted (3.8%) and 37 (17.6%) cases deserving admission were referred making the number of cases requiring admission 45(21.4%). One hundred six (50.5%) of the victims had major injury and the rest 104(49.5%) had minor injury (Tables 3 and 4). There were 30 cases of mild head injury, 5 cases of moderate head injuries and 14 cases of severe head injuries with 4 cases of vertebral fractures. The extremity injuries recorded were 113 (53.8%) of which soft tissue injuries were 51(35.8%), closed fractures were 37 (24.2%), compound single fractures accounted for 10(4.3%) and multiple fractures occurred in 15 (7.6%). Majority of the victims

(70.4%) were from the capital Addis Ababa out of which 11 (5.2%) accidents happened on the highway road in Addis Ababa where pedestrians are not allowed to cross. Hundred and forty five of the injured patients were pedestrians (69%), 46 were passengers (21.9%) and the rest 19 (9%) were drivers. Tables 5 and 6 show the type of vehicle and the mechanism of injuries.

**Table 1 . Age of the Patient Involved in the Road Traffic Crashes**

Age Pt	Frequency	Percent	Cum Percent
11-20	36	17.1%	17.1%
21-30	84	40.0%	57.1%
31-40	40	19.0%	76.2%
41-50	20	9.5%	85.7%
51-60	13	6.2%	91.9%
61-70	10	4.8%	96.7%
71-80	2	1.0%	97.6%
81-90	3	1.4%	99.0%
91-100	2	1.0%	100.0%
<b>Total</b>	210	100.0%	100.0%

**Table 2. Age Distribution of the Driver Causing the Crashes**

Age of Driver	Frequency	Percent	Cum Percent
<25	36	17.1%	17.1%
>56	7	3.3%	20.5%
25-35	83	39.5%	60.0%
36-45	30	14.3%	74.3%
46-55	12	5.7%	80.0%
Hit and Run	3	1.4%	81.4%
Unkown	39	18.6%	100.0%
<b>Total</b>	210	100.0%	100.0%

**Table 3. Musculoskeletal Injuries sustained in RTC**

Extremity Injury	Frequency	Percent	Cum Percent
Closed fracture	37	32.7%	32.7%
Compound fracture	10	8.8%	41.6%
Multiple fractures	15	13.3%	54.9%
STI	51	45.1%	100.0%
<b>Total</b>	113	100.0%	100.0%

**Table 4 – Incidence of Head and Spinal Injuries**

HEAD INJURY	Frequency	Percent	Cum Percent
Mild	30	32.6%	32.6%
Moderate	5	5.4%	38.0%
NO	1	1.1%	39.1%
Sever	14	15.2%	54.3%
STI	38	41.3%	95.7%
Vertebral fracture	4	4.3%	100.0%
Total	92	100.0%	100.0%

**Table 5. Mechanism of the Injury in the Road Traffic Crashes.**

Mechanism Of	Frequency	Percent	Cum Percent
Car on pedestrian	140	66.7%	66.7%
Collusion with stationary object	7	3.3%	70.0%
Decelerating injury for motorbikes	6	2.9%	72.9%
Rolling over	43	20.5%	93.3%
Two cars collusion	14	6.7%	100.0%
Total	210	100.0%	100.0%

**Table 6. Type of Vehicle Involved in the Road Traffic Crash.**

Type Of Vehicle	Frequency	Percent	Cum Percent
4wd	13	6.2%	6.2%
Automobile	38	18.1%	24.3%
Bus	15	7.1%	31.4%
Hit and Run	1	0.5%	31.9%
Light weight trucks	26	12.4%	44.3%
Minibus	56	26.7%	71.0%
Motor cycle	6	2.9%	73.8%
Other Taxi	16	7.6%	81.4%
Others	22	10.5%	91.9%
UK	17	8.1%	100.0%
Total	210	100.0%	100.0%

## Discussion

Road traffic crashes are a major public health challenge. We have noted Mortality form RTA constituted about 40% of the overall deaths of same period at our department including all elective and emergency operations (unpublished data from the department of surgery registry). The fact that most of the injured are males and are pedestrians goes with most international data for developing countries and also results of previous studies in Addis <sup>6</sup>. Out of the 210 cases presented to the emergency surgical OPD due to road traffic accidents 113 cases of orthopedic injuries in the form of single or multiple fractures and 48 cases of different levels of head injuries were entertained of which most required admission. This is a huge case burden which gravely affects and contracts the health service delivery for other diseases.

The numbers of injuries requiring hospitalization and the major cases according to the definition of this paper are by far very significant as a burden of disease in a country like Ethiopia where communicable diseases have been the major health problems and continue to be. Referred patients to other less specialized hospitals which may also have the bed shortages of their own beckons to the need to increase the bed capacity of the TAH and other hospitals to decrease the mortality and morbidity due to lack of early treatment and specialized care.

Our study showed most of the victims were brought within 4 hours which is acceptable for a country with nonexistent triage and accident response system but demands a stronger effort to make these durations as short as 15 to 20 minute to save more lives and reduce lots of disabilities.

Age group distribution of drivers involved indicates maturity may have a significant role in road safety and prevention of accidents. It makes a strong argument that it may be prudent that public transport vehicles to be driven preferably by a higher and mature age group than only the cut-off age of 18 and above for the driving license in the country. The other fact that most of the injured patients are in the same age group as the driver's show that there needs a lot to be done to increase awareness in the most important work force of the country about road accidents so that they comply with safe road use as pedestrians. Loosing these important productive population group will have significant effect in the overall productivity of the country and as they support lots of family who may be completely dependent on the income generated by these people. There must be something done to reduce its serious effect on the growing economy of the country.

The fact that most of the injuries were caused by commercial vehicles is in conformity with other middle and low income countries. Probably the way these vehicles are driven with some degree of competition and hence disregard for the traffic laws in the city are contributing factors why they cause most of the injuries.

## Conclusion

RTA's are major public health problems in Ethiopia as it is everywhere in the world especially in developing countries. There are lots of injuries requiring subspecialty treatment due to RTAs requiring the need of specialized treatment centers and specialists. There is a need of trauma center in the country including the capital with beds and equipment and personnel to handle the increasing RTA victims. There is need a lot to be done to improve awareness of the public both as driver and pedestrian about the safe use of roads and vehicles



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