



**HARAMAYA UNIVERSITY**  
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**HARAMAYA UNIVERSITY**

**COLLEGE HEALTH AND MEDICAL SCIENCES**

**POST GRADUATE PROGRAMS DIRECTORATE**

**TRENDS AND FATALITY FROM ROAD TRAFFIC ACCIDENT AND  
ASSOCIATED FACTORS AMONG VICTIMS REPORTED TO TRAFFIC  
POLICE STATIONS IN SELECTED FOUR CITIES IN PUNTLAND  
STATE OF SOMALIA.**

**MPH THESIS**

**BY**

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among Victims Reported To Traffic Police Stations in Selected four Cities in  
Puntland State of Somalia**

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## **BIOGRAPHICAL SKETCH**

I was born in 1995 in Galkaio, Puntland State, Somalia. My early years were spent in Galkaio, where I received my foundational education at Barda'ad Primary School, followed by Omar Samater Secondary School. These institutions played a crucial role in instilling in me a thirst for knowledge and a commitment to academic excellence.

Driven by a deep passion for education, I graduated in June 2021 from Red Sea University in Galkaio with a Bachelor's degree in Veterinary Medicine. This program equipped me with a strong understanding of animal health systems and veterinary clinical practice, as well as the vital role veterinary professional's play in public health.

Currently, I am on the edge of completing my Master of Public Health in Epidemiology at Haramaya University in Harar. This advanced study has broadened my expertise in disease prevention and health promotion, emphasizing the interconnectedness of human, animal, and environmental health. In addition to my academic pursuits, I have been working at the Red Sea University Galkaio, Compus, since September 5, 2021.

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## **ACRONYMS ANDS ABBRIVATIONS**

CI	Confidence Interval
DALYs	Disability Adjusted Life Years
HU	Haramaya University
IHRERC	Institutional Health Research Ethics Review Committee
MVA	Motor Vehicle Accidents
OR	Odds Ratio
RTA	Road Traffic Accident
RTD	Road Traffic Death
RTI	Road Traffic Injury
SSA	Sub Sahara Africa
USA	United State of America
WHO	World Health Organization

## ABSTRACT

**Background:** Road traffic accidents pose a global challenge that impacts nations worldwide. Road traffic accidents are a significant public health problem and have become the leading cause of mortality and morbidity. Even though there is a problem of road traffic accidents in Puntland, no study so far has been conducted study area

**Objective:** This study aimed to assess trends and fatality from road traffic accident and associated factors among victims reported to traffic police stations from January 01 to December 31, 2023, in selected four cities in Puntland state of Somalia.

**Methods:** An institutional-based cross-sectional study was conducted in selected cities in Puntland State, Somalia, focusing on victims registered and reported to traffic police station. With the sample of 536 victims, central station police were selected through simple random sampling. A systematic sampling method was employed to gather representative data from victim registries at four central police stations. Data analysis was performed using STATA version 17. Binary logistic regression were used to assess crude associations between fatality and independent variables, Factors that show a significant bivariate association ( $p \leq 0.25$ ) for candidate in multivariate logistic regression analysis.

**Results:** The majority of road traffic accident (RTA) victims were male (63%), with the most affected age group being 18-30 years. Urban residents (70.40%) were more frequently involved in accidents. The highest number of accidents occurred in May, September and August, with most accidents occurring on city roads (71.73%) during normal working days. The study found that prevalence of fatalities from road traffic accidents were 31.31 % ( 95% CI: 27.4, 35.5%). Drivers aged 31–50 years (AOR, 4.49, 95% CI, [2.26, 8.91]), In type of accidents, Rollover accident (AOR, 2.15, 95%CI, [1.02, 4.52]), Vehicle collision with animal (ARO 3.82, 95%CI, [1.45, 10.04]), accident occurred at night time (AOR, 2.29, 95%CI, [1.1, 4.97]) were found to be statistical associated with more fatalities. Private vehicles, extremity injuries, and public vehicles were associated with less fatality from road traffic accidents.

**Conclusion:** Fatality prevalence from road traffic accident was found to be higher. Driver age, type of accidents, time of accident, site of injury, and vehicle type were statistically significantly associated with fatal outcomes. To reduce fatality, Puntland state should be develop and implement educational programs specifically for middle age drivers.

**Key Words:** Trends, fatality, non-fatality, victim, Road traffic accident, Puntland, Somalia.

# 1. INTRODUCTION

## 1.1. Background

Road traffic accidents (RTAs) pose a global challenge. They lead to injuries, disabilities, and fatalities and affect individuals of all ages, particularly affecting children and the working population. It is the leading cause of death among individuals aged 5-29 years, according to a 2018 report by the World Health Organization (WHO). Annually, road traffic accidents claim the lives of around 1.3 million people globally, and an additional 20–50 million individuals experience non-fatal injuries, often resulting in disabilities and shockingly. 93% of these fatalities occur in low- and middle-income countries, despite these nations having only 60% of the world's vehicles (Razzaghi et al. 2019). A road traffic accident (RTA) is a public road or street accident involving at least one moving vehicle that results in injuries or fatalities, it is a significant global concern, posing a major threat to public health and economic development (Pradhan et al. 2023).

Road traffic injuries cause substantial economic losses to individuals, families, and nations. These losses stem from treatment costs and lost productivity due to fatalities and disabilities. Road traffic crashes cost around 3% of gross domestic product (GDP) in most countries (Ahmed 2023). The cost associated with road traffic accident (RTA)-related fatalities and injuries has a significant effect on socioeconomic development and societal well-being (Misker et al. 2017). In 2020, RTA was declared the third-largest contributor to the global burden of disease (Murray 2022).

Road traffic accidents (RTAs) cause severe and long-term physical and psychological consequences for the victims (Mekonnen et al. 2022). The burden of road traffic injuries (RTI) is higher in Africa due to the high number of road users who are exposed, overcrowding, poor transportation conditions such as not using seat belts, and hazardous driving conditions (Alemayehu 2023). Evidences on the Risk factors for RTA reported from various countries in Africa (Kenya, Uganda, Ethiopia, Tanzania, Ghana, South Africa, and Zimbabwe) demonstrate that a variety of factors include human factors, drivers and pedestrians, vehicle factors such as poor vehicle maintenance, vehicle overload and environment related factors, hilly terrain and, road factors bad infrastructure are mostly causes for the majority of traffic accidents (Rosen 2022). Road traffic accident-related traumatic brain injuries (RTAs with TBIs) are strongly influenced by environmental conditions such as road quality, weather, and time of day as well as risky human behaviors, including speeding, drunk driving, and distracted driving. Additionally, children

involved in non-motorized activities (like cycling, running, or walking) may experience minor injuries that can escalate into more serious events(Zainafree et al. 2022).

Road traffic accidents (RTAs) arise from three main factors: human, environmental, and vehicle-related. Human factors such as age, alcohol use, fatigue, stress, and poor safety practices are the leading contributors. Environmental factors include difficult terrain, seasonal traffic increases, harsh weather, time of day, and inadequate road signage, Vehicle factors relate to the condition of the vehicle and the driver's familiarity with vehicle increase road traffic accidents(Madhumali et al. 2021). Driving under the influence of drugs is a major public health concern, and alcohol use is strongly linked to higher rates of illness, death, and violent injuries including road traffic accidents, which rank among the most significant alcohol-related harms(Papalimperi et al. 2019)

## 1.2. Statement of Problem

In 2015, WHO reported that the impact of RTA deaths varied across countries: low-income countries had 24.1 deaths per 100,000 of the population, middle-income countries had 18.4 deaths per 100,000, and high-income countries had 9.2 deaths per 100,000 (Razzaghi et al. 2019). According to the World Bank and World Health Organization have reported that globally, there are approximately 500,000 fatalities and 15 million injuries per year due to road accidents. This highlights the significant public health impact of road safety issues around the world(Razzaghi et al. 2019), The global burden of road traffic injury (RTIs) has been growing over the past decades, and it is estimated that it will become the fifth leading cause of mortality by 2030. Additionally, RTIs are the eighth leading cause of disability-adjusted life years (DALYs)(World Health Organization 2018).globally road traffic accident, four wheel vehicle are mostly causes of accidents and occupants up 30% of fatalities, followed pedestrians 23%, two and three-wheeler 21%, and cyclists 6% of fatalities(WHO 2023).

Developed countries have had success in reducing the occurrence of road traffic accidents (RTAs) through cost-effective interventions, however, in Africa road traffic injuries and deaths have been steadily increasing over the past three decades. In 2013, the region had the highest rate of fatalities from road traffic injuries worldwide, with 26.6 deaths per 100,000 population, This is due to the continent's ongoing rapid economic growth and increasing motorization, particularly in many Sub-Saharan African (SSA) countries, which are facing an enormous road safety crisis(Adeloye 2016). as road networks are expanded and motorization rates increase, particularly in rapidly urbanizing areas, this can contribute to a higher incidence of road traffic accidents (RTAs) and negatively externality associated with fatalities. The worsening fatality rate from RTAs as motorization grows globally is a significant public health challenge (Goyal 2018).

In Namibia on motor vehicle accidents highlighted that the fatality rate for motor vehicle accidents (MVAs) in Namibia was 14 per 100,000 population, This highlights the significant burden that motor vehicle accidents on public roads and safety in Namibia, with high fatality rates and a concerning number of accidents and deaths, particularly in the Oshana region.(Nghishihange 2018).

In Ethiopia, road traffic accidents (RTAs) were found to be the most common type of injury, it become a serious public health problem, Rapid population growth, rapid motorization and Factors

such as weak enforcement of road traffic laws, pedestrian ignorance, driver negligence, poor road infrastructure and road networks, poorly maintained or defective vehicles, rampant reckless driving, and irregular or non-existent vehicle maintenance are increased RTA(AkliluToma 2021). In Uganda is facing a severe road traffic injury (RTI) epidemic and the estimated road traffic death (RTD) rate in Uganda is 29 per 100,000 population and road traffic fatalities were 40% road traffic deaths involved vulnerable road users pedestrians, cyclists, etc. (Biribawa 2019).

In Kenya, has found, road accident related deaths have increased by mainly result from human error, including careless driving, drunk driving, distracted driving, and unsafe actions by pedestrians and passengers. Additional risks come from natural or man-made obstructions such as stalled vehicles, fallen trees, rocks, or overgrown vegetation that reduce visibility. Vehicle defects like brake failure and burst tires, along with road defects such as potholes, narrow roads, and sharp bends, further increase accident likelihood. Extreme weather conditions including heavy rain, fog, storms, and glare negatively affect visibility and road surface conditions, contributing to more accidents.(Muguro 2020).

In Hargeisa city Somalia, the prevalence was 28.17% that involved individuals who have experienced road traffic accidents. Factors that contribute to RTA, According to the drivers, the most commonly perceived causes of road traffic accidents were lack of experience (13.4%), poor road infrastructure (12.1%), over-speeding (11.7%), lack of driving skills (11.1%), using a phone while driving (9.2%), absence of road signs (8.6%), and weak enforcement of traffic laws (7.6%). In contrast, the least frequently mentioned causes were overloading (5.2%) and vehicle defects (Mohamed et al. 2023)

Puntland state is increasingly concerned about the need to ensure the safety of its roads and address the escalating rates of road fatalities, injuries, and property damage. Even though there is a problem of road traffic accidents in Puntland, no study so far has been conducted with regards to the trend and fatality of road traffic accidents and associated factors, particularly in the selected study area or whole state. Understanding the prevalence and contributing factors of road traffic accidents and fatalities is crucial for designing effective prevention strategies, as the majority of these fatalities are preventable. Therefore, aim of this study to assess the trend and fatalities from road traffic accidents and associated factors in the Puntland State of Somalia.

### **1.3. Significance of the Study**

**For traffic office:** The findings of this study will provide policymakers and government institutions in Puntland included traffic police and health offices with valuable insights into the factors contributing to road traffic accidents. This information can be used to develop targeted policies, regulations, and interventions to address road safety issues, such as infrastructure improvements, driver education programs, and enforcement of traffic laws. The study's insights into the trends of RTAs can help guide the allocation of resources and the prioritization of road safety initiatives in the four selected regions of Puntland. This can lead to more efficient and effective use of limited resources to address the most pressing road safety challenges. The study can contribute to raising public awareness about the importance of road safety and the factors that influence the occurrence and severity of RTAs. This awareness can encourage behavioral changes among road users, such as adherence to traffic rules, defensive driving, and the use of safety equipment.

**For the Victims/community:** The study can help minimize the impact of road traffic injury fatalities by informing the development of necessary road signs and better road designs that reduce the risk of accidents, particularly for vulnerable road users like pedestrians.

**For future researchers:** study result also serve as valuable baseline data for researchers interested in conducting further studies on road traffic accident fatality in study Area.

## **1.4. Objectives**

### **1.4.1. General Objective**

This study aimed to assess trends and fatality from road traffic accident and associated factors among victims reported to traffic police stations from January 01 to December 31, 2023, in selected four cities in Puntland state of Somalia.

### **1.4.2. Specific Objectives**

- To assess trends from road traffic accidents registered at selected four cities in Puntland State of Somalia.
- To determine the prevalence of road traffic accident fatalities among road traffic victims registered at selected four cities in Puntland State of Somalia.
- To identify factors associated with road traffic accidents registered at selected four cities in Puntland State of Somalia.

## 2. LITERATURE REVIEW

In this section we will search, appraise and synthesize key literatures on RTA across the globe on trends, fatalities, and their impact on social well-being and the study prioritize the identification of associated risk factors related road traffic accidents.

### 2.1 Trends of Road Traffic Accidents

A seven-year retrospective study conducted in Iran from 2014 to 2021, indicate that road traffic accidents, deaths reach their peak during the summer, while the fewest road traffic deaths occur in the winter, it shows that 3,028 individuals died due to road traffic accidents, the road traffic fatality rate per 100,000 was 47.6 in 2004 and decreased to 37.6 in 2010, (Mirzaei et al. 2016).

Utilization of five secondary data sets conducted in Turkey in 2019, the study demonstrate there were 697,957 road traffic accidents (RTAs), resulting in 1,168,121 injuries and 3,534 fatalities, When analyzing the monthly distribution of these road traffic accidents (RTAs), it was found that the occurrence of RTAs increased during the summer months compared to the winter months and Correspondingly, injuries and fatalities were more prevalent during the summer months, additionally, the frequency of road traffic accidents (RTAs) tends to increase on weekends, specifically on Saturdays and Sundays (15.0% and 14.6%, respectively), The proportion of road traffic accidents (RTAs) leading to fatalities was found to be higher during the night (30.31%)(Erenler and Gümüş 2019).

According to a cross-sectional survey that analyzed secondary data on road traffic accidents (injuries and fatalities) in Anambra State, Nigeria, between 2010 and 2014, An important findings shows that trend in percentage changes showed an increase in all variables, including the number of fatalities, serious and minor cases, people injured, and persons involved in road traffic accident (RTA) cases, The only exception was minor injuries, which saw a 40% increase in 2010 compared to 2014, the injury and death trends in road traffic accidents (RTAs) from 2010–2014 show a gradual increase over the years, reaching a peak in 2013 and then declining in 2014, yearly trends indicate a gradual increase in proportions from 2010 to 2013, followed by a decline in 2014 for all parameters, including the trend number of fatality of males, females, and children involved in road traffic accidents (RTAs). (Anebonam et al. 2019).

According to a cross-sectional study conducted in Ethiopia in 2019, shows that trends of road traffic injury fatalities vary from month to month, the highest number of road traffic injuries was recorded in November, followed by August and October 2018. During the period of January 2018 to December 2018, a total of 866 road traffic injuries (RTIs) were reported, resulting in an average of 3 deaths per month (32 deaths in total). The trends in road traffic injury fatalities vary both on a monthly and seasonal basis.(Bayera et al.).

## **2.2 Prevalence of Fatalities from Road Traffic Accident**

A prospective study conducted Menoufia University Hospital (MUH), Egypt from 2016 to 2017, indicate that the fatality from road traffic accident was found 9.3%, whereas 37.4% were simple or slight, 53.3% dangerous injuries, and majority of accidents occurred at morning and early afternoon 45.20% followed by late afternoon and evening 37.5% and traffic is heavy Concerning the site of injuries during road traffic accident, lower Limbs were the commonest sites of injury 70.04% followed by head and neck 65.5%, were upper extremity 3.97%, chest 2.65% and 1.32% other parts of the body, about victims from road traffic injury the most commonly were pedestrians 31.6% and 8.3% passengers, 5.7% motor cyclists and 4.2% drivers (Kandeel et al. 2018, Oltaye et al. 2021).

Another study in South Africa demonstrate that majority of road users who died on the roads traffic injury were pedestrians 40%, passengers (34%, drivers 25%) and cyclists 1%, the Pedestrians still continue the top victim of RTI in South Africa(Adeniji et al.).

According to the cross sectional survey conducted across the nine regions and two city administrations of Ethiopia in 2019, was found that there were 123 road accidents in the reference 12-month period, resulting in a road traffic fatality rate was found 37% per 100,000 people, The population-based data indicates that road traffic accident (RTA)-related casualties in Ethiopia are alarmingly high.(Abegaz and Gebremedhin 2019).

A cross-sectional study conducted in Woliso towns, central Ethiopia, from January 01, 2010, to December 31, 2016, revealed that road traffic accidents resulted in a fatality rate of 26.7%. During this period, a total of 658 individuals lost their lives, including 469 pedestrians, 152 passengers, and 37 drivers. The remaining 73.3% of the accidents caused non-fatal injuries, with 502 (24.5%) classified as severe injuries, 430 (21.1%) as slight injuries, and 568 (27.7%) as property damage injuries and the majority of fatalities, 469 (71.3%), were pedestrians, while nearly half of the survivors (46%) were passengers involved in the road traffic accidents(Geleta et al. 2020).

A cross sectional study conducted in Finote Selam traffic police station, Ethiopia, from September 2009 up to January 2018, Indicate that fatality from road traffic injury was 23.5%, while 40.4% were serious injuries, and 36.1% were slight injuries, 70.6% accidents were occurred on the normal working days while 29.4% were occurred on the weekends (Tadege 2020).

A cross-sectional study conducted at St. Luke Hospital in the Southwest Shewa Zone of Central Ethiopia found that head injuries are the leading cause of death from road traffic accidents (RTAs). The study revealed that RTA victims with head injuries were more than twice as likely to die compared to those without head injuries, with (AOR) of 2.515 (95% CI: 1.075–5.885)(Beyera et al. 2024)

In study conducted in Jigjiga, Somali Regional State, Eastern Ethiopia indicate that with regard to the magnitudes of the accidents 29.3% were severely injured, while 13.8% were died. Slightly more than half 55.7% of the pedestrians were injured while 41.4% of the passengers were injured and only 2.9% of the drivers were injured. Nearly three fourth 73.9% of the pedestrian died and only 26.15% of the passengers die(Hussen et al. 2020).

## **2.3. Factors Associated Fatalities for Road Traffic Accidents**

### **2.3.1. Socio-demographic Characteristics.**

A five year retrospective data obtained from the official website of the Turkish Statistical Institute in 2019, Even though both males and females are at risk of road traffic accident fatalities, males are more commonly involved in road traffic injury fatalities, as indicated by study, Males have a significantly higher rate of death due to road traffic accidents compared to females (77.14% and 22.86%, respectively), When specifically looking at driver deaths, males are 60 times more likely to lose their lives. Regarding with pedestrian, Males have a 2.5-times higher rate of pedestrian deaths compared to females, in additionally, according to injuries, males 14 times more likely to sustain driver injuries compared to females (Erenler and Gümüş 2019).

A prospective study conducted in India, 230 patients who reported to the General Surgery and Orthopedic departments between April 2016 and December 2017 were included, The study found that out of the 230 respondents, the age range varied from 11 to 60 years, Among them, 120 (52.17%) were married, while 110 (47.83%) were unmarried. Additionally, 175 (76.09%) resided in urban areas, while 55 (23.91%) lived in rural areas.(Goyal 2018).

A cross sectional study conducted in Hargeisa city, Somaliland, Northern Somalia, were found, the men (27.13%) to be more frequently involved in RTAs compared to women (1.03%), Among various age groups of drivers the 18–25 years of age had the highest rate of road traffic accidents (RTAs) at 11.89%, followed by the 26–35 year of age group at 2.7%. The age group of 46 years and older had the lowest involvement in RTAs at 2.07%.

### **2.3.2. Personal Factors Related Road Traffic Accident**

Based on both quantitative and qualitative cross sectional research conducted in Rome, Italy 2021, aimed at achieving a more comprehensive understanding of the background human factors contributing to accidents through interviews, it is highlighted that the most prevalent contributing factor that causes accidents is inattention and careless, irrespective of age or gender, In 40% of analyzed traffic accidents, inattention has been a contributing factor and Inattention can be caused by various factors, including attention overload (35%), distractions (19%), monotonous driving (13%), and more, Traffic accidents involving young drivers are often attributed to two primary long-term factors: inexperience and speeding or failure to adapt to driving conditions, Young drivers frequently make errors in accurately assessing the route's difficulty or the condition of the road surface, leading to an increased likelihood of accidents and Additional risk factors for road accidents include reckless driving, impaired driving (such as alcohol or drug use), failure to use seat belts, driver distraction (such as using mobile devices while driving), driver fatigue, poor vehicle choice (such as driving a vehicle with known safety issues), unfamiliarity with the road or driving conditions, and lack of driving experience(Bucsuházy et al. 2020).

A cross sectional study conducted in in Addis Ababa, Ethiopia in 2022, reveals personal factors related to road traffic accidents were Over speeding (39.3%) was reported as the highest among accidents, other potential causes of RTA; the remaining 21.8% and 18.8% were caused by drunk driving and by-passing traffic lights, respectively, and the remaining 20.1% mentioned other and pedestrian crossing outside the zebra cross were 35.4% of the injury. More than half (54.8%) of participants were under the influence of alcohol during the RTA, and the remaining 41.2% and 6.9% were using chat and drugs (medication), respectively(Weldeslassie et al. 2022).

A cross-sectional study in mekele, Northern Ethiopia found that drivers who consumed alcohol were 2.29 times more likely to be involved in road traffic accidents (RTAs) compared to those who abstained ([AOR, 2.29; 95%, CI, 1.08 4.85). Additionally, drivers operating government

vehicles had a 4.16 times higher likelihood of experiencing RTAs compared to those driving privately owned vehicles (AOR 4.16; 95% CI 1.48 to 11.70). Furthermore, for each additional year of driving experience, the probability of being involved in an RTA decreased by 26% (AOR 0.74; 95% CI 0.60 to 0.90)(Woldu et al. 2020).

A cross-sectional study conducted in Burayu town police stations, between 2010 and 2015, Ethiopia, demonstrated about 89% of the fatalities and 83% of the injuries from traffic accidents were caused by driver errors, such as speeding, failing to give priority to other vehicles and pedestrians, and only 6% were caused by pedestrian error. Sixty-six per cent of fatal and 56% of nonfatal accidents were caused by driving above the speed limit alone.(Hordofa et al. 2018).

A study conducted in India in 2017, indicated that drivers' mistakes are the single most essential factor responsible for accidents; they accounted for 78% of total accidents, 76.5% of total injuries, and 73.7% of total fatalities, Within the category of driver error, accidents caused by higher than lawful speed accounted for a high share of 55.6%, and consumption of alcohol and drugs accounted for 5.3% and 6.4%, respectively, careless driving habit while 20.14%, As a share of total road accidents and deaths, overloading/overcrowding of vehicles accounted for 19.6% and 22.8%, respectively(Singh 2017)

### **2.3.3. Vehicle Factors Related with Road Traffic Accident**

A cross sectional study was conducted in Hilly District of Nepal in 2017, was found that around two fifth (38.4%) of the accidents were caused by two wheeler vehicles and 36.6% were with four wheelers. The passengers (55.4%) and bike riders (29.5%) were the main victims of RTAs. Collision between two motorized vehicles (26.8%) was found the major type of accident, were the leading causes of the accident as reported by the victims(Shrestha et al. 2017).

A cross-sectional study conducted in Tanzania between April and September 2014, revealed that Motorcycles (53.4%) were the primary cause of road traffic accidents, followed by motor vehicles (42.5%) and bicycles (3.7%), The majority of casualties were drivers (38.3%), followed by passengers (35.4%), pedestrians (25.5%), and an unidentified portion (1.1%), the majority of motor-vehicle crash victims were drivers, accounting for 62.8% of the total, Passengers and pedestrians were more frequently involved in motor-vehicle crashes, comprising 53.4% and 48.7% of the incidents, respectively (Boniface et al. 2016).

A cross-sectional study conducted in Ethiopia between February and March 2017, information regarding mechanical defects was collected from 400 drivers operating three and four-wheeled vehicles, the study indicated that vehicles experienced defects in the brake (16%), steering wheel (22.8%), tire (37.5%), light (11.3%), and other mechanical defects (8.3%), Within the period, 33% of vehicle drivers reported being involved in an accident, The most common causes of accidents were collision with another car (29.5%) and pedestrian crossing road (25%), Approximately three-fourths of the accidents resulted in minor injuries, while 5% of the accidents were fatal and types of vehicles driven by the respondents were Bajaj (three-wheeler mini-car with three seats) at 46.5%, followed by mini-bus (vehicle with twelve seats) at 35.3%, The remaining 15.2%, were a combination of minibus with 17 seats, mid-bus with 45 seats, and bus with above 45 seats.(Getachew and Dechassa 2020).

A cross-sectional study conducted in Jigjiga, Somali Regional State, Ethiopia, 19.7% of accidents result from collisions with other vehicles. Over half (58.1%) of the drivers indicated that the type of collision was due to the fault of the other vehicle's driver, while 19.7% reported that pedestrian error was the cause. Only 17.9% of drivers noted that the collision involved animals(Hussen et al. 2020).

A cross-sectional study conducted in Hargeisa, Somaliland, Somalia, on the types of vehicles involved in road traffic accidents reveals that the majority of drivers (26.27%) were operating a Vitz and 20.34% were driving luxury cars (Automobile vehicle), Additionally 11.86% and 11.02% were operating city buses and Probox vehicles, respectively, Minibus vehicles were found to have a 3.2 times higher likelihood of being involved in road traffic accidents (RTAs) compared to other vehicle types (AOR = 3.249, CI: 1.022–10.332). Similarly, Vitz cars had a 2.3 times higher likelihood of being associated with RTAs compared to other vehicles (AOR = 2.325, CI: 1.092–5.494). (Mohamed et al. 2023)

#### **2.3.4. Environmental Factors Related with Road Traffic Accident**

In a study conducted in India, regarding, Environmental factors related to road traffic accidents included poor road conditions at 23.91%, animals crossing the road at 4.35%, and bad weather at 15.22%. These were significant contributors to road traffic accidents(Goyal et al. 2018).

Based on a comprehensive quantitative assessment of Indonesia's Land Transportation Statistics from 2016 to 2018, it was observed that various risk factors contribute to traffic accidents, These

factors include environmental aspects like road maintenance, road safety barriers, lighting, and marking, as well as vehicle characteristics such as size, weight. To address these risks, the implementation of intelligent transport system (ITS) equipment has proven to be advantageous, ITS equipment assists in monitoring traffic flow, provides traffic signals for drivers, and guides other road users.(Djalante 2020). In a study conducted in Addis Ababa, Ethiopia, the environmental factors contributing to road traffic accidents, it was found that 25.6% of accidents were attributed to issues related to road conditions (such as faded markings, zebra crossings, damaged roads, and congestion). (Wordofa 2017).

### **2.3.5. Weather Condition That Causes Traffic Accidents**

A descriptive study design was conducted on daily traffic accident records from October 2013 to June 2018, obtained from the Hawassa city administration police department, the study found that highest percentage of road traffic accidents (RTAs) occurred in sunny weather conditions, accounting for 39.57% of all incidents, the second-highest percentage, 29.02%, was recorded during normal weather conditions. In contrast, cold weather conditions accounted for only about 3.12% of RTAs, while cloudy weather conditions and Strong wind contributed to approximately 3.36% of the total(AkliluToma 2021)

## **2.4. Conceptual Framework of the Study**

This conceptual framework was developed by thoroughly reviewing the existing literatures pertaining to the key variables influencing the trends and fatality from road traffic accident and associated factors (Goyal 2018, Erenler and Gümüş 2019, Bucsuházy et al. 2020, Hareru et al. 2022, Mohamed et al. 2023)

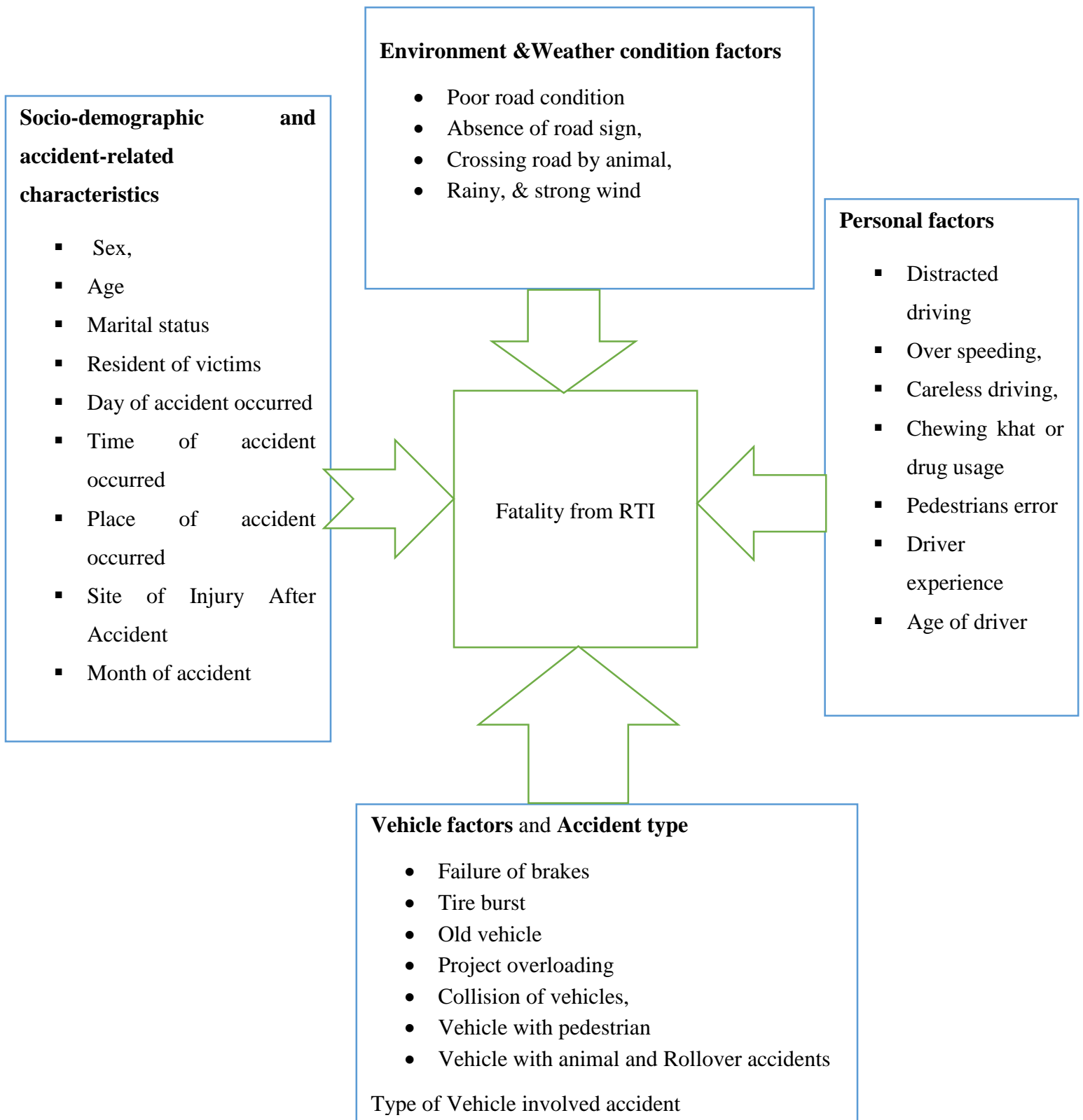


Figure 1 Conceptual Framework shows factors related to road traffic accident.

(Developed by the investigator by reviewing different literatures)

## **3. METHODS**

### **3.1. Study Area and Period**

This study was conducted in selected four cities of Puntland State. Puntland a member of the federal government of Somalia, located in northeastern Somalia. Puntland is bordered by Somaliland to the west, the Gulf of Aden to the north, the Indian Ocean to the east, the Galmudug region to the south, and Ethiopia to the southwest. Puntland is a semi-arid region with an average daily temperature range of 27–37 °C. It covers an area of approximately 212,510 km<sup>2</sup> and the population of Puntland state is estimated at 4,334,633 in 2016, Population consists of Nomadic 39%, Urban 38%, Rural 20% and IDPs 3% and approximately 70% of the population is below the age of 30. The study was conducted from November 22 to December 20, 2024

### **3.2. Study Design**

An institutional-based cross-sectional study design was employed.

### **3.3. Population**

#### **3.3.1. Source Population**

The source population for this study included all victims registered and reported to traffic police stations for road traffic accidents in Puntland State, Somalia

#### **3.3.2. The Study Population**

The study population comprised all individuals registered and reported as victims of road traffic accidents that occurred in select cities within Puntland State, Somalia.

### **3.4. Inclusion and Exclusion Criteria**

#### **3.4.1. Inclusion Criteria**

- All road traffic accidents injured and fatality wounded victims registered at four police stations.

#### **3.4.2. Exclusion Criteria**

- Incomplete documentation and unclear, unreadable handwriting were excluded from the study.

### 3.5. Sample Size Determination

To determine the sample size for this study, outcome variable and factors significantly associated with the outcome variable was considered. Accordingly, for the second and third specific objectives the sample size is calculated separately and the larger sample size was taken to be used for this study.

**Specific objective 1:** To assess trends from road traffic accidents registered at selected four cities in Puntland State of Somalia. Trends can be upward, downward, or flat (no discernible pattern and cannot be calculated).

**Specific objective 2:** To determine the prevalence of road traffic accident fatalities among road traffic victims registered at selected cities police stations in the Puntland State of Somalia in 2023, The sample size is calculated by using single population proportion formula, where Proportion of fatality for road traffic accident  $P= 28.17\%$  which was taken from study conducted Hargeisa city Somaliland, Northern Somalia (Mohamed et al. 2023) and The level of confidence ( $\alpha$ ) was taken as 95% ( $Z \alpha/2 = 1.96$ ), the margin of error was take as 0.04 and 10% incomplete documentation, the sample size is calculated by the following formula.

$$n = \frac{(Z \alpha/2)^2 p(1-p)}{d^2}$$

n = desired sample size

( $Z \alpha/2$ ) 1.96 (95% confidence level)

P= proportion of the event (prevalence)

d = margin of error

$$(1.96)^2 * 0.2817(1-0.2817) \div 0.0016 = 486$$

For adding incomplete documentation=10% (Incomplete record is record that lack at least place, time, person and cause of fatal and non-fatal)  $N=486*10\%$  **N=535**

**Specific objective 3:** factors associated with road traffic accident. The sample size for the third specific objective of this study was determined by considering factors that are significantly associated with the outcome variable, confidence level of 95%, the margin of error of 4%, power of 80% using Epi Info Version 7 software.

**Table 1:** Sample size determination for associated factors for Trends and fatality from road traffic accident in Puntland State of Somalia in 2023.

Predictors	Ratio (exposed un in	Percentage Of outcome	CI	Power	OR	Sample size	Reference
Weather condition(Raining)	0.21	88.8	95%	80%	0.065	50	(Misker et al. 2017)
Reason(over speeding)	0.17857	9.5	95%	80%	5.09	200	(Geleta et al. 2020)
Gender(male)	0.469	9.2	95%	80%	18.16	33	(Misker et al. 2017)

Weather condition and over speeding are the common factors for road traffic accident. As it can be seen from Table 1, the calculated sample size for the second objective is larger than that of the third objective

### 3.6. Sampling Procedure

The Puntland state is composed of nine cities, and for this study four cities were selected using simple random sampling. The selected police stations are as follows: Bosaso police station in the Bari region, Kardo police station in the Karkar region, Garowe police station in the Nugal region, and Galkaio police station in the Mudug region. A systematic sampling approach was used to collect representative information from the victim registries maintained at four central police stations in select cities. Based on the total number of victims recorded (1,437) and divided by the desired sample size (536), a sampling interval (k) of 2 was used. The registry books were reviewed, and every 2<sup>nd</sup> victim recorded was identified based on their registration numbers. The first victims were selected by the lottery method and followed by K intervals all victims' record in the frame.

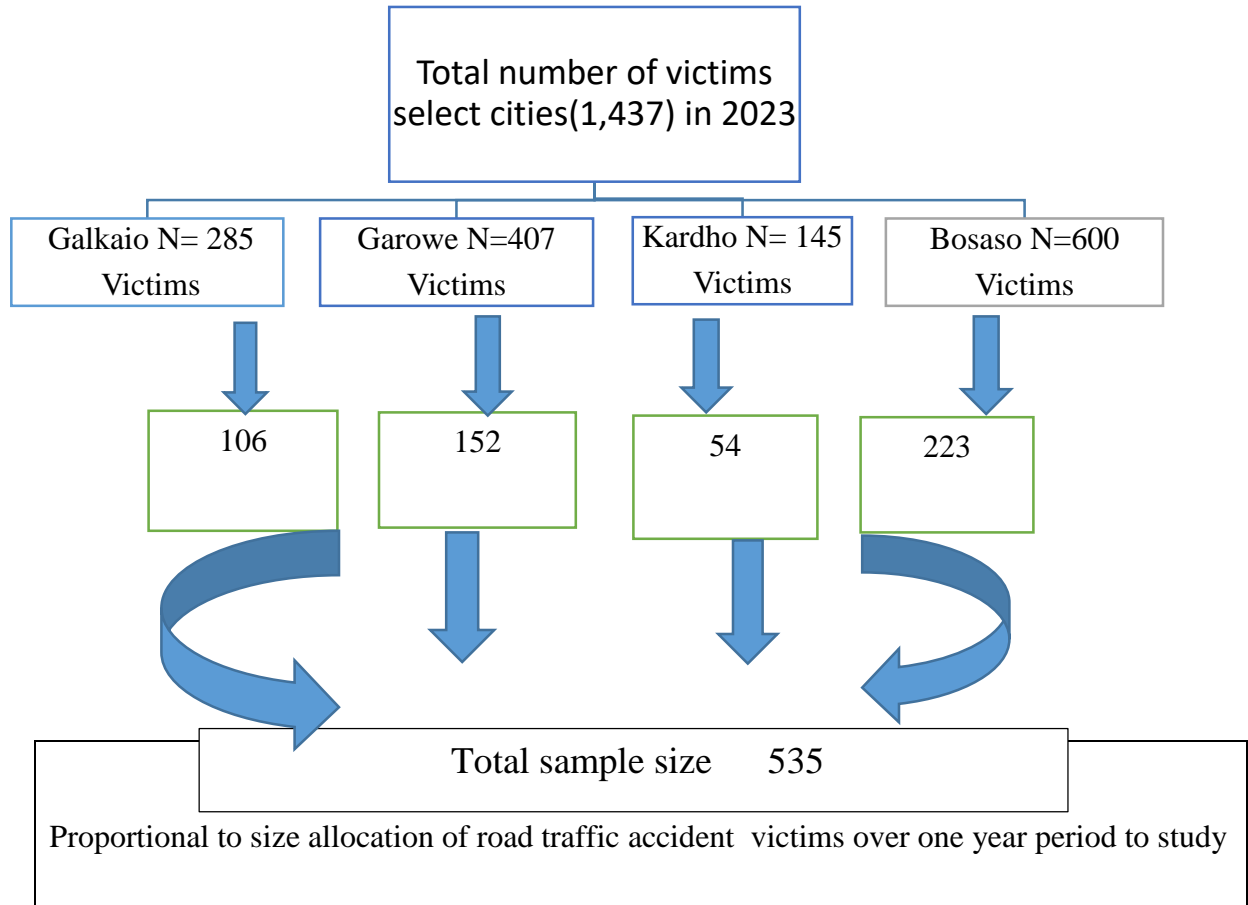


Figure 2: Schematic presentation of the sampling procedure from Road traffic accident

### 3.7. Data Collection Methods

#### 3.7.1. Data Collection Instruments

The data was collected using Kobo Toolbox, a pretested and adapted checklist that was prepared according to inclusion criteria and traffic police registration format. A data collection tool was developed from previous research literature (Adeniji et al. , Goyal 2018, Abegaz and Gebremedhin 2019, Alemayehu 2023, Beyera et al. 2024). The checklist was developed in English and then translated into the Somali language spoken in the study area by the local community for better understanding by the data collectors and supervisors.

#### 3.7.2. Data Collectors and Supervisors

Eight qualified data collectors were selected for the study, including one diploma nurse, two with diplomas in environmental health, two with diplomas in public health, and three public health supervisors with bachelor's degrees. They collected data from the records of four police stations

in four different cities with a specific focus on victim information. A pretested and adapted structured data extraction checklist format was used during data collection at the traffic police registry.

### **3.7.3. Data Collection Procedure**

This is a quantitative cross-sectional study that reviews secondary data on road traffic accident cases (injuries and fatalities) from the traffic police station registry. The data was obtained and extracted from traffic police offices in the selected cities. Information extracted included sex, age of victims and time of accidents, the place where the accident occurred and probable causes of accidents, the number and type of vehicles or motorbikes involved in accidents, the number of people involved in road traffic accidents (RTAs), as well as the categories of vehicles involved.

## **3.8. Variables**

### **3.8.1. Dependent Variables**

Trends of road traffic accident

Fatality of road traffic accident

### **3.8.2. Independent Variables**

- ❖ Socio-demographic characteristics include sex, age, marital status and resident of victims
- ❖ Environmental and Weather condition characteristics include poor road condition, Absence of road sign, Crossing road by animal, narrowing road/ one side road, rainy, strong wind
- ❖ Human factors include distracted driving (e.g., using a phone), over speeding, Careless driving, chewing khat or drug usage, fail to give priority, wrong way driving
- ❖ Vehicle factors, mechanical defects: Failure of brakes or steering wheel, Tire blowout or tire burst, old vehicle, project overloading, and accident type (collision between vehicles, vehicle, and pedestrian, vehicle and animal) and type of Vehicle involved accident

### **3.9. Operational Definitions**

**Road Traffic Accident:** An accidents that occurred on a road in 2023 and was recorded by the Puntland Traffic Police in the study area.

**Pedestrian:** A person walking on the road who was involved in a traffic accident and was registered by the Puntland Traffic Police in 2023.

**Fatality:** A person who died in a road traffic accident that occurred in the selected area and was recorded by the Puntland Traffic Police in 2023.

**Non-Fatality:** A person who sustained visible or invisible injuries in a road traffic accident in the selected area and was recorded by the Puntland Traffic Police in 2023

### **3.10. Data Quality Control.**

To assure the quality of the data, the questionnaire that is primarily written in English was translated into the local language, Somali, and then translated back to English to ensure that it was translated accurately. A week before the actual data collection, the instruments were pretested on 5% of victims from areas other than the research area (Goldgob police station). The data collection procedures were supervised by both supervisors and the principal investigator to ensure the completeness and coherence of the collected data. To ensure data quality, well-designed data collection tools were used. The data collectors and supervisors underwent a comprehensive four-day training session to enhance their proficiency in data collection as well as to emphasize the importance of maintaining confidentiality and privacy throughout the process. This training was to ensure that they were well-equipped to handle victims' information and adhere to the necessary protocols to protect the privacy of the individuals involved in the data collection. The principal investigator, along with supervisors, was to provide daily supervision of the data collection techniques and ensure the completeness of the tools. The checklist was checked for accuracy and completeness every day by the primary investigator, and modifications were made if errors were discovered in the collected data.

### **3.11. Data Processing and Analysis**

Following data collection, checklists were entered in the Kobo Toolbox and checked for completeness, inconsistencies, and missing data, and then data was exported for analysis using

STATA version 17 software. Descriptive statistics were used including percentages, frequency distribution to explore the socio-demographic characteristics of victims and the occurrence of road traffic accidents (RTAs). This analysis was presented using tables and figures. Binary logistic regression was used to assess the crude association between fatalities from road traffic accidents and all independent variables like socio-demographic characteristics of victims, age and sex, residence, the season for the accident, the time of the accident, the location of the event, and the type of vehicle involved. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) and corresponding p-values were calculated. A p-value of less than 0.05 was considered statistically significant. Factors that show a significant bivariate association ( $p \leq 0.25$ ) was retained for candidate in multivariate logistic regression analyses. Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test ( $p\text{-value} > 0.05$ ), and multicollinearity was assessed using the Variance Inflation Factor (VIF). Additionally trend was used to assess the trend of road traffic accidents through month of the year.

### **3.12. Ethical Considerations**

The study was approved by the Haramaya University College of Health and Medical Sciences Institutional Health Research Ethics Review Committee (Ref. No. IHRERC/120/2024). Before conducting, an informed, voluntary, written, and signed consent was obtained from all police station heads in Puntland State, Somalia. An official letter of cooperation was written by the Puntland Police Officer and was shared with the police officer responsible for road traffic accidents (RTAs) in the selected cities. Additionally, a letter of support was provided to each police station in the study area. To ensure the confidentiality of the information, victims' names were not recorded on the checklist. Once the data collection is completed, the police records was promptly returned to their original location.

### **3.13. Plan for Dissemination of Results**

Upon completion of the study, the research findings will be disseminated to Haramaya University, the Puntland Traffic Police Offices, and the Transport Office. The purpose of this dissemination is to provide crucial information regarding the factors associated with road traffic accident fatalities among the victims registered at police stations. This contributed to the wider scientific

community by sharing valuable insights and promoting further research in the field of road traffic accident prevention and management. Additionally, endeavors will be made to publish the study's outcomes in peer-reviewed scientific journals.

## 4. RESULTS

### 4.1. Socio-demographic Characteristic of RTA victims

Out of the total sample (535), 527 records were successfully obtained and analyzed. Among the victims 332 (63%) were males, while 195(37%) were females. The average mean age of the victims was 31.45 ( $\pm 16.74$  SD). The most affected age group was 18-30 years, 205 (38.9%) of the total, followed by those aged 31-50 years at 149 (28.27%). A majority of victims 371 (70.40%) were from urban areas, compared to 156 (29.60%) from rural areas

**Table 2: Socio-demographic characteristic of RTA victims from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia.**

Variable	Category	Frequency(n=527)	Percent (%)
Age-of victim	<18	93	17.65
	18-30	205	38.90
	31-50	149	28.27
	51 and above	80	15.18
Sex of victim	Male	332	63.0
	Female	195	37.0
Victim residence	Urban	371	70.40
	Rural	156	29.6

#### 4.1.1. Socio-demographic characteristic of RTA drivers

The highest number of drivers involved in road traffic accidents were male 502, (95.26%), with female drivers 25 (4.74%). The victims who had a driver's license were 378 (71.73%), while 149 (28.27%) drivers had no license. Drivers aged 18-30 years were involved in the majority of accidents, 241 (45.73%) closely followed by drivers aged 31-50 years, who accounted for 235 (44.59%). The mean age of drivers was 33.72 ( $\pm 11.71$  SD). Drivers were those held a level four driving license 111 (29.37%), followed by 96 (25.40%), 86(22.75%), 85(22.49%) had a first, second and third level of license respectively. Drivers with 1-3 years of experience 193 (36.62%), were most repeatedly involved in RTAs followed by those with 4-6 years, 136 (25.81%).

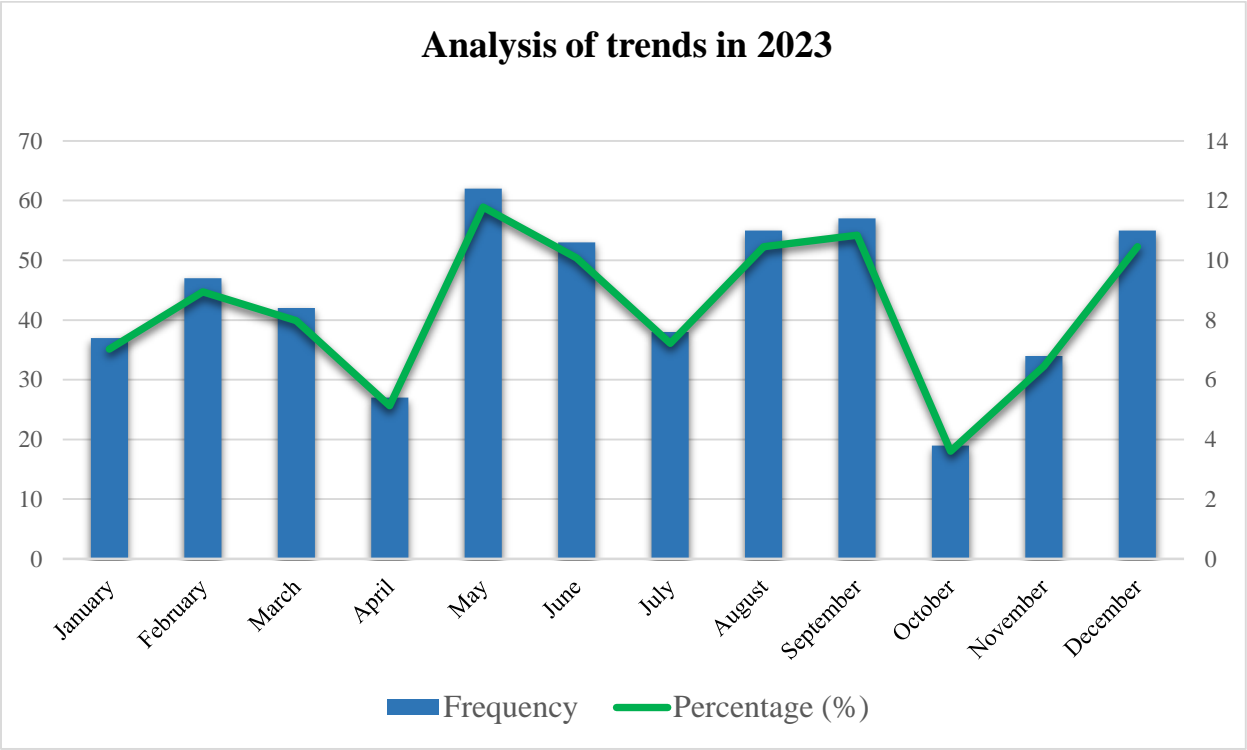
Regarding the marital status of the drivers, 372(70.59%) of the them were married, while 155 (29.41%) were single

**Table 3: Socio-demographic characteristic of RTA drivers from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia.**

Variable	Category	Frequency	Percent (%)
Age of driver	18-30	241	45.73
	31-50	235	44.59
	51 and above	51	9.68
Sex of driver	Male	502	95.26
	Female	25	4.74
Marital status	Single	155	29.41
	Married	372	70.59
Driver license	Yes	378	71.73
	No	149	28.27
Driver experience	< 1 years	90	17.08
	1-3 years	193	36.62
	4-6 years	136	25.81
	7 years and above	108	20.49
Level of driver license	1st level	86	22.75
	2nd level	85	22.49
	3rd level	96	25.40
	4th level	111	29.37

## 4.2. Trends in road traffic accidents in 2023

In 2023, the data shows fluctuations in accident frequencies across the 12 months that occurred. May had the highest accident rate at 11.79%, followed closely by September at 10.84% and August at 10.28%. In contrast, October recorded the lowest accident rate at 3.61%, suggesting either a seasonal decline in activities or effective risk mitigation strategies during that month. Variations with significant peaks in May, September, and August



**Figure 3: Month analysis of trends in road traffic accident victims from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia**

**4.3. Prevalence of fatality from road traffic accident (RTA)**

The findings indicate that the prevalence of fatality from road traffic accidents among victims was higher 165 (31.3%). In contrast, non-fatal injuries were more common, with 362 cases representing 68.69% of the total injuries, making non-fatal injuries the largest proportion

Most road traffic accidents occurred on normal working days 363(68.88%), with fewer during weekends 109(20.68%) and holidays 55(10.44%). Regarding time, accidents were most common in the morning 210(39.85%), followed by the afternoon 170 (32.26%). Most of the accidents occurred on city roads 378(71.73%), while 149 (28.27%) happened in rural roads. Concerning types of accidents vehicle collisions were the most common 175(33.21%), closely followed by pedestrian accidents 171(32.45%) and rollovers 123(23.34%). Among the vehicle, public transport was the one that faced the highest road traffic accidents 212(40.22%), followed and by private cars and governmental vehicles 146(27.70%), 111(21.1%) respectively.

Personal factors contributed to over half the road traffic injury, followed by Environmental factors and around of accidents were due to vehicle-related problems, such as mechanical failures. Personal factors play a significant role in road traffic accidents, with over-speeding accounting for 105(39.03%) of accidents, followed by careless driving at 60(22.30%) and distracted driving due to mobile phone use at 46(17.10%).Environmental factors also contribute to accidents, with poor road conditions responsible for 47(37.6%) and a lack of road signs contributing to 34(27.2%).Additionally, vehicle-related issues such brake or steering failures contributing to 51(48.11%)of accidents and tire blowouts accounting for 33(31.13%).

**Table 4: Prevalence of fatality and contribute Factors from road traffic Accident from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia**

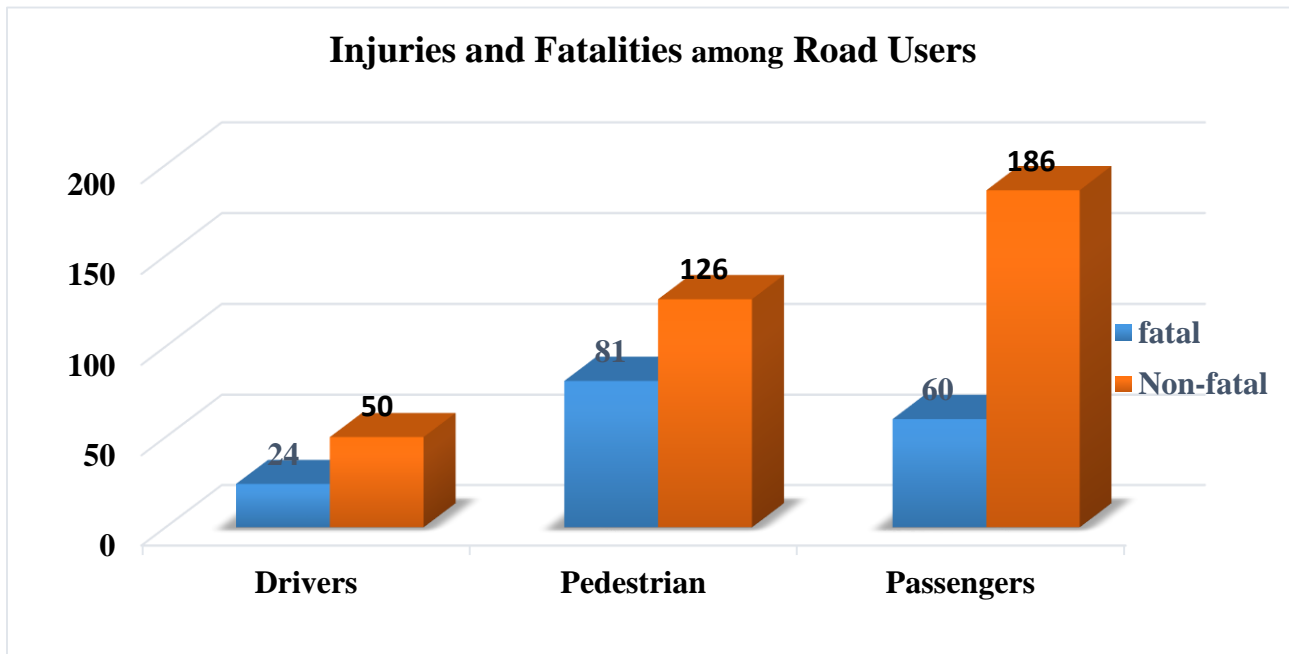
Variables	Category	Frequency	Percent %
Day of accident occurred	Normal working day	363	68.88
	Holiday	55	10.44
	Weekend	109	20.68
Time of accident occurred	Afternoon	170	32.26
	Evening	40	7.59
	Morning	210	39.85
	Night	107	20.30
Place of accident occurred	City road	378	71.73
	rural road	149	28.27
Type of accident	Collision between vehicle and animal	58	11.0
	Pedestrian accident	171	32.45
	Rollover	123	23.34
	collision of vehicles	175	33.21
Type of vehicle caused injury	Private vehicle	146	27.70
	Governmental vehicles	111	21.10
	Public transport	212	40.30
	Motorbike	57	10.82
Personal factors	distracted driving by phone	46	17.10
	careless driving	60	22.30
	chewing khat or drug usage	33	12.27
	over speeding	105	39.03
	Others*	25	9.29
Environmental and Weather factors	Crossing road by animal	25	20.0
	Absence of road sign or traffic sign	34	27.20
	Rainy	27	5.12
	Poor road condition	47	37.6

	Others**	19	15.20
Vehicle factors	Failure of brakes or steering wheel	51	48.11
	Tire blowout or tire burst	33	31.13
	Others***	22	20.75

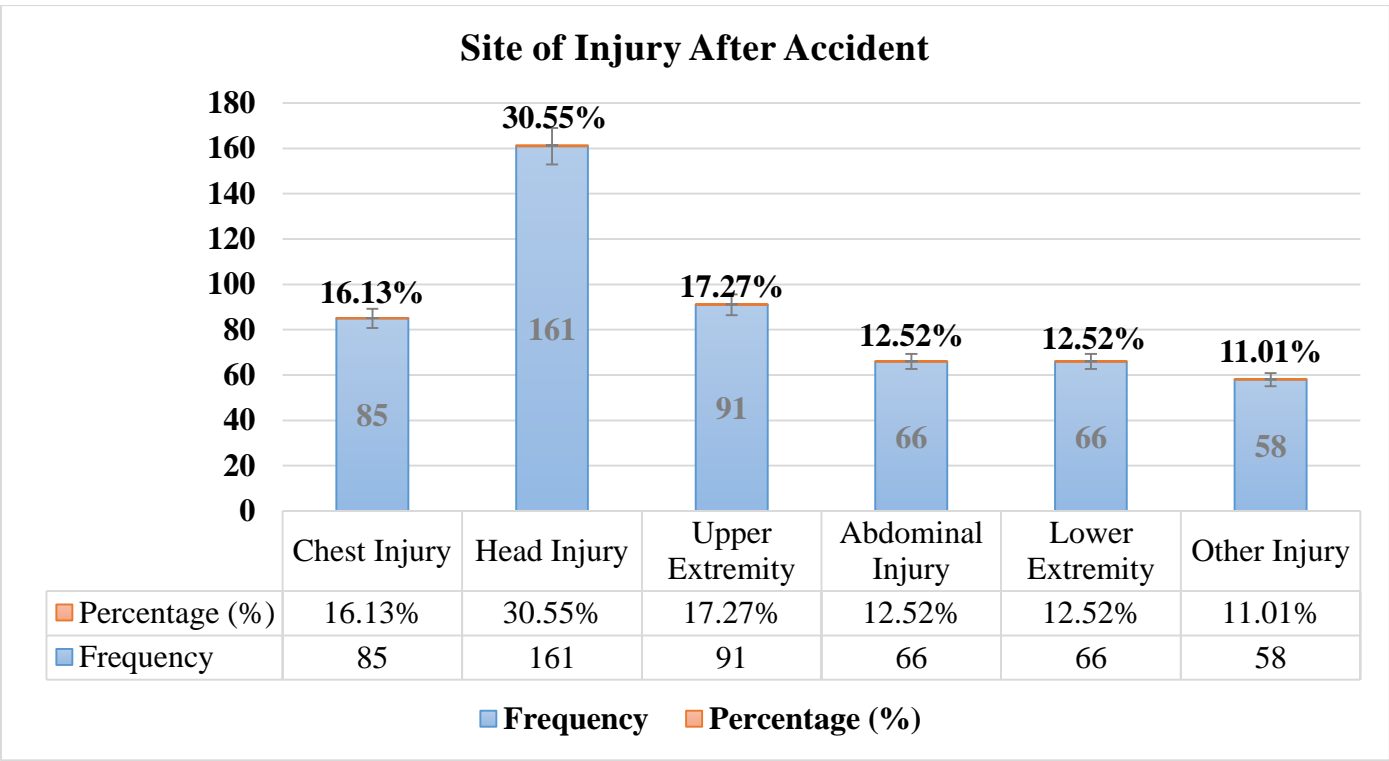
**Others\***: fail to give priority, fatigue driver and improper turning. **Others\*\*** Narrowing road diversion road and strong wind. **Others\*\*\*** Old vehicle and Project Overloading

#### 4.1.2. Injuries and Fatalities among Road Users

Among all road user victims, pedestrians represent the highest number of fatalities resulting from road traffic accidents (RTAs), with a total of 81 recorded fatal cases. This highlights the significant vulnerability of pedestrians in traffic accidents. In terms of non-fatal victims, when examining non-fatal injuries, passengers are the most affected group, accounting for 186 cases.



**Figure 4: Road user’s victims for RTA from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia**



**Figure 5: The site of injury among RTA victims from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia**

The figure shows that head injuries are the most common site of injury after an accident 30.55%, followed by injuries to the upper extremities (17.27%), chest injury (16.13%), lower extremities (12.52%), and abdominal injuries (12.52%) while other injuries make up the smallest category at 11%.

#### **4.5. Factors associated with fatality from road traffic accident**

This study used bivariate logistic regression analysis to examine the association between independent variables and fatality resulting from road traffic injury (RTIs). The analysis identifies independent variables that determine significant associations with a P-value less than 0.25. These variables include factors such as the age of victim, victim's place of residence, the driver's marital status, the driver's license level, place of the accident, the road user category, day of accident occurred, the victim's age (18-30 years), the driver's age (31–50 years), the driver's experience (1–3 years), the time of the accidents, the injury site, season of the year, type of accidents and the type of vehicles involved in accidents.

The study applied multivariate logistic regression analysis to identify factors associated with fatality from road traffic accidents (RTAs). Initially, a bivariate analysis revealed several independent variables with P-values less than 0.25, which were candidate into the multivariate logistic regression model. After controlling for confounding effects, independent variables, like driver's age (31–50 years), type of accidents, site of injury, time of accident occurred and vehicle type involved in accidents, were found to have a significant association with fatalities from road traffic accidents in the study population with P-values below 0.05.

Drivers aged 31–50 have 4.49 times greater odds of being involved in a fatality from road traffic accidents compared to those in the age group between 18 and 30 years with odds (AOR, 4.49, 95%CI, [2.26, 8.91]). In road traffic accidents collision of vehicle with animal are associated with a 3.82 increase in the likelihood of resulting in a fatality from road traffic accident when compared to collisions between two vehicles with odd (ARO 3.82, 95%CI, [1.45, 10.04]) and rollover accidents are associated with more than twice the odds of resulting fatalities compared to collisions between two vehicles with odd (AOR, 2.15, 95%CI, [1.02, 4.52]). Regarding the time of the accident, accidents at night are almost 2.29 times more likely to result in fatalities from road traffic accidents than in the afternoon with odds (AOR, 2.29, 95%CI, [1.1, 4.97]). Compared to the governmental vehicles the private vehicles significantly reduce the odds of fatality from road traffic accidents by 85% (AOR, 0.15, 95%CI, [0.06, 0.38]). Similarly public vehicles also show a significant reduction in the odds of being involved in fatality from road traffic accidents 71% (ARO, 0.29, 95%CI, [0.14, 0.60]). Regarding the site of injury those with extremity injuries have 62% significantly lower odds of fatality from road traffic accidents compared to those with chest injuries with (AOR, 0.38, 95%CI, [0.17, 0.87])

**Table 5: Bivariate and Multivariate logistic Regression Indicating Factors Associated with RTA victims from January 1, 2023 to December 31, 2023 in selected four cities in Puntland state of Somalia**

Variable	Category	RTA Fatality		COR (95%CI)	AOR(95% CI)	P value
		Fatal	Non-fatal			
Age of victim	<18	23	70	1		
	18-30	62	143	1.32(0.76, 2.30)	1.09(0.44, 2.72)	0.851
	31-50	53	96	1.68 (0.94, 2.99)	1.71(0.69, 4.23)	0.247
	50 and above	27	53	1.55 (0.80, 3.0)	1.68(0.59, 4.73)	0.327
Victim residence	Rural	58	98	1		
	Urban	107	264	0.68(0.46, 1.02)	1.06(0.49, 2.28)	0.873
Age of driver	18-30	46	195	1		
	31-50	103	132	3.31(2.19, 4.99)	4.49(2.26, 8.91)	<b>0.000**</b>
	51 and above	16	35	1.94(0.98, 3.79)	2.14(0.71, 6.42)	0.175
Marital status	Married	131	241	1		
	Unmarried	34	121	0.52(0.33, 0.79)	0.74(0.34, 1.62)	0.454
Driver experience	< 1 years	22	68	1		
	1-3 years	63	130	1.49(0.85, 2.64)	1.37(0.51, 3.64)	0.533
	4-6 years	43	93	1.43(0.78, 2.61)	0.58(0.21, 1.45)	0.231
	7 years and above	37	80	1.43(0.77, 2.65)	0.40(0.15, 1.1)	0.072
Level of driver license	1st level	23	63	1		
	2nd level	44	41	2.94(1.55, 5.57)	2.05(0.92, 4.58)	0.079
	3rd level	31	65	1.31(0.68, 2.48)	1.1(0.43, 2.66)	0.885
	4th level	30	81	1.01(0.54, 1.91)	0.80(0.37,1.73)	0.580
Day of accident occurred	Normal working day	105	258	1		
	Public holiday	22	33	1.64(0.91, 2.94)	1.37(0.53, 3.59)	0.517
	Weekend	38	71	1.32(0.83, 2.07)	0.79(0.38, 1.66)	0.545
Time-of accident occurred	Afternoon	55	115	1		
	Evening	14	26	1.13(0.55, 2.32)	1.50(0.49, 4.63)	0.479
	Morning	53	157	0.71(0.45,1.10)	0.96(0.51, 1.81)	0.908
	Night	43	64	1.40(0.85, 2.32)	2.29(1.1,4.97)	<b>0.035**</b>
Place of accident occurred	City road	108	270	1		
	rural road	57	92	1.55(1.04, 2.31)	1.1(0.48, 2.51)	0.823
Category of road user or victim	Driver	24	50	1		
	Pedestrian	81	126	1.34(0.76, 2.35)	1.44(0.65, 3.89)	0.438
	Passenger	60	186	0.67(0.38, 1.18)	0.62(0.26, 1.48)	0.283
Site of injury after RTA	Chest injury	36	49	1		
	head injury	71	90	1.07(0.63, 1.83)	1.41(0.65, 3.06)	0.391
	Extremities	30	127	0.32(0.18, 0.58)	0.38(0.17, 0.87)	<b>0.022**</b>
	Abdominal-pelvic and Spinal injury	28	96	0.39(0.22, 0.72)	0.697(0.29, 1.66)	0.416

**Table 6: Bivariate and Multivariate logistic regression  
continue**

Season of the year	Winter	42	84	1.43 (0.81,2.52)	1.75(0.73, 4.18)	0.209
	Spring	52	90	1.65(0.95,2.86)	1.39(0.61, 3.16)	0.433
	Summer	43	107	1.15(0.66, 2.00)	1.23(0.51, 2.96)	0.652
Type of accident	Autumn	28	80	1		
	Vehicle with animal	24	34	2.63(1.39, 4.97)	3.82(1.45, 10.04)	<b>0.007**</b>
	Pedestrian accident	49	122	1.49(0.92, 2.45)	0.70(0.33, 1.48)	0.351
Type of vehicle faced accident	Rollover collision of vehicles	55	68	3.02(1.82,5.01)	2.15(1.02, 4.52)	<b>0.043**</b>
	Governmental vehicle	37	138	1		
	Private vehicle	53	58	1		
	Public transport	38	108	0.39(0.23, 0.65)	0.15(0.06, 0.38)	<b>0.000**</b>
	Motorbike	51	161	0.35(0.21, 0.56)	0.29(0.14, 0.60)	<b>0.001**</b>
		23	34	0.74(0.39, 1.41)	0.51(0.19,1.32)	0.165

Note: \* and \*\* variables for multivariable logistic regression at p-value < 0.25 and < 0.05, respectively. COR=Crude odds ratio, AOR= Adjusted odds ratio CI=Confidence interval,

## 5. DISCUSSION

This study examined fatality from road traffic accidents reported to traffic police in four cities of Puntland. The prevalence of fatalities was found to be high 31.3% (95% CI: 27.4, 35.5%). Significant factors associated with fatality rate included Driver age, type of accidents, time of accident, site of injury, and vehicle type.

This finding is consistent with study compared to previous study in Hargeisa, Somaliland, which reported a prevalence of 28.17% (Mohamed et al. 2023). Discrepancy may be due to differences in study periods, and the types of vehicles involved (Mohamed et al. 2023). In contrast a study conducted in Addis Ababa, Ethiopia, found a lower fatality prevalence of 15.1% (Alemayehu et al. 2023), In contrast, research from Burayu Town police station in Oromiya, Ethiopia, the fatality rate from road traffic accidents was found to be low which is 25% (Hordofa et al. 2018), In a study carried out in Kigali, Rwanda, the fatality rate from road traffic injuries was found to be lower which is 22% (Kim et al. 2016). Additionally, a study conducted in the North Shewa Zone of Central Ethiopia was found a higher fatality of 40% rate associated with road traffic accidents (Deresse et al. 2023). In contrast study conducted in Ethiopia which reported higher fatality rate 37% (Abegaz and Gebremedhin 2019). In discrepancy due to drivers were inadequately experienced or trained, mobile phone use, dense traffic, poor pedestrian prioritization, and limited road-safety awareness. This contributed to the high rate of fatality from road traffic accidents in the area (Hareru et al. 2022).

The results showed that drivers aged 31–50 years had significantly higher odds of involvement in fatal accidents compared to those aged 18–30 years. This finding is consistent with study conducted in Hilly District of Nepal (Shrestha et al. 2017). In contrast, a study conducted in the Oromia region of Ethiopia demonstrated that drivers aged 30-50 years were linked to a reduced risk of fatalities per accident resulting from road traffic accidents (Aga et al. 2021). Another research study conducted in Dar es Salaam, Tanzania, indicates that the age group of 18 to 45 years is associated with a higher mortality rate from road traffic injuries (Boniface et al. 2016). This discrepancy may indicate differences in road safety measures, driver training, or traffic conditions between the regions studied (Papalimperi et al. 2019)

Furthermore, vehicle-animal collisions were associated with a 3.46 increase in the likelihood of fatal outcomes compared to collisions between vehicles. A similar finding was reported in the

United Arab Emirates, where car-camel collisions were significantly associated with severe head injuries or death (Al-Ali et al. 2019). Discrepancy may Animals can cause drivers to lose control of their vehicles, which may lead to crashes with other vehicles or stationary objects(Al-Ali et al. 2019).

Moreover, rollover accidents are associated with more than twice the odds of resulting fatalities. This finds is consistency with study conducted in Addis Ababa City, Ethiopia, (Bekelcho et al. 2023). This is consistent with study from Oromia region, Ethiopia, where vehicle upside down accident was associated with higher expected human deaths per road traffic accident compared collision between vehicles(Aga et al. 2021).this due to, During a rollover, passengers can be ejected from the vehicle, significantly increasing the risk of fatality(Zainafree et al. 2022).

Injury site was also an important determinant of fatality. Victims with extremity injuries had significantly lower odds of death compared to those with chest injuries. This is supported by a study conducted in Shanghai, China, (Yu et al. 2017). This study is similar to a study conducted in Addis Ababa, Ethiopia, which found that participants with extremity injuries had a lower risk of death compared to those with multiple injuries(Mengistu 2025).The severity and critical nature of chest and head injuries likely account for this increased fatality risk.

The timing of accidents was also found to influence fatality outcomes. Accidents occurred at night are almost more likely to result in fatalities from road traffic accidents than in the afternoon. This finding is consistent with study conducted in Kampala, Uganda(Biribawa 2019) and Ilam district, Iran (Jalilian et al. 2019). A study conducted in Oromia region, Ethiopia was found that road traffic accident occurred during the evening and night time was statistically significantly lower than the number of human deaths occurred in the afternoons (Aga et al. 2021). This discrepancy may be due to differences in traffic volume, lighting conditions, and the availability of emergency response services across regions.

This study demonstrated that as compared to the governmental vehicles, the private vehicles related accidents were associated with significantly reduced odds of fatality from road traffic accidents. this finding is in contrast to study from Nepal where private company vehicle were more likely to have exposed with an accident than those personal vehicles (Shrestha et al. 2017). Another study conducted in Mekelle city, Northern Ethiopia, revealed that government vehicles were significantly more likely to be involved in road traffic accidents compared to privately owned vehicles(Woldu et al. 2020).Similarly public vehicles also show a significant reduction in the odds

of being involved in fatality from road traffic accidents. A study conducted in Addis Ababa, Ethiopia, shows differently, fatality caused by commercial trucks vehicle (a type of public transport vehicle) was higher by times than the fatality caused by automobile (Alemayehu et al. 2023).

### **5.1. Strength and Limitation of the Study**

This study demonstrates several key strengths. By incorporating a broad range of socio-demographic variables for both victims and drivers, it allows for a comprehensive analysis of the factors influencing road traffic accidents (RTAs). The monthly trend analysis of RTA fatalities and injuries reveals high-risk periods. Study use both of bivariate and multivariate logistic regression that strengthen the study. Additionally, the identification of human, environmental, and vehicle-related contributors to RTAs offers valuable insights for shaping effective policies and prevention strategies. Moreover, the findings of study can be applied to similar city of Puntland that was not included in this study.

As a limitation, this study collected data retrospectively by reviewing the traffic police records at the police station. Some required variables for the study were missing in the records like helmet use, cyclist report, and educational status of driver. Lack of standardized and periodic record system at each police station was also the other limitation. In some accidents that caused a minor injury, the matter was resolved through dialogue and the police might not report this accident. Although various factors such as human error, animals, road and vehicle defects, obstructions, and extreme weather conditions contribute to accidents, there may also be misclassification bias arising from the traffic police reporting system, particularly in how the causes of accidents are recorded and categorized

## **6. CONCLUSION AND RECOMMENDATIONS**

### **6.1. CONCLUSION**

Fatality prevalence from road traffic accident was found to be around one third of RTA. Driver age, type of accidents, time of accident, site of injury, and vehicle type were statistically significantly associated with fatal outcomes. Personal factors, such as over-speeding and careless driving, played a significant role in contributing to accidents, together with environmental and vehicle-related factors. The findings reveal that males constitute the majority of both victims and drivers involved in RTAs. The study identified May had the highest accident rate followed closely by September and August

### **6.2. RECOMMENDATIONS**

The findings of this study highlight critical risk factors associated with road traffic accident fatalities and provide valuable evidence for strengthening road safety interventions. Based on the results, the following recommendations are made:

The Puntland State should establish targeted driver education programs for individuals in middle age focusing on safe driving practices, defensive driving, and increased awareness of risk-related factors. Traffic police should strengthen public safety campaigns by promoting adherence to traffic rules, discouraging unnecessary nighttime driving, and providing guidance on safe travel when night driving is unavoidable. Additionally, Puntland authorities should enhance public health education to improve awareness of fatality risks associated with different injury types and ensure that emergency responders prioritize the management of chest injuries, which carry higher fatality rates. Finally, promoting the use of safer private and public vehicles, alongside enforcing regular vehicle safety inspections, will contribute to reducing the overall risk of fatalities on the road. Therefore, the findings of this research are expected to guide the Puntland state should be formulating effective strategies, implementing targeted interventions, and conducting further studies aimed at reducing fatality from accident

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## 8. ANNEXES

### 8.1. Information Sheet and Informed Consent form for Head of Traffic Police Offices (English Version)

Good morning/afternoon My name is Abdiwali Jama Osman I am studying my master's degree program at Haramaya University, College of Health and Medical sciences. I kindly request you to lend me your attention to explain to you about the study and being selected as the study participant.

**The study title:** trends and fatality from road traffic accident and associated factors among victims reported to traffic police stations in selected four cities in Puntland state of Somalia 2023.

**Purpose of the study:** The findings of this study suggest that adopting conservative preventive measures can play a crucial role in preventing accidents in the long term and promoting a safe road environment. To gather relevant information, it would be beneficial to collect data on the age and sex of the victims, as well as the characteristics of the road traffic accidents (RTAs) and the conditions surrounding the accidents. Collecting information about the age and sex of the victims can help me identify any demographic patterns or trends related to road accidents. This data can provide insights into which age groups or genders are more prone to accidents. Additionally, gathering information about the characteristics of the RTAs is essential. This could include factors such as the location of the accidents, the time of day, weather conditions, road infrastructure, and any contributing factors like speeding or distracted driving. Analyzing these details can help me identify specific areas or situations where accidents are more likely to occur, enabling authorities to implement targeted measures to reduce risks. The aim of this study is to write a thesis as a partial fulfillment of a master's program in public health in epidemiology for the principal investigator.

**Procedure and duration:** Specifically, I will collect record data registered in 2023 from RTA like age of victim, sex victim, place of accident, cause of accident, type of injury, using questionnaires to provide me with pertinent data that is helpful for the study. There are about 16 questions to answer. Where I will fill out the questionnaire by record data registered in 2023 from RTA. The completion time is about 15 to 20 minutes. I do not want write the name. The information that will take during the study will be kept confidential. Only data collectors and researchers will have access to the questionnaires and the information that provided.

**Risks and benefits:** The risk of participating in this study is minimal, but only takes 15-20 minutes from your time. There would not be direct payment for participating in this study. But the findings from this research may reveal important information for the road traffic officers.

**Confidentiality:** The information you provide for me will be kept confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study community and will not reflect anything particular about a person. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the study.

**Rights:** Participation in this study is fully voluntary. You have the right to declare to allow or not the study. If you decide not to allow, you have the right to withdraw from the study at any time and this will not label you for any loss of benefits to which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

**Contact address:** If there are any questions or enquires any time about the study or the procedure, please contact through the following address:

- ❖ Principal investigator Adiwali jama,
- ❖ [Abdiwalijama03gmail.com](mailto:Abdiwalijama03@gmail.com) or Mobile phone: +251-909410883, +252-097609591
- ❖ Institutional Health Research Ethics Review Committee (IHRERC): Office phone: 0254-66-20-11 or P.O.BOX: 235, Harar, Ethiopia.

**Declaration of Informed Voluntary Consent:** I have read the participant information sheet and voluntary informed consent. I have clearly understood the purpose of the research, the procedures, the risk and benefits, issues of confidentiality, the rights of participating and contact address for any enquiry. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declared my voluntary consent to participate in this study with my initials (signature) as indicated below:

Name and Signature of the head of traffic police office: \_\_\_\_\_ Date\_\_\_\_\_

Name and Signature of the principal investigator \_\_\_\_\_ Date\_\_\_\_\_

## **8.2. Information Sheet and Informed Consent form for Head of Traffic Police Office (somali version)**

### **Hordhaca**

Subax wanaagsan/ galabnimo Magacaygu waa Cabdiwali Jaamac Cismaan Waxa aan shahaadada Masterka ka bartaa Jaamacadda Haramaya, Kuliyaadda Caafimaadka bulshada. Waxaan si naxariis leh kaaga codsanayaa inaad i siiso dareenkaaga si aan idiin kuugu sharaxo daraasadda iyo in lagu doorto ka qaybqaataha daraasadda.

**Cinwaanka daraasadda:** isbeddellada iyo dhimashada shilalka waddooyinka iyo arrimaha la xidhiidha dhibbanayaasha ee laga diwaan galiyay saldhigyada booliiska taraafikada ee afar gobol oo ka tirsan maamul goboleedka Puntland ee Soomaaliya 2023.

**Ujeedada daraasadda:** Natiijooyinka daraasaddan waxay soo jeedin doontaa qaadashada tallaabooyin looga hortagayo shilalka waddooyinka mustaqbalka fog iyo kor u qaadida tayada waddooyinka siloo ilaaliyo badqabka rakaabka kusafraha waddooyinka. In la ururiyo macluumaadka khuseeya, waxay faa'iido u yeelandoontaa guud ahaan gobolada puntland. In la ururiyo xogta da'da iyo jinsiga dhibbanayaasha, iyo sidoo kale sifooyinka shilalka waddooyinka (RTAs) iyo xaaladaha ku xeeran shilalka waa muhiim dhamaan. Aruurinta macluumaadka ku saabsan da'da iyo jinsiga dhibbanayaasha waxay iga caawin kartaa inaan aqoonsado qaababka tirakoobka ama isbeddellada la xiriira shilalka waddooyinka. Xogtan ayaa bixin karta aragtiyo ku saabsan kooxaha da'da ama jinsiga ee aadka ugu nugul shilalka. Intaa waxaa dheer, ururinta macluumaadka ku saabsan sifooyinka RTA waa lama huraan. Tan waxaa ku jiri kara arrimo ay ka mid yihiin goobta shilalka, waqtiga maalinta, xaaladaha cimilada, kaabayaasha waddooyinka, iyo arrimo kasta oo gacan ka geysta sida xawaaraha ama wadista mashquulka ah. Falanqaynta tafaasiishan waxay iga caawin kartaa inaan aqoonsado meelo gaar ah ama xaalado ay shilalku aad ugu dhow yihiin inay dhacaan, taasoo awood u siinaysa mas'uuliyiinta inay fuliyaan tallaabooyin la beegsanayo si loo yareeyo khatarta. Ujeeddada daraasaddan ayaa ah in la qoro tesis ahaan dhammaystirka qayb ahaan barnaamijka master-ka ee caafimaadka dadweynaha ee cudurrada faafa ee baaraha maamulaha.

**Habka iyo muddada:** Gaar ahaan, waxaan ka ururin doonaa xogta diiwaanka ee ka diiwaangashan 2023 RTA sida da'da dhibbanaha, dhibbanaha jinsiga, goobta shilka, sababta shilka, nooca dhaawaca, anigoo isticmaalaya su'aalo-waraysiyo si ay ii siiyaan xogta muhiimka ah ee waxtar u leh daraasadda . Waxaa jira ilaa 16 su'aalood in laga jawaabo. Halka aan ku buuxin doono xog-ururinta xogta diiwaanka ee 2023 ee RTA. Wakhtiga dhamaystirku waa 15 ilaa 20 daqiiqo. Ma

rabo in aan qoro magaca. Macluumaadka qaadan doona inta daraasaddu socoto waxa lagu hayn doonaa sir. Kaliya xog-ururinta iyo cilmi-baarayaasha ayaa heli doona xog-ururinta iyo macluumaadka la bixiyay.

**Khatarta iyo faa'iidooyinka:** Khatarta ka-qaybgalka daraasaddan waa mid aad u yar, laakiin kaliya waxay qaadataa 15-20 daqiiqo wakhtigaaga. Ma jiri doonto lacag toos ah ka qaybqaadashada daraasaddan. Laakiin natiijooyinka ka soo baxa cilmi-baaristan ayaa laga yaabaa inay daaha ka qaadaan macluumaadka muhiimka ah ee saraakiisha waddooyinka.

Qarsoodi: Macluumaadka aad i siisay waxa lagu hayn doonaa sir. Ma jiri doono macluumaad si gaar ah kuu aqoonsan doona. Natiijooyinka daraasadda ayaa noqon doona mid guud oo loogu talagalay bulshada daraasadda mana ka tarjumayso wax gaar ah oo qofka ku saabsan. Foomka xog-ururinta ayaa kood lagu dhejin doonaa si looga saaro muujinta magacyada. Wax tixraac ah laguma samayn doono warbixino hadal ama qoraal ah oo xidhiidhin kara ka qaybgalayaasha daraasadda.

**Xuquuqda:** Ka-qaybgalka daraasaddan waa ikhtiyaari. Waxaad xaq u leedahay inaad caddayso inaad ka ogolaato ama aadan ka ogolaan daraasadda. Haddii aad go'aansato inaad ka qaybgelin, waxaad xaq u leedahay inaad ka baxdo daraasadda wakhti kasta tanina kuma calaamadayn doonto wax khasaare ah oo dheefo ah oo aad xaq u leedahay. Uma baahnid inaad ka jawaabto su'aal kasta oo aadan rabin inaad ka jawaabto.

**Cinwaanka xiriirka:** Haddii ay jiraan wax su'aalo ah ama weydiiyo wakhti kasta oo ku saabsan daraasadda ama nidaamka, fadlan la xiriir ciwaanka soo socda:

Mr.Abdiwali Jama: +251909410883/+252097609591,

Iimaylka: [abdiwalijama03@gmail.com](mailto:abdiwalijama03@gmail.com).

Institutional Health Research Ethics Review Committee (IHRERC) Jaamacada Haramaya :  
Lambarka xafiiska:- 0254662011, P.O.Box 235, Harar, Ethiopia

**Ku dhawaaqida Ogolaanshaha iskaa wax u qabso ee la wargeliyay:** Waan akhriyay xaashida macluumaadka ka qaybqaataha iyo ogolaanshaha wargelinta ikhtiyaariga ah. Waxaan si cad u fahmay ujeedada cilmi-baarista, hababka, khatarta iyo faa'iidooyinka, arrimaha sirta, xuquuqda ka-qaybgalka iyo ciwaanka xiriirka wixii su'aalo ah. Waxaa la i siiyay fursad aan ku weydiiyo su'aalo laga yaabo in aan caddayn. Waxaa la igu wargeliyay inaan xaq u leeyahay inaan ka baxo daraasadda wakhti kasta ama inaan ka jawaabin su'aal kasta oo aanan rabin. Sidaa darteed, waxaan

ku dhawaaqay oggolaanshahayga ikhtiyaarka ah si aan uga qayb galo daraasaddan anigoo wata xarfaha hore (saxiixa) sida hoos ku cad:

Magaca iyo Saxeexa madaxa xafiiska ilaalada wadooyinka: \_\_\_\_\_  
 \_\_\_\_\_ Taariikhda \_\_\_\_\_

Magaca iyo Saxeexa baaraha \_\_\_\_\_ Taariikhda \_\_\_\_\_

### 8.3. Checklist for Data Collection (English Version)

Trends and fatality from road traffic accident and associated factors among victims reported to traffic police stations in selected four cities in puntland state of somalia.

Name of supervisor \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

Name of Data collector \_\_\_\_\_ Date \_\_\_\_\_ Signature \_\_\_\_\_

<b>Part 1: Socio-demographic characteristics of victims</b>		
101	Age of victim	_____in year
102	Sex of the victim	1. Male 2. Female
103	Place of Residence	1. Urban 2. Rural
<b>Socio-demographic characteristics of driver</b>		
106	Age of the of driver	___in year
107	Sex of the driver	1. Male 2. Female
108	Marital status of driver	1. Single 2. Married
110	Driver license	1. Yes 2. No
111	Level of holding a driving license	_____
112	Driver experience	_____in year

<b>Part2: Information about the accident</b>		
	<b>Question</b>	
201	Day of occurrence	1.Normal working day 2.Weekends 3. Public holidays
202	Time of occurrence	1.Morning      2.Afternoon 3. Night
203	Place of occurrence	2. City road   2. Rural road
204	Category of road user or victim?	1. Pedestrian    2.passenger    3.Driver
205	Accident type	1. collision between vehicles, 2. Vehicle and pedestrian. 3. vehicle and animal 4. Rollover accident
206	Month when accident Occurred	_____
207	Types of vehicle faced accident	1. Governmental vehicles 2. Public transport vehicle 3. private vehicles 4. Motorbike
208	Type of injury/fatal	1. Fatal    2. Severe/ Slight injury( Non-fatal)

209	The site of injury in the body after a sustained road traffic accident (RTA	1. Head injury 2. Upper extremity 3. Chest injury    4. abdominal injury 5. Pelvic injury 6. Lower extremity injury 7. Spinal cord injury
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<b>Part3: Human, Environmental, Vehicle, and Weather factors associated with RTAs</b>		
	Causes of accident	
	<b>Human</b>	<b>Factors</b>
301		Careless driving/ reckless
302		Overworking driver
303		Over speeding
304		Fail to give priority
305		Distracted driving by phone
306		Improper Turns/ Wrong-Way Driving
	<b>Vehicle</b>	<b>Factors for Vehicle defect</b>
307		Old vehicle
308		Failure of brakes or steering wheel
309		Tire Blowouts/ tire burst
310		Projecting loads/Overloading
	<b>Environmental and weather</b>	<b>Factor</b>
311		Poor road condition

312		Absence of road signs/ traffic signs
		Narrowing road or one side road
		Animal crossed road
313		Road Diversions
		Rainy
314		Strong Wind

#### 8.4. Checklist for Data Collection (Somali version)

Su'aalo qoraala.

**Ciwaanka cilmi baarista: isbad-badalka, dhimashada iyo dhaawaca ay sababaan shilalka wadooyinku iyo wax yaalaha saameeya ee kadhaca in puntland state of Somalia 2023.**

Magaca kormeeraha \_\_\_\_\_ Taariikhda \_\_\_\_\_ Saxiixa

Magaca xog uruuriyaha \_\_\_\_\_ Taariikhda \_\_\_\_\_ Saxiixa

<b>Part 1: Xogta dhibanayaasha</b>		
101	Da'da dhibanaha	_____ in year
102	Jinsiga dhibanaha	1. Lab 2. Dhedig
103	Goobtuu deganyahay	1. Magaalo 2. Miyi
<b>Xogta Darwalada</b>		

104	Da'da darawalka	___in year
105	Jinsiga darawalka	1. Lab 2. Dhedig
106	Xaaladiisa guur	1. Doob 2. Reerleh
107	Heerka aqoonta	1.Waxbartay 2.Aan wax baran
108	Aqoonsiga wadida gaariga	1. Haa 2. Maya
109	Khibrada darawalka	_____in year

<b>Part2: Information about the accident</b>			
	<b>Question</b>		
201	Maalinta shilku dhacay	1.Maalmaha shaqada caadiga 2.Khamiis iyo jimce 3. Maalmaha ciidaha	
202	Goorta shilku dhacay	1.Galin hore 2.Galin danbe 3. Habeen	
203	Goobta shiku kadhacay	2. Magaalada dhexdeeda 2. Baadiye	
204	Nooca dhibanaha	1.Qof-lugaynayay 2.Rakaabkii 3.Darawalkii	
205	Nooca shilka	1. Isku dhac labo gaari. 2. Gaari iyo qof lugaynaya. 3. Gaari iyo xoolo.	
206	Bisha shilku dhacay	_____	
207	Nooca gaariga shilka galay		

		<ol style="list-style-type: none"> <li>1. Bajaaj</li> <li>2. Bus</li> <li>3. Gawaarida raaxada</li> <li>4. gawaarida xamuulka</li> <li>6. baaskiil</li> </ol>
208	Nooca dhaawaca ama dhimashada	<ol style="list-style-type: none"> <li>1. Dhimasho</li> <li>2. Dhaawac culus</li> <li>3. Dhaawac fudud</li> </ol>
209	Meesha dhaawucu kasoo gaaray shilka kadib	<ol style="list-style-type: none"> <li>1. Madaxa</li> <li>2. Qaarka hore</li> <li>3. Xabadka</li> <li>4. Caloosha</li> <li>5. Miskaha</li> <li>6. Qaarka danbe</li> <li>7. Xangulaha</li> </ol>

<b>Part3: Human, Environmental, Vehicle, and Weather factors associated with RTAs</b>		
Waxa shilka sababay	Factors	Response
301	Darawal daalan	
302	Taxadar la'aanta wadaha	
303	Isticmaalka maandooriye	
304	Darawal da'yar	
305	In gaarigu sikhaldada uleexday	
306	Gaari sikhaldan usocday	
307	Qof lugaynaya ayuu kudhacay	
308	Xawaare saaida	
309	Fursad kabax	
310	Isticmaalka teleefonka	

311	Cilad gaariga kutimid
312	Wade waqti badan shaqeeyay
<b>Vehicle</b>	<b>Vehicle factors</b>
315	Gaari duqa ama wayn
316	Taayir ayaa ubaxay
317	Culays badan buu siday
318	Waxaa lumay koontaroolkii
319	Layrkaa cilad kutimid
<b>Environmental</b>	<b>Environmental factors</b>
320	Wadada oo xun
322	Wadada oo aan laahayn calaamadaha hagida gawaarida
322	Wadada oo qaloocatay
<b>Weather condition</b>	<b>Weather condition factors</b>
323	Xilli roobaad
324	Dabaylo culus baa jiray