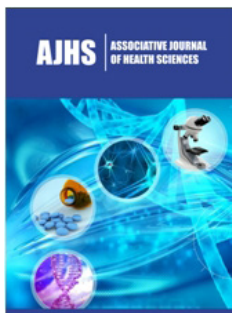



Prevalence and Outcomes of Road Traffic Accidents in Children, Southwest, Ethiopia

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Abstract

Background: Road traffic accidents (RTA) are the leading cause of unnatural deaths and a major burden in many African countries including Ethiopia. RTA is extremely common among children and the injuries suffered by those involved can differ greatly from minor to fatal injuries. Even though child trauma is a problem in Ethiopia, no adequate study has been conducted to determine the prevalence and outcome of RTA in children to support the formulation of effective solutions to improve road safety in children.

Objective: The aim of this study was to determine the circumstances, prevalence and outcomes of RTA among children in Agaro general hospital, Southwest Ethiopia.

Design: Hospital-based retrospective study design.

Setting: Agaro general hospital, southwest Ethiopia.

Participants: Total 405 injured children visited the emergency department of Agaro general hospital between 1/1/2018 and 30/8/2021. Data were collected from 1/9/2021 to 23/10/2021 from children medical charts using a structured checklist, then entered Epi-data version 4.4.2.1 for cleaning, analyzed using SPSS version 24. Tables, charts, and texts were used to report the results.

Primary outcome: Circumstances, prevalence and outcomes of RTA on children

Result: The overall of RTA in all injury cases was found to be 24.2 % (95% CI: 20.26-28.63). Males were more likely to be victims than females. Most of the children affected were in the age category of 13-18years. The majority (67.35 %) recovered from their injury after they receive care at the emergency department. The majority of accidents have occurred around streets and more than half are caused by the involvement of bicycles and motorcycles.

Conclusion and recommendation: The prevalence of RTA among children was found to be high and continued as a public health problem; therefore, education targeting both children and the wider community, enforcement of penalties, and other effective programs should be implemented to minimize the problem

Keywords: Road traffic accidents; Prevalence; Outcome; Southwest Ethiopia

Abbreviations and Acronyms: FMOH: Federal Ministry of health; LMICs: Low-and-Middle-Income Countries; RTAs: Road Traffic Accidents; PTSD: Posttraumatic Stress Disorder; SPSS: Statistical Package for Social Science; WHO: World Health Organization

Article summary

Strength and limitation of the study

The study focus of the research was on hospital based available data in relation to RTA involvement in children, which was ignored previously. The results provide insight for policy makers within the country to develop evidence-based regulations to reduce or mitigate RTAs among children in Ethiopia. While using only descriptive analysis and cross-sectional methods on secondary sources of data can be a limitation.

Introduction

Every day around the world, the lives of more than 2000 families are torn apart by the loss of a child to an unintentional injury or so-called "accidents" [1]. According to the World Health Organization, more than 1.2 million people die each year, and up to 50 million are injured on the world's roads [2]. Even though Africa and eastern Mediterranean regions have the highest rates of fatalities from road traffic accidents (RTA) below 20 years of age, low- and middle-income countries still lack the most basic epidemiologic data [3].

Pediatric trauma is primarily observed in neglected young children and leading to high morbidity and mortality rates. Road traffic injuries are the fourth leading cause of death in children aged 5-9 years, the 3rd leading cause of death in children aged 10-14 years and the 1st cause of death in children aged 15-17 years [2].

Childhood injuries have emerged as a significant public health concern necessitating urgent attention [4]. Road traffic injuries and deaths have a significant impact on individuals under the age of 18 who account for more than 186,000 road traffic deaths annually [5]. Ninety percent (90%) of all deaths and DALYS among children in developing countries are lost due to traffic accidents [6].

In addition to mortality, road traffic injuries are associated with lifelong disability, psychosocial problems, and financial losses to the victim and their families [4,7,8]. Road traffic injuries place a heavy burden on a country's economy through the direct impacts on health care and rehabilitation services as well as indirect costs [9]. A Meta-Analysis on the prevalence of posttraumatic stress disorder (PTSD) among Children and adolescents following RTA indicated that one-fifth of children and adolescents develop PTSD in the aftermath of RTAs [10].

Studies of children in road traffic have shown that young children may lack the knowledge, skills and levels of concentration needed to manage the road environment, regardless of the road conditions and patterns of the accidents [1,3,8].

The study done in Karnataka, India showed that RTA's prevalence is more in 15-18-year age group (31%), and males are affected more commonly (79.5%) [11]. Retrospective study conducted in Addis-Ababa, Ethiopia indicated that 11.4% accidents occurred in children 4-14 years of age [6]. In Ethiopia Approximately 13 Ethiopians per day do not return home because they are victims of road traffic crashes which mostly affect passengers, and pedestrians [12]. Yet, little is known about road traffic accidents in children and their outcomes. Therefore, this research seeks to address the lack of information on road traffic accidents in children and determine the epidemiology of road traffic accidents, the circumstances surrounding them and their outcomes.

Material and Methods

Study area and period

The study was conducted at Agaro general hospital, which is located in Jimma Zone of the Oromia Region southwestern Ethiopia. Agaro general hospital is located in the Jimma Zone of the Oromia Region, 397 km from Addis Ababa the capital city of Ethiopia. Agaro

general hospital provides many inpatient and outpatient services such as dental care, ophthalmic, medical, surgical, gynecology, obstetrics, pediatrics and emergency services. In the emergency department of Agaro general hospital, 680 pediatric trauma individuals visited from 1/ 1/2018 to 30/8/2021. This study was conducted from 1/9/2021 to 23/10/2021.

Study design: Institutional based retrospective cross-sectional study design was conducted among children visiting emergency department.

Population, eligibility criteria

All children with any type of trauma below or equal to 18 years old who visited in the emergency department at Agaro General Hospital from 1/ 1/2018 to 30/8/2021 E.C. were source population.

In this study, all children under the age of 18 visiting the Emergency Department (ED) of Agaro General Hospital emergency department, due to road traffic injury, from 1/ 1/2018 to 30/8/2021 were study population.

Exclusion criteria: Children whose charts had an incomplete observation on major variables (age, date of admission,) and lost cards were excluded.

Sampling procedure

A single population proportion formula was used to determine the sample size and the following assumptions were made, 95% confidence level, 5% margin of error, and prevalence $P=39.8\%$ (0.398), taking the prevalence of childhood road traffic trauma among children visiting the emergency department of ABET Hospital, Addis Ababa, Ethiopia [13].

$$n = \frac{(z\alpha / 2)^2 * p(1-p)}{d^2}, n = \frac{(1.96)^2 * 0.398(0.602)}{(0.05)^2} = 368$$

Then considering a 10%, non-response rate for incomplete and lost card final minimum sample size required for this study was 405.

Sampling techniques and procedure

A sample among such children was selected from the sampling frame using a simple random sampling technique by using the computer random number generating system to select a required number of study participants. Their medical record number was used to extract the medical charts of the selected participants from the card room.

Operational definitions

Pediatric trauma: refers to traumatic injury in children ≤ 18 year.

Traffic accidents: Defined as an accident involving at least one vehicle on a road open to public traffic in which at least one person is injured or killed.

Who are children?: A child is every human being under the age of 18 years [1].

Outcome of road traffic accidents: Measures how an injury could be serious to threaten loss of life or not (died /discharged / referred/ left against medical advice) [14].

Data collection tools and procedures

The checklist was adapted after reviewing previously conducted research and modified to local context to address the objective of the study. Data collectors were trained in the data collection process. Data were extracted from children's medical chart using a structured checklist. Data were collected by BSc two nurses and supervised by an MSc. Nurse.

Data processing and analysis

Data were entered and coded through epi-data version 4.4.2.1 then exported into SPSS version 24 for statistical analysis. Descriptive analyses were carried out for variables and reported as frequency distribution, and percentages. The findings of the study were also presented using pie charts, and tables according to the type of data.

Data quality assurance

In order to ensure the quality of data, pretest of checklist was done on 5% of the total sample size of the study one-week prior to the actual data collection period using the medical records of children who were not included in the actual study. Based on the pretest result wording, presences of variables on the checklist were checked with recorded variables on the patients' medical charts and modified accordingly. One day training was given to data collectors and supervisor on the objective of the study and how to gather information using the data extraction checklist. Supervisors were observed during the data collection process. The principal investigator and supervisor were checked daily for the completeness of the filled checklist.

Ethical consideration

Permission Letter was obtained from the research committee of Mizan-Tepi University, Department of Nursing. Then, data was collected after consent of cooperation was obtained from hospital administrator focal person. Because of the anonymous and retrospective nature of the study, the need for informed consent was exempted.

Patient and public involvement

The study participants were not involved in the development of the research question or design, conduct, reporting, implementation or dissemination plans and evaluation.

Result

From January / 1/2018 to 30/8/2021, 680 patients under 18 years of age visited Agaro General Hospital. Of these, 405 pediatric trauma medical charts were reviewed based on the required samples making a response rate of 100%.

Socio-demographic characteristics

Among 405 study participants, 271(66.9%) of injured children were male. The majority 167(41.2%) of children five to twelve years or more were affected by trauma. Similarly, the majority 315 (77.8%) of the trauma case children who came from urban areas (Table 1).

Table 1: Socio- demographic characteristics of injured children visited Emergency Department of Agaro General Hospital, from September 1/ 1/2018 to 30/8/2021(N=405).

Characteristics	Categories	Frequency	Percent (%)
Sex	Male	271	66.9
	Female	134	33.1
Age in years	Less than 5 years	109	26.9
	5 to 12 years	167	41.2
	13 to 18 years	129	31.9
Residence	Urban	315	77.8
	Rural	90	22.2

Prevalence and factors associated with road traffic injury among children

In this study, the prevalence of RTA was found to be 24.2% (95% CI: 20.26-28.63). Majority of the children affected by RTA were males, which was approximately 68.37%. Most (40.82%) of the children affected were found to be in the age category of 13-18years. Most (58.16%) children did not use any vehicle for transportation like bicycles and motorcycles before the occurrence of accidents (Table 2).

Table 2: Background information of the children affected by road traffic accidents, Southwest Ethiopia, 2021.

Characteristics	Category	Frequency	Percentage
Sex	Female	31	31.63
	Male	67	68.37
Age(years)	<5years	29	29.59
	5-12 years	29	29.59
	13-18	40	40.82
Resident	Urban	82	83.67
	Rural	16	16.33
Did Injured children use any vehicle for transportation?	Yes	41	41.84
	No	57	58.16

Outcome status and length of hospital stay of road traffic accidents

Even though the affected children had different arrival time to the Emergency Department of Agaro General Hospital, the majority, (83.67%) of them had arrived within 24 hours from the event of RTA. Seventy-seven (78.57%) of the affected children had one week of hospital stay/admission. In this study from children affected by

road traffic accidents, after triage in the Emergency Department, the majority (67.35 %) recovered from their injury after they received care in the Emergency Department, which approximately 18.37% of the cases died from their accident (Table 3).

Table 3: the outcome status and length of hospital stay among children affected by road traffic accidents, Southwest Ethiopia 2021.

Outcome Category		Frequency	Percentage
children outcome with road traffic accidents	Recovered	66	67.35
	Left Against Medical Advice	6	6.12
	Refereed	6	12.12
	Death	18	18.37
	Outcome Not Documented	2	2.04
Arrival time to the hospital	within 24h	82	83.67
	24 to 72h	8	8.16
	after e 72h	8	8.16
Length of hospital staff stay	≤7 days	77	78.57
	>7 days	21	21.43

In this study, the majority of road traffic accidents (61.2%) had occurred around streets and more than half of the accidents (52.0%) were caused by the involvement of bicycles and motorcycles. The majority (69.4%) of the injured children did not receive any care/prehospital care before arriving at the Emergency Department. More than half (58.0%) of the victims were sorted out/screened for red triage (Table 4).

Table 4: Place of injury, types of vehicle involved, and triage category in children affected by road traffic accidents, south west Ethiopia 2021.

Characteristics	Category	Frequency	Percentage
Place of injury/ accidents	Near home	29	29.6
	At street/road	60	61.2
	Near school	7	7.1
	Others	2	2
Types of vehicles involved in RTA	Car	33	33.7
	Bajaj	14	14.3
	Bicycle and motorcycle	51	52
Anatomic sites involved in injury	Abdomen and pelvic area	38	38.8
	Head and face	27	27.6
	Chest and thoracic	22	22.45
	Upper limb	4	4.1
	Lower limb	4	4.1
	Spine	3	3.06
Pre-hospital care	Yes	30	30.6
	No	60	69.4

Triage categories	Red	57	58.2
	Orange	4	4.1
	Yellow	26	26.5
	Green	11	11.2

In this study, the majority (88.78%) of the children sustained an injury to a single body region, line their hands, head, leg, etc.; while approximately 11.22% of the children had many traumatic injuries, more than one body region, all affected by the accident (Figure 1).

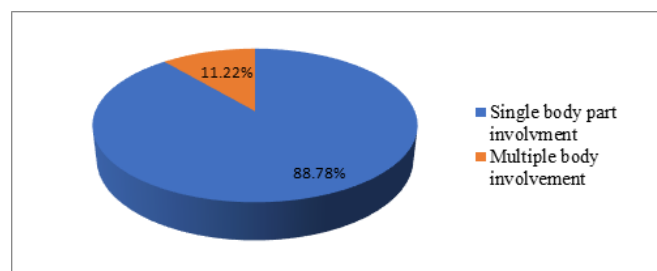


Figure 1: Type of body involvement during trauma among children affected by road traffic accidents, southwest Ethiopia 2021.

Discussion

Road injury estimates have been inconsistent across studies. This study sought to determine the prevalence and outcomes of road traffic accidents among children. In this study, the prevalence of RTAs in children was found to be 24.2% (95% CI: 20.26-28.63). The prevalence in this study was consistent with WHO data of 2004, 22.3% [1], and higher than the study conducted in Hyderabad, India, in which the overall prevalence of self-reported roads was 17% [15], Iran, (EDHS) indicating approximately 0.9% of the children received RTIs in 2010 [16] and the study conducted in Morocco (21) RTA was (18.1%). This discrepancy may be due to the difference in road traffic safety practices and exposure status, variations in road infrastructure among countries. On the contrary the prevalence of our study was lower than the study conducted at Addis Ababa AaBET Hospital, where RTAs accounted (40%) [17]. This difference might be due to the higher traffic burden in Addis Ababa, which is the capital city of Ethiopia, in comparison we found a lower traffic flow in our study area, which is rural and implies that more children that lived in a city were more affected.

In this study, majority of the children affected by road traffic accidents were males, which was approximately 68.37%. This result was consistent with other study findings such as the WHO 2004 data [1], India [15] and Ghana [18]. Various reasons might be proposed for the difference in road traffic accident rates between boys and girls, which may include boys engaging in more risk-taking activities than girls and boys having higher activity levels the road. It may also include the suggestions that boys are more socialized and are less likely to have their exploration restrained by parents and They are more likely to be allowed to go school and play alone, which leads them to engage in risky acts like those that occur around the road, which can lead to RTAs.

This study shows that the prevalence of road traffic accidents is more in the 13–18-year age group (40.8%) than in the 5-12 year of age. This finding was in line with a study conducted in Iran (16) and India 2022/7/10. This might be because as the age of the children increases, their independence from their family increases (less control) and protection may expose the children to RTAs. As a child ages, the risk of road of accidents increases [19].

In this study, most RTAs (61.2%) occurred around streets, which is in line with a study conducted in Addis Ababa [17]. Around 18.37 % of children died because of road traffic accident, which is higher than the study conducted in Turkey. The fatality rate from RTIs in children rose to 2.13 in 2019 [20]. This difference may be that the study in Turkey includes only children aged 0- 14 years, while our study included children up to 18 years of age. Using the secondary source of data is a limitation of this study.

Conclusion and Recommendation

Road traffic accidents in children remain a major public health concern. In our study, boys were more affected by road traffic accidents than girls and the proportion of road traffic accidents was higher in children who were 13-18 years old than their counterparties. In addition, the majority of road traffic accidents had occurred around streets, and more than half of the accidents were caused by the involvement of bicycles or motorcycles. In this study, children affected by road traffic accidents, after triage in the emergency department, majority recovered from their injury after they receive care at the emergency department.

Children's maturity, their interests and needs differ from adults, and simply reproducing injury prevention strategies that are relevant to adults does not adequately protect children from RTAs; therefore, a special focus should be given for children and their parents to avert their exposure status. This fact strongly calls for implementing effective solutions to improve traffic safety for children by the different stakeholders. Therefore, children injury prevention should receive greater attention among policymakers and the public. Ministries of Health should play a central role in prevention, advocacy and research and in the care and rehabilitation of children with disabilities.

Acknowledgement

Mizan-Tepi University department of nursing is acknowledged for providing ethical clearance to conduct this study. Our thanks also go to Agaro General Hospital administrators and the record keepers. Finally, it is also our pleasure to thank the data collectors and supervisors.

Ethics Approval and Consent to Participate

Ethical Letter was obtained from the research committee of Mizan-Tepi University department of nursing Review committee of nursing department with. IRB number, Ref: Nurse/503/21. Because of the anonymous and retrospective nature of the study, the need for informed consent was exempted and therefore no written consent taken from the child or parent. To keep the confidentiality names

and any personal identification of the children were not registered in the data collection tool. Generally, the study was performed per the Declaration of Helsinki.

Authors' Contributions

All authors contributed to the work reported equally, in the conception, study design, execution, and acquisition of data, analysis and interpretation. They also drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

Consent to Participate

Because of the anonymous and retrospective nature of the study, no written consent from the patient or parent was required but other requirements were fulfilled.

Conflict of Interest

The authors declared no conflict of interest.

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