Prevalence of road traffic injury and its associated factors at hospitals in Wolaita Zone

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Abstract

Background Road traffic injury is defined as fatal or non-fatal cases incurred as a result of road traffic crashes. It accounts for an estimated 1.2 million people death and as many as 50 million injury in each year worldwide. This study was aimed to determine prevalence and associated risk factors of road traffic injury.

Objective To determine the prevalence and its associated risk factors of road traffic injury.

Method Facility based cross-sectional study with sample size of 309 was used for conducting study in two selected hospitals in Wolaita Zone. Systematic sampling method was applied to select study subject based on inclusion criteria. Data was collected by questionnaires which was developed from reviewing different literatures and analysed by using SPSS version 20 statistical software.

Result Among the total of trauma victims who visited emergency department of hospitals, approximately half of victims (49.2%) were due to road traffic injury followed by falling injury 60 (19.4%) and burns 35 (11.3%). After adjusting for confounding in multivariate logistic regression analysis, sex and living places are independent factors of road traffic injury. Two of them are highly significantly associated with road traffic injury and being male and urban resident had thirteen times AOR 13.08 95% CI (6.15-27.85) and more than two times AOR 2.69 95% CI (1.55-4.64) increased odd of road traffic injury respectively.

Conclusion Road traffic injury was leading injury types among trauma victims visiting emergency department of Hospitals. Therefore, strong road safety policy at local and country level is needed to reduce vulnerability of individuals and vehicle related injury.

Background

Until the end of the 21st century, epidemiological and public health research made no intention of injury. Nevertheless, injury remains a hugely neglected public health problem(1). Between 1990 and 2013 injury DALY rates have declined by 30.9%, an annualized rate of decline of 1.6%, but this decline rate is widely varying across region and this significant change seen more in high income countries (2).

Road traffic injury is defined as fatal or non-fatal cases incurred as a result of road traffic crashes(3). Road traffic injuries accounts for an estimated 1.2 million people death and as many as 50 million injury in each year worldwide. Most of burden of road traffic injury falls in low-income and middle-income countries, which accounts for about 85% of the deaths and for 90% of the annual disability adjusted life years lost(4).

According to WHO data of road safety in 2017, more than three fourth of African countries are ranked as responsible for high road traffic accident death. In this ranking, Ethiopia is 22th which is 36.36 per 100,000 death (5). Road crash injury is a human-made problem which is amenable to rational analysis

and counter measures. In this sense, investigating risk factors of RTI is very important for taking evidence based prevention measure(4). Mainly road users, vehicle factors, environmental factors, driver factors and individual behavioural factors are known risk factors which hastens road traffic injury.

Many studies conducted in Ethiopia explored the possible risk factors of road traffic injuries. But in Wolaita Zone there were no study available on determinants of RTI. Therefore, this study would explore risk factors that are associated with road traffic injury which can be useful for taking intervention by stakeholders.

Methods

The study was conducted at WSURTH and Soddo General Hospital which are found in Soddo Town of Wolaita Zone. Soddo Town is administrative city of the Wolaita Zone, which is located 327 km from Addis Ababa. Soddo Christian Hospital is non-governmental hospital and it serves for local community as well as patient abroad from Ethiopia. It is one of the 10 surgical training centres in Africa and provides a full range of medical, and surgical service, including Orthopaedic and General, Maternity and Paediatrics. Wolaita Soddo University Teaching Referral Hospital is also located in this town and it serves around two million people(6).Emergency service is one of major service given by both Hospital listed above.

Study design

The study used was a cross-sectional study design with retrospective chart review for determining prevalence and risk factors of road traffic injury in WSURTH and Soddo Christian Hospital

Study period

Retrospective chart review was performed from May 23 to May 26, 2019 at hospitals which are found in Soddo Town of Wolaita Zone.

Source population

The source population were road traffic injury victims of Soddo Town.

Study population

Study populations were injury victim whom registered on chart that were visited emergency department of health facility from July 1st to Dec 2011 E.C(6-month data).

Inclusion criteria

Those who are victims of road traffic injury within range of study period

Exclusion criteria

Those who have incomplete information regarding injury on register of the patient, those who are admitted emergency department because of medical conditions are excluded from study.

Sample size and sampling technique

The number of clients included for the study was estimated by applying a single population proportion formula with the following assumptions: α = the risk of rejecting the null hypothesis (0.05), d = degree of precision or margin of error (0.05), Z = the standard score corresponding to a 95% confidence interval and $p = 62.5\%$, which is the proportion of road traffic injury in previous study conducted in Wolaita Zone(7).

Accordingly, the sample size determined using single proportion formula with finite population correction factor by using OpenEpi V303 is 309. Correction factor is used with evidence of Wolaita Zonal health department report of road traffic injury. In here, total number of road traffic injury reported in HMIS of Soddo Town in 2010 EFY is 2151. But sample size calculated for associated risk factors of road traffic injury which estimated less sample size is discarded.

Proportional allocation of study participant was done based on injured patient number who visited hospital with in range of study period. Then using systematic random sampling technique, first card was selected by lottery method, then using K^{th} interval subsequent cards was selected and their card was traced using registration number.

Data collection instruments and procedure

By using checklist developed from reviewing literature conducted at hospital levels which were prepared in English was used as a data collection instrument. Data was collected from randomly identified charts of trauma cases who visited emergency department of two hospital.

Variables

Dependent variable

Road traffic injury

Independent variable

- Age
- Gender
- Residence

Data analysis

Data was collected and checked for completeness and accuracy, then coded, entered and analysed in SPSS version 20 computer software. The assumption of logistic regression was checked by using multi-collinearity diagnostic test ($VIF < 10$, $\text{tolerance} < 0.1$). Binary logistic regression analysis was carried out to distinguish association of independent and dependent variable.

Then, p -value of less than 0.25 was candidate for multivariate logistic regression. Using multivariate logistic regression analysis, 95% CI and adjusted odds ratios (AORs) were computed in order to identify any statistically significant associations between risk factors and RTC involvement. The level of statistical significance was set at $P < 0.05$. The goodness of fit of the final logistic model was tested using Hosmer and Lemeshow test at a p value > 0.05 . The result was presented in narrative, tables and figures.

Results

A total of 309 subjects selected based on eligibility criteria is included in results, which makes response rate 100%. Among total of victims who were visited of emergency department in two selected hospitals, approximately half of clients (49.2%) were due to road traffic injury followed by falling injury 60 (19.4%) and burns 35 (11.3%) (Figure 1).

Socio-demographic characteristics

A total of 309 injury victims who visited emergency department of hospitals were included in the study. Of all victims visited the hospitals approximately three fourths are 231 (74.8%) were male. The mean age of the injury victims was 31.45 ± 14.72 . Above one fourth 89 (28.8%) of victims were aged between 20–29 years followed by age 30–39 years 67 (21.7%). RTI more commonly occurred in urban areas than rural areas (*Table 1*)

Characteristics of road traffic injury

Among road traffic injury victims, about three fourth of clients injured part of the body is lower limb (42.1%) and head injury (30.9%) followed by trunk injury (*Figure 2*). Majority 68 (44.7%) were due to motor bicycle crash followed by 26 (17.1%) were due to Bajaj and 21 (13.8%) due to Isuzu (*Table 2*). Regarding to role of victims at time of road traffic injury, 79 (52%) were passengers, 81 (33.8%) were pedestrians followed by 33 (21.7%) and 29 (19.1%) were drivers (*Table 3*).

Factors associated with road traffic injury

In binary logistic regression analysis, sex and living place of client are associated with road traffic injury with 95% CI and p-value of less than 0.05. Accordingly, being male is more than 12 times COR 12.46 95%CI (5.92–26.21) increased of road traffic injury victims than female. With this analysis, those who are living in urban area had more than two times COR 2.45 95%CI (1.49–4.03) increased odd of having road traffic injury when compared to those who are living in rural area.

After adjusting for confounding in multivariate logistic regression, age, sex and living places are independent factors of road traffic injury. Being male, and urban resident had thirteen times AOR 13.08 95%CI (6.15–27.85) and more than two times AOR 2.69 95%CI (1.55–4.64) increased odd of road traffic injury respectively. The odd of road traffic injury is more than 3 times AOR = 3.05, 95% CI (1.20–7.69) higher for individual of below 15 years old as compared to individual above 45 years old.

Discussion

The overall prevalence of road traffic injury among trauma victims were 49.2%, which was high and consistent with studies conducted in Arbaminch General Hospital in Ethiopia. Study conducted in South Ethiopia at Arbaminch, the prevalence of road traffic injury among emergency admitted patients were 47 % in which figure was not far from this study (8). But, this studies prevalence is higher than study conducted at Jimma specialized hospital (30.3%), Amhara Regional public hospitals (20%) and A.A Zewuditu Memorial Hospital (9–11). This was may be due to difference in geographical location. In contrary to this, it was lower than previous study conducted in similar study area. This was may be due to difference in time.

Regarding age of clients affected by injury, age of range of (20–29) and (30–39) are more affected than other age groups and elder and below 10 years are less affected. The odd of road traffic injury is more than 3 times $AOR = 3.05$, 95% CI (1.20- 7.69) higher for individual of below 15 years old as compared to individual above 45 years old. This study result was consistent with finding Arbaminch General Hospital, EDHS 2016 secondary data analysis, Dicholora Hospital and Tekur Anbessa Referral Hospital (8, 12–14). It was also consistent with previous study conducted in Wolaita Zone in similar study area (7). In this study age of clients had no association with occurrence of road traffic injury by both binary and multiple logistic regression. This was supported with finding from Jimma specialized Hospital (9). But, according to EDHS 2016 data age of between 30 and 64 were more than six times $OR\ 6.06$ 95%CI (3.34–10.98) increased odd of experiencing road traffic injury than age between 15 and 29 categories (12).

In this study, road traffic injury was more common among males than females. Also, in multiple logistic regression, being male were thirteen times $AOR\ 13.08$ 95%CI (6.15–27.85) more risk of road traffic injury than females. Similarly, study conducted in Central Ethiopia(15) and Arbamich Hospital (8), being male had $AOR = 20.73$ 95% CI (4.088–105.134) and $AOR = 4.74$, 95% CI (1.5–15) more risk of road traffic injury than female respectively. In contrary to this, study conducted in Jimma Specialized Hospital, being male had decreased risk of road traffic injury (9). This was may be due too difference in study settings.

Regarding the residence of injury victims who visited emergency department, most of them (68%) are urban. Also, road traffic injury is more common among urban residents. The clients who comes from urban area had thirteen times $AOR\ 13.08$ 95%CI (6.15–27.85) more risk of road traffic injury than rural. This study result was consistent with study of secondary analysis of EDHS 2016 (12).

About 44.7% motor vehicle accounts for road traffic injury followed by 17.1% Bajaj. This figure was higher than the previous study conducted in these two hospitals. But study conducted in A.A city about 78% of road traffic injury occurred by automobile (11). This is due to high traffic load of road by automobile in A.A city than motor vehicles.

Above half 52% of road traffic injured were passengers and 33.8% were pedestrians, which are considered as vulnerable road users. This studies result is higher than studies conducted in other part of Ethiopia (7–9, 11, 12, 14).

STRENGTH AND LIMITATION OF STUDY

The main strengths of this research were the study conducted in one of the main higher hospitals in Wolaita Zone, thus likely reflecting the operational realities of a public hospital ED in an urban context. Supplementing data from traffic police report gave clue for further study or research gap. There were a number of study limitations. Lack of some very useful data was a problem. For example, the records in the health institution had no full information specially on risk factors of road traffic injury. Also, this study falls in fit ball of cross-sectional study. Finally, we did not assess the outcome of the RTI at the end of hospital discharge, which was beyond the scope of this study.

Conclusion

Prevalence of road traffic injury was proportional high among trauma victims who visited emergency department of Hospitals. The risk factors of road traffic injury identified in this study were being urban and male in sex. Two wheeled (motor bicycle) and three-wheeled (Bajaj) vehicles were most commonly injured than other vehicle types. Also, vulnerable road users such as pedestrian and passengers were affected more than others.

We suggest further study on determinants of road traffic injury of two- or three-wheeled vehicles and vulnerable road users. Also, strong road safety policy at local and country level will be needed to protect vehicle related injury and vulnerability of road traffic injury.

Abbreviations

AOR: Adjusted Odd Ratio; CI: Confidence Interval; EDHS: Ethiopian Demographic Health Survey; RTI: Road Traffic Injury; SCH: Soddo Christian Hospital; WSURTH: Woalita Soddo University Referral and Teaching Hospital; UN: United Nation; ED: Emergency Department; HMIS: Health Management Information System

Declarations

Declaration

Publication charges for this article have been funded by No body.

Competing interests

The authors declare that they have no competing interests.

Funding

No funding was obtained for this study

Consent to publish

Not applicable

Ethics and consent to participate

Permission was obtained from Wolaita Sodo University, College of Health Sciences and Medicine. After finalizing, the study was submitted and approved by WSU ethical Review committee. The advantages and purposes of the study were explained to staff members of the hospitals. Then, for retrieval of individual record and confidentiality of information a written consent was given to the record office of the hospitals. After completion of data collection, medical records were returned back to their original place properly.

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Availability of data and materials

The data set used and/or analysed during this study available from corresponding author on reasonable request.

Authors' contribution

Conceived and designed study: HSW, Contributed and Provided training on SPSS analysis tool: and conducted the study: LTA also conducted the study, Analyzed the data and wrote the paper: Both Authors read and approved final manuscript.

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Tables

Due to technical limitations, tables are only available as a download in the supplemental files section.

Figures

Figure 1

Body part affected due to road traffic injury at SCH and WSURTH from July1st to Dec 2011 E.C in Wolaita Soddo Town

Supplementary Files

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