CHAPTER 1

INTRODUCTION

1.1 BACKGROUND:

Road traffic crashes are a leading cause of death globally, and the main cause of death among those aged 15‑29 years (see Figure 1.1), every year the lives of approximately 1.25 million people are cut short as a result of a road traffic crash. Between 20 and 50 million more people suffer non-fatal injuries, with many incurring a disability as a result of their injury.

Road traffic injuries cause considerable economic losses to victims, their families, and to nations as a whole. These losses arise from the cost of treatment (including rehabilitation and incident investigation) as well as reduced/lost productivity (e.g. in wages) for those killed or disabled by their injuries, and for family members who need to take time off work (or school) to care for the injured.

There are few global estimates of the costs of injury, but research carried out in 2010 suggests that road traffic crashes cost countries approximately 3% of their gross national product. This figure rises to 5% in some low- and middle-income countries.

Road traffic injuries have been neglected from the global health agenda for many years, despite being predictable and largely preventable. Evidence from many countries shows that dramatic successes in preventing road traffic crashes can be achieved through concerted efforts that involve, but are not limited to, the health sector.

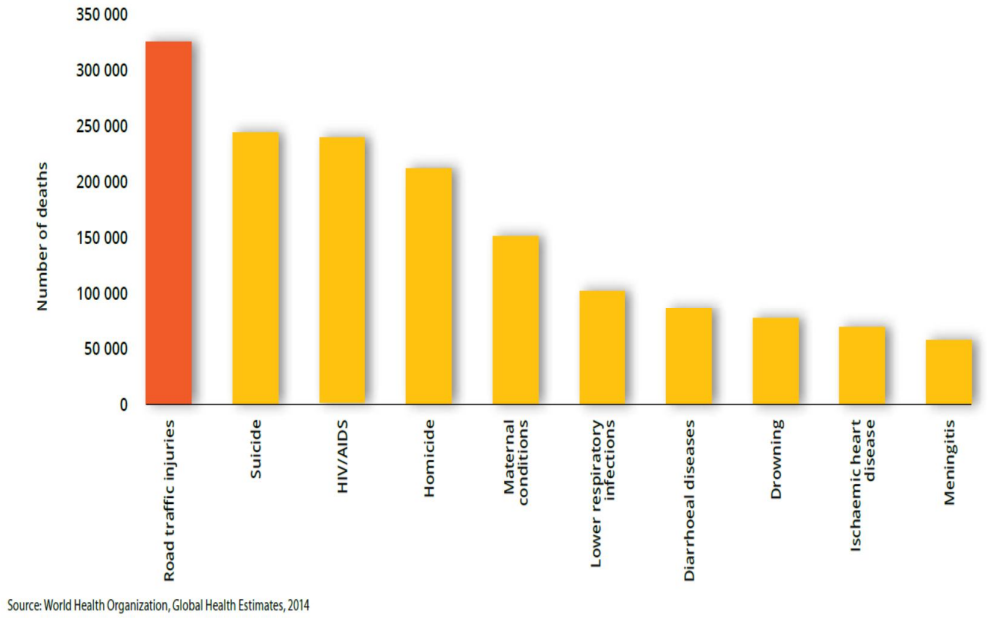


Figure1.1 top ten cases of death among people aged (15-29) years

Who is at risk?

Socioeconomic status

More than 90% of deaths that result from road traffic injuries occur in low- and middle-income countries. Road traffic injury death rates are highest in the low- and middle-income countries of the African region. Even within high-income countries, people from lower socioeconomic backgrounds are more likely to be involved in a road traffic crashes.

Age

People aged between 15 and 44 years account for 48% of global road traffic deaths.

Sex

From a young age, males are more likely to be involved in road traffic crashes than females. About three-quarters (73%) of all road traffic deaths occur among men. Among young drivers, young males under the age of 25 years are almost 3 times as likely to be killed in a car crash as young females.

Road traffic injuries claim more than 1.2 million lives each year and have a huge impact on health and development. They are the leading cause of death among young people aged between 15 and 29 years, and cost governments approximately 3% of GDP. Despite this massive – and largely preventable – human and economic toll, action to combat this global challenge has been insufficient [1].

Road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by 2030 .This rise is driven by the escalating death toll on roads in low- and middle-income countries – particularly in emerging economies where urbanization and motorization accompany rapid economic growth. In many of these countries, necessary infrastructural developments, policy changes and levels of enforcement have not kept pace with vehicle use. In contrast, many high-income countries have managed to break the link between rising motorization and road traffic deaths, with some managing to dramatically reduce such deaths. These achievements are the result of making infrastructure safer, improving the safety of vehicles, and implementing a number of other interventions known to be effective at reducing road traffic injuries. Having good quality data to monitor the impact of these efforts is also critical to demonstrating their success [1].

Eighty-eight countries – in which almost 1.6 billion people live – reduced the number of deaths on their roads between 2007 and 2010, showing that improvements are possible, and that many more lives will be saved if countries take further action. However, of concern is that 87 countries saw increases in the numbers of road traffic deaths over the same period.

Middle-income countries have the highest annual road traffic fatality rates, at 20.1 per 100 000, compared to 8.7 and 18.3 in high- and low-income countries respectively. Eighty per cent of road traffic deaths occur in middle-income countries, which account for 72% of the world’s population, but only 52% of the world’s registered vehicles. These countries bear a disproportionately high burden of road traffic deaths relative to their level of motorization.

The risk of dying as a result of a road traffic injury is highest in the African Region and lowest in the European Region (see Figure1.1). Nonetheless, there are significant disparities in road traffic fatality rates between countries in the same region, with the European Region showing the greatest differences.

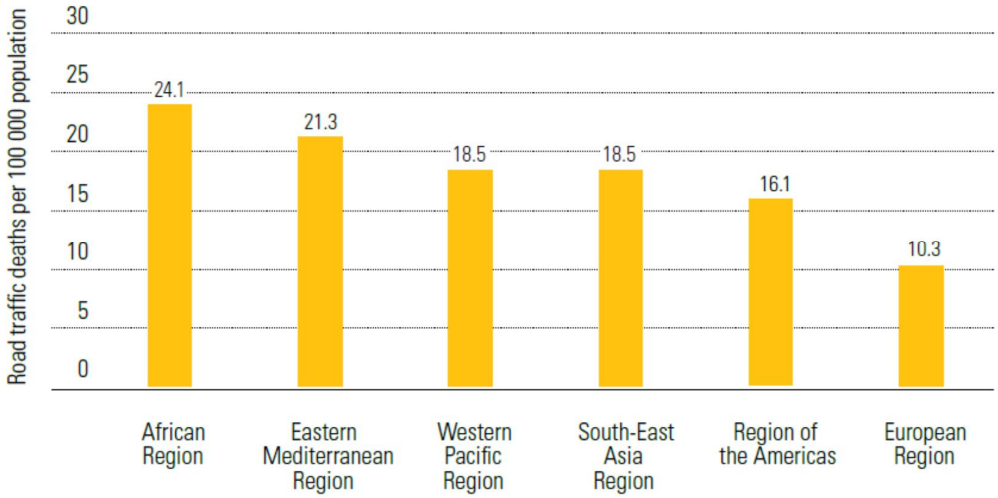


Figure 1.2.Road traffic deaths per 100 000 population, by WHO region

Half of the world's road traffic deaths occur among pedestrians (22%), bicyclists (5%) and motorcyclists (23%) – i.e. "vulnerable road users". However, there are significant differences regarding who is most at risk by country income status and by region. In the African Region, where walking and bicycling are important forms of mobility, a high proportion of deaths (38%) occur among pedestrians. In contrast, in many Western Pacific countries where motorcycles are used frequently, 36% of road traffic deaths are among motorized two- and three-wheelers.

The Arab world, which is majority state within the scope of developing countries, they are severely suffering from the problem of traffic and the resulting injuries and deaths caused by road accidents and the economic damage exceeding expectations. The WHO warns that the continuation of the current situation in the Arab region for traffic accidents, it will lead to increased numbers of deaths and injuries due to traffic accidents by 60% from what it is now and that the year 2020 AD.

Since the society in Sudan - Khartoum state is suffering like all other societies of the problem of high rates of road accidents and the resulting incidents of human and economic losses. And it became traffic accidents represent a most significant issues and problems faced by the residents of the state of Khartoum. The state of Khartoum occupied the highest level of Sudan for road accidents; the rate of accidents has reached to about 53.9% of which occurs in all states of Sudan.

1.2 STUDY AREA (KHARTOUM STATE)

Khartoum state is located in the center of Sudan is bordered on the northeast side River Nile State and the North West, Northern State and the eastern and south-eastern states of Kassala and Gedaref and the state of the island. Any Khartoum State is located in the northeastern part of the center of the country in the heart of Sudan at the confluence of the White Nile, Blue Nile to form the Nile River state is located between longitudes 5.31-34 east and latitudes north almost 15-16.

The estimated Khartoum state space of about 22.736 square kilometers, Home to the state of about 8 million people, representing all ethnic, political, social and cultural spectrums, Sudan and distributed in the seven administrative localities. Third of the population fled to this state from other states of Sudan and became the state now densely populated almost up to a quarter of the population in the country. Figure 1.3 shows the map of Khartoum State.

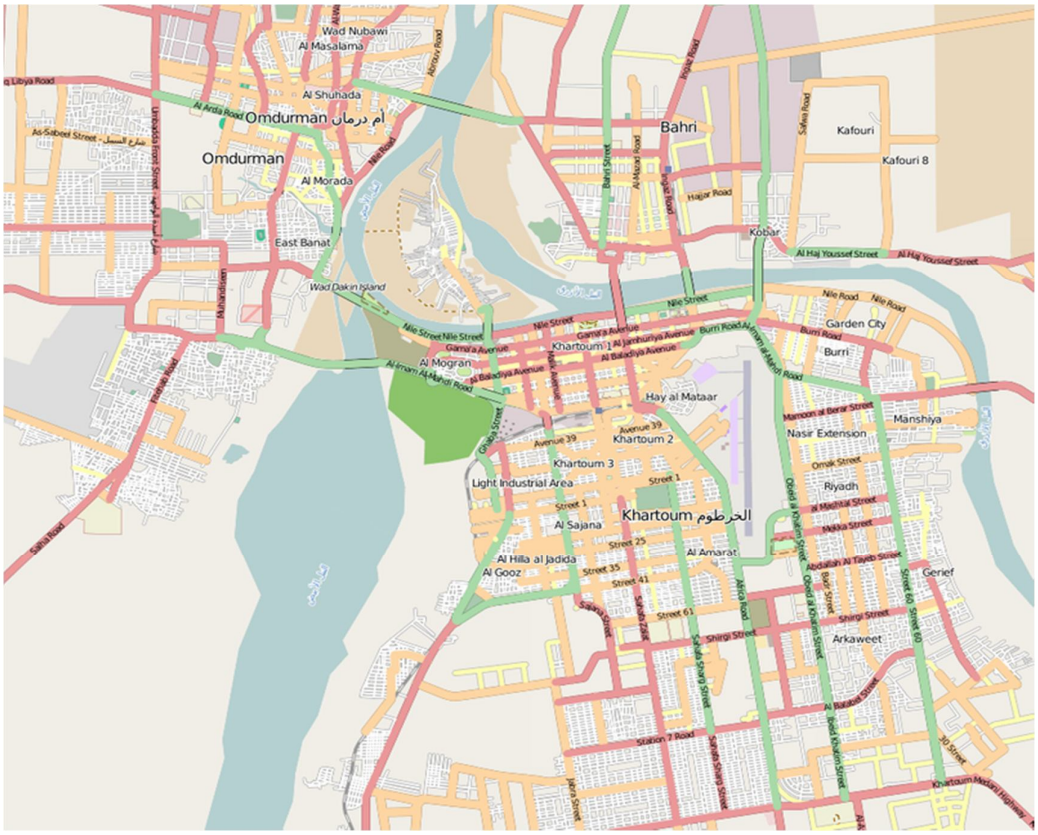


Figure 1.3 of Khartoum State map.

1.3 STATEMENT OF THE PROBLEMS

For more than a decade in Sudan, the government and community as a whole have faced enormous economic and social loss due to human and property damage arising from the adverse effects of road accidents. The Socio –economic loss can easily be observed by looking at the rising patterns of fatality risk, fatality rates, and motorization levels in Sudan as shown in Figure 1.4

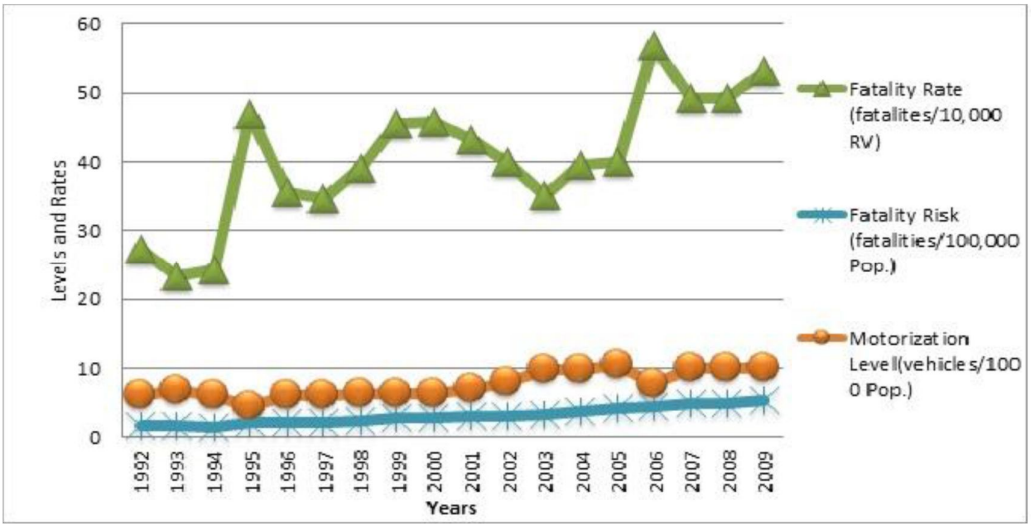


Figure 1.4 Fatality rates, risk, and motorization level trends from 1992 to 2009
Source: (CBS, 2011; GDT, 2010)

From table 1.1, figure 1.5 below we find that the year 2010 has the highest percentage of deaths due to traffic accidents, since the year 2010 to 2014 began a number of death accidents continues to drop.

Table 1.1 Number of personal death in Sudan (2010-2014)

	2010	2011	2012	2013	2014
Number of population	32923005	33975593	35055538	36010109	37557094
Number of vehicles	335784	358971	182217	320974	341580
Number of accident	20170	18223	17435	15839	12959
Number of injured	23501	22203	19837	21024	16793
Number of death	2758	2667	2482	2349	2223
N.injured/N.accident	1.17	1.22	1.14	1.33	1.30
N. death/N.accident	0.14	0.15	0.14	0.15	0.17
N.injured per 100,000 people	71.38	65.35	56.59	58.38	44.71
N. death per 100,000 people	8.38	7.85	7.08	6.52	5.92
N.injured per 10,000 vehicles	699.88	618.52	1088.65	655.01	491.63
N. death per 10,000 vehicles	82.14	74.30	136.21	73.18	65.08

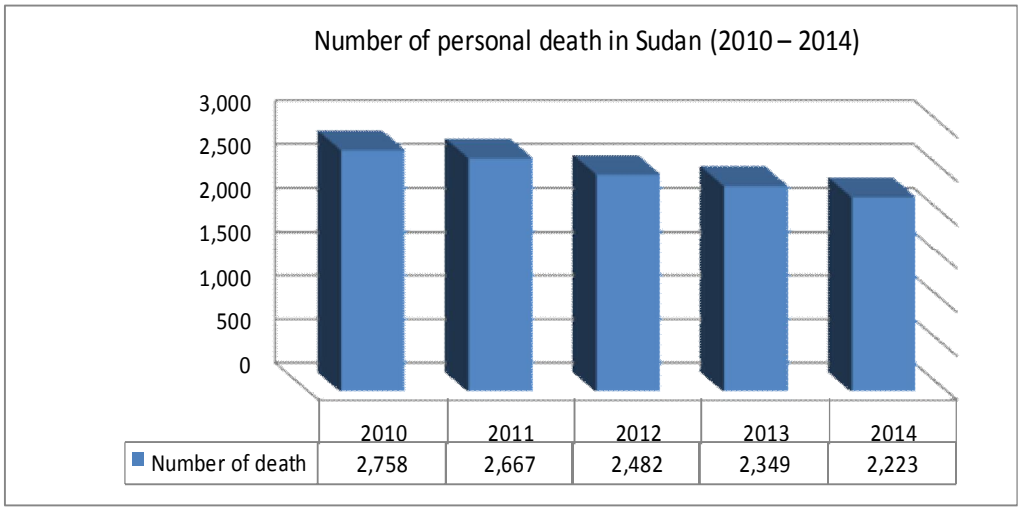


Figure 1.5 Number of personal death in Sudan (2010-2014)

This study comes in the framework to identify the causes of traffic accidents in Khartoum state, and ways to minimize them, and identify how the traffic safety application in Khartoum state, and develop a strategy for traffic safety, and develop proposals to solve traffic congestion problems in the Khartoum state.

1.4 OBJECTIVES OF THE STUDY

The main objectives of this research are summarized on the followings points:

1. To study the causes of traffic accidents the state of Khartoum - Sudan.
2. To find out the level of application of traffic safety on the three elements of a traffic; road, vehicle and road users.
3. To comparison between the vision of persons interested in traffic safety and the information contained in the annual report of accidents and traffic violations
4. Propose a strategic plan for traffic safety of Khartoum State.
5. To Study alternative transport systems (river transport) help reduce traffic congestion.
6. To study the most successful ways to reduce the number of traffic accidents in Khartoum state?

1.5 SCOPE AND LIMITATIONS

Limitation of this research was based on official information provided by the Ministry of Interior represented by the General Directorate of Traffic is worth mentioning that the General Directorate of Traffic annually publishes the annual report of the accidents and traffic offenses booklet, a booklet containing most of the traffic information on accidents of numbers and types of traffic accidents, ages of the injured and deceased, sex and type of causing compounds in a traffic accident and other information, these research was confined on the information obtained from the annual report of the accidents and traffic offenses to the number five years ago, There is also information within this research outstanding number of traffic accidents to the number of 15 years ago.

1.6 CONTRIBUTION OF THE RESEARCH

This research has contributed to identify the causes of traffic accidents, according to the annual report of the accidents and traffic violations issued by the General Directorate of Traffic - Ministry of Interior and opinions different from those reasons segments of society, as research contributes also to see how the application of traffic safety elements also contribute to the development of the study of river transport contributes reduce traffic congestion and traffic accidents and contributes to this research is also to develop a strategy for traffic safety plan for the next five years (2017 -2020)

1.7 STRUCTURE OF THE DISSERTATION

This dissertation is organized into seven chapters. Chapter 1 gives a broad idea about the accident situation globally and in the African continent and also useful information about Sudan the study area. Also covers the general traffic accident situation in Sudan and the magnitude of the problem that necessitate conducting this research. Meanwhile, the definitions of the research objectives also presented. Chapter 2 is the literature review of related works and theories, which can be helpful to readers and can be used as a guideline for this research. Chapter 3 is the methodology and conceptual framework, which is used in carrying out this research. Chapter 4 presents the Data collection and analysis. Chapter 5 presents the Study of river transport project.. Chapter 6 presents the research conclusions and recommendations.

CHAPTER 2
LITERATURE REVIEW

2. 1 PUPLIC TRANSPORTATION SYSTEM

2.1.1 Overview

From the beginning of history, human sensitivity has revealed an urge formability leading to a measure of Society's progress. The history of this mobility or transport is the history of civilization. For any country to develop with right momentum modern and efficient transport as a basic in frastructureis a must. It has been seen throughout the history of any nation that a proper, extensive and efficient Road Transport has played a major role. Transporters perform one of the most important activities, at every stage of advanced civilization. Where roads are considered as veins and arteries of a nation, passengers and goods transported are likened to blood in circulation. Passenger Road Transport Service (PRTS) is essentially connected to the economic development. Transport is the essential convenience with whichpeople does not only connect but also progress. Throughout history, people's progress has been sustained on the convenience, speed and safety of the modes of transport. Road transport occupies a primary place in to-day's world as it provides a reach unparalleled by any other contemporary mode of transport.

2.1.2 Transport

Transport (British English) or transportation (American English) is the movement of people and goods from one place to another. The term is derived from the Latin Trans("across") and portare ("to carry").

2.1.3 Function of Transport

1. Transport contributes in growth of industries whose product requires quick marketing. Fresh foodstuffs like fish and green vegetables are carried to various consumers quickly even in distant markets through transport.
2. Transport helps in increase in the demand for goods. Through transport newer customers in newer places can be easily contacted and products can be introduced to

them. Today markets have become national or international only because of transport.

3. Transport creates place utility. Geographical and climatic factors force industries to be located in particular places far away from the markets and places where there may not be any demand for the products. Transport bridges the gap between production and consumption centers.

4. Transport creates time utility. It has been made possible by virtue of the improvements in the speed of transport. It helps the product to be distributed in the minimum possible time.

5. Transport helps in stabilization of price. Transport exerts considerable influence upon the stabilization of the prices of several commodities by moving commodities from surplus to deficit areas. This equalizes the supply and demand factor and makes the price of commodities stable as well as equal.

6. Transport ensures even flow of commodities into the hands of the consumers throughout the period of consumption.

7. Transport enables the consumers to enjoy the benefits of goods not produced locally. This increases the standard of living, an essential factor for further development of marketing and economy.

8. Transport identifies competition, which in turn, reduces pries. Prices are also reduced because of the facilities offered by transport for large-scale production. Advantages of large-scale production are possible only due to transport.

9. Transport increases mobility of labor and capital. It makes people of one place migrate to other places in search of jobs. Even capital, machineries and equipment are imported from foreign countries through transport alone.

2.1.4 Mean of Transport

The first means of transport in human history were people's feet. After somebody had invented a wheel, a lot of various types of vehicles were developed. At present there are a lot of means of transport which help people to move from one to another place, to get to very distant places in a very short time, to overcome seas and oceans and even fly to the stars, to transport huge amounts of goods.

People travel in order to reach places that are close or far away, they travel for fun or from necessity. Travelling takes up more time in our lives than most of us imagine.

An everyday form of travelling may be going shopping, commuting to school, to work or visiting friends. There are two ways of travelling: one is using our own means of transport and the other is to rely on the public transportation services. People and goods can be transported by land, by air or by water.

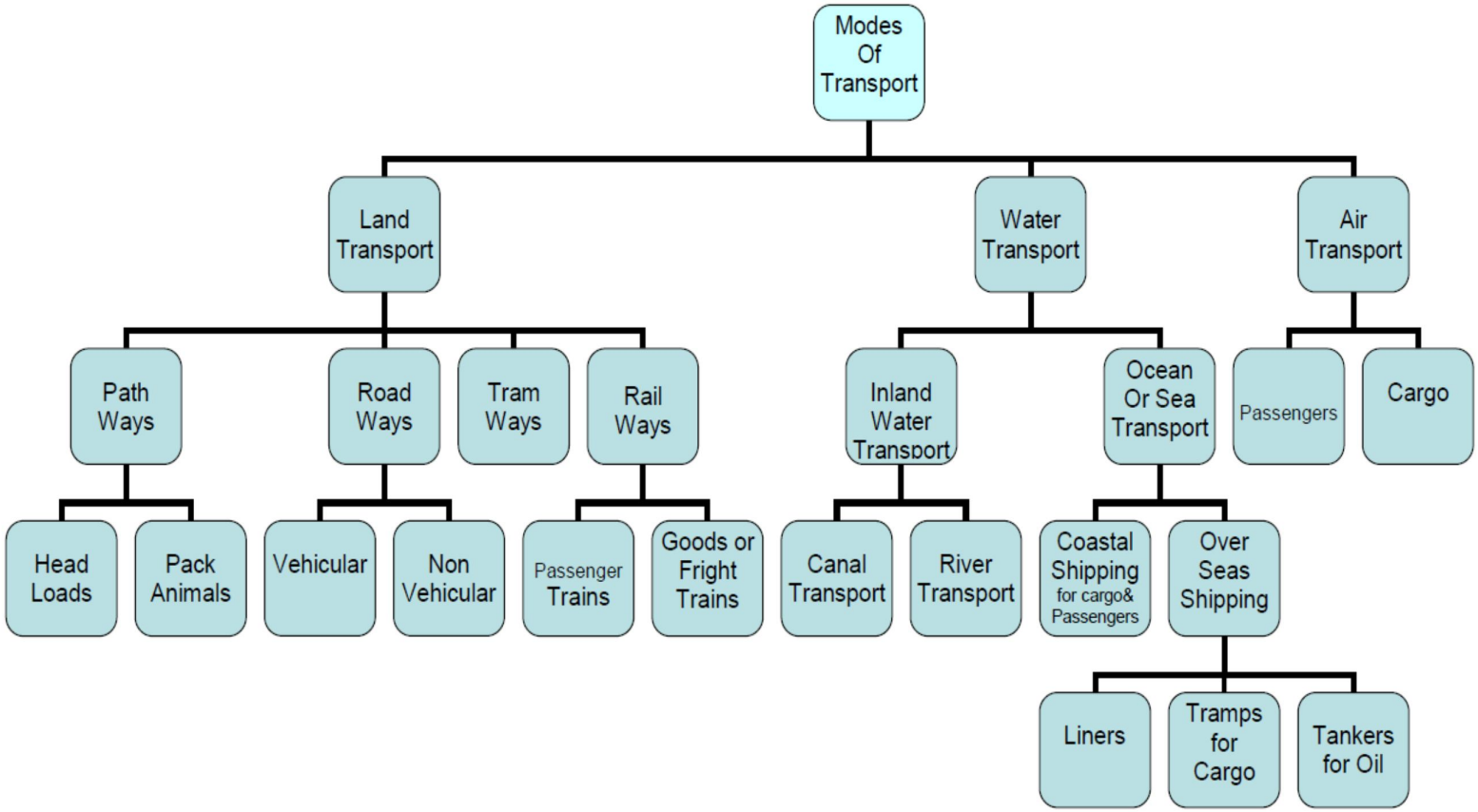


Figure 2.1 Means of Transport

2.1.4.1 Land Transport

A/ Roadways:

Road Transport is one of the most important modes of transport. The history of Road Transport started from ancient civilizations. Gradually it becomes more and more popular means of transport. Road Transport further subdivided into Vehicular Transport (cars, trucks, buses, Lorries, rickshaws, bullock carts, and hand carts etc.) and Non-vehicular Transport (Animals like camels, dogs, elephants, horses, oxen etc.).

- **Advantages:**

- Less Capital Outlay.
- Door to Door Service.
- Service in rural Areas.
- Flexible Service.
- Suitable for Short Distance.
- Lesser Risk of Damage in Transit.
- Saving in Packing Cost.
- Rapid Speed.
- Less Cost.
- Private Owned Vehicles.
- Feeder to other Modes of Transport

- **Disadvantages:**

- Seasonal Nature.
- Accidents and Breakdowns.
- Unsuitable for Long Distance and Bulky Traffic.
- Slow Speed.
- Lack of Organization.

B/ Tramways:

Tramway is one of the cheaper, longer, quicker and safer modes of Land Transport which is suitable in large cities. However due to certain limitations like slowness, huge investment, inflexibility etc., gradually it was replaced by other means of Land Transport.

C/ Railways:

Railway has been the pioneer of modern mechanical transport. It has brought the greatest revolution in transport. It accelerated commercial and industrial development of various countries. Until the introduction of Motor Transport, Railway had the monopoly as the Land Transport. In India, it is the principal means of transport. It carries over 80 per cent of goods traffic and over 70 percent of passenger traffic. It provides for more than 60000 kilometers of railways all over the country.

Advantages:

- Ability of loading and unloading goods and services.
- Frequency of delivering the goods over long distances.
- Climatic conditions have no effect.
- No traffic or congestion - easy movement of the vehicle.

Disadvantages:

- Capital and initial investments are more.
- High material usage for the construction and even the fuel consumption.
- The above are some of the advantages and disadvantages of using the rail.

2.1.4.2 Water Transport

Water transport is the cheapest and the oldest form of transport for heavy goods and bulk cargoes. Waterways are the natural gifts, hence it does not require large amount of capital expenditure for the construction of road and railway tracks, except canal transport, as in the case of land transport. In addition to that the cost of running is also very less.

- **Advantages:**

- It is economical mode for transporting heavy loads and even cargo.
- It is the safest mode which provides convenience to the people without accidents.
- Cost of construction and maintenance is very low.
- It even provides international transport.

- **Disadvantages:**

- It is highly affected by the weather conditions.
- It requires large initial investment.
- It is a slow process.

A. Inland Waterways

Inland waterways may be subdivided into:

A.1 River Transport:

Rivers are the water highways given by nature. River Transport is suitable for small boats and steamers. It was highly developed in the pre-railway days. But with the development of railways, river transport was neglected gradually.

A.2 Canal Transport:

Canals are the artificial waterways constructed for the purpose of navigation and irrigation.

B. Ocean Transport

Ocean Transport or shipping may be subdivided into:

B.1 Coastal Shipping:

Coastal shipping is a cheaper, speedy, flexible and economical form of transport for the movement of bulky and heavy cargoes. Usually coastal shipping trade is reserved for the national shipping. In India, also from 1951and onwards the coastal shipping trade is extremely reserved for the national ships.

B.2 Overseas Shipping:

On the basis of their working, overseas shipping may be divided into: The Liner (those ships which follow defined routes with fixed places and fixed timetable), The Tramps (those ships which have no set routes or fixed time table)and The Oil Tanker (special sea carriers of crude oil in very large quantity).The Liners may again be subdivided into Passenger Liners and the Cargo Liners.

2.1.4.3 Air Transport

Air transport is the gift of twentieth century to the world. It is the latest means of transport. The first flight in the air was made in 1903, only for twelve seconds. Successfully it was used as a means of transport after the First World War (1914-1918). The first air service started in 1919 between London and Paris. Since then it has made notable progress and provided tough competition to Railways. Air Transport can again be subdivided into passenger and cargo.

- **Advantages:**

- High Speed.
- Comfortable and Quick Services.
- No Investment in Construction of Track.
- No Physical Barriers.
- Easy Access.
- Emergency Services.

- Quick Clearance.
- Most Suitable for Carrying Light Goods of High Value.
- National Defense.
- Space Exploration.

Disadvantages:

- Very Costly.
- Small Carrying Capacity.
- Uncertain and Unreliable.
- Breakdowns and Accidents.
- Large Investment.
- Specialized Skill.
- Unsuitable for Cheap and Bulky Goods.
- Legal Restrictions.

2.2 SOCIOECONOMIC AND HEALTH EFFECTS OF ROAD TRAFFIC INJURIES

Road traffic injuries place a heavy burden on national economies as well as on households. In low- and middle-income countries, they particularly affect the economically active age group, or those set to contribute to family, society and the workforce in general. Many families are driven deeper into poverty by the loss of a breadwinner, or by the expenses of prolonged medical care, or the added burden of caring for a family member who is disabled from a road traffic injury. The economic costs also strike hard at a national level, imposing a significant burden on health, insurance and legal systems. This is particularly true in countries struggling with other development needs, where investment in road safety is not commensurate with the scale of the problem. Data suggest that road traffic deaths and injuries in low- and middle-income countries are estimated to cause economic losses of up 5% of GDP. Globally an estimated3% of GDP is lost to road traffic deaths and injuries.

2.2.1 Who is affected by road traffic injuries?

The World report on road traffic injury prevention indicates that there are notable differences in the way different road users are affected by road traffic collisions as summarized below:

- More than half of all global road traffic deaths occur among young adults between 15 and 44 years of age.
- 73% of all global road traffic fatalities are males.
- Vulnerable road users – pedestrians, cyclists and motorcyclists – account for a much greater proportion of road traffic collisions in low-income and middle-income countries than in high-income countries.

2.2.2 Socioeconomic and health effects of road traffic injuries

Road traffic injuries cause emotional, physical and economic harm. There is a moral imperative to minimize such losses. A case can also be made for reducing road crash deaths on economic grounds, as they consume massive financial resources that countries can ill afford to lose. It is important to estimate the cost of road traffic injuries to society:

- To justify the expenditure necessary in promoting road traffic injury prevention;
- To make the best use of investments when different options are available;
- To ensure that the most cost-effective safety improvements are introduced in terms of the benefits that they will generate in relation to the cost of their implementation.

2.2.3 Global estimates of costs of road traffic crashes

It is estimated that road traffic crashes cost (Table 2.1):

- US$ 518 billion globally;
- US$ 65 billion in low-income and middle-income countries, exceeding the total amount received in development assistance;
- between 1% and 1.5 % of gross national product in low-income and middle-income countries;
- 2% of gross national product in high-income countries.

Road traffic injuries put significant strain on families. For everyone killed, injured or disabled by a road traffic crash, there are many others deeply affected. Many families are driven into poverty by the cost of prolonged medical care, the loss of a family breadwinner, or the extra funds needed to care for people with disabilities. Road crash survivors, their families, friends and other caregivers often suffer adverse social, physical and psychological effects. Various studies have made an effort to analyze some of these detailed aspects but further research is needed in this area. There is anteed not only for more evidence but also for improvement in methods of data collection and analysis, especially concerning poor families and communities.

Table (2.1). Road crash costs by region

Region	GNP, 1997 (US$ billions)	Estimated annual crash costs	
		As percentage of GNP	Costs (US$ billions)
Africa	370.0	1.0	3.7
Asia	2454.0	1.0	24.5
Latin America and Caribbean	1890.0	1.0	18.9
Middle East	495.0	1.5	7.4
Central and eastern Europe	659.0	1.5	9.9
Subtotal	5615.0		64.5
Highly motorized countries	22 665.0	2.0	453.3
Total			**517.8**

2.2.4 Key points

- Worldwide, about 1.2 million persons are killed in road traffic crashes every year.
- 20 million to 50 million more are injured or disabled in these crashes.
- Road traffic injuries account for 2.1% of global mortality and 23% of all injury deaths worldwide.
- The position of road traffic injuries as a contributor to the global burden of disease is predicted to rise from tenth place in 2002 to eighth place by 2030.
- Over the past four decades there has been an overall downward trend in road traffic deaths in high-income countries and an increase in many of the low-income and middle-income countries.
- Globally, the economic cost of road traffic injuries is about US$ 518 billion with low-income and middle-income countries accounting for US$ 65 billion.
- Road traffic injuries put significant financial strain on families. Many families are driven into poverty by the cost of prolonged medical care, the loss of a family breadwinner or the extra funds needed to care for people with disabilities.
- Road crash survivors, their families, friends and other caregivers often suffer adverse social, physical and psychological effects.

2.3THE PROBLEM OF TRAFFIC ACCIDENTS GLOBALLY

2.3.1 Background

Over 1.2 million people die each year on the world's roads, with millions more sustaining serious injuries and living with long-term adverse health consequences. Globally, road traffic crashes are a leading cause of death among young people, and the main cause of death among those aged15–29 years (see Figure 2.2).

Road traffic injuries are currently estimated to be the ninth leading cause of death across all age groups globally, and are predicted to become the seventh leading cause of death by 2030 .This rise is driven by the escalating death toll on roads in low- and middle-income countries –particularly in emerging economies where urbanization and motorization accompany rapid economic growth. In many of these countries, necessary infrastructural developments, policy changes and levels of enforcement have not kept pace with vehicle use. In contrast, many high-income countries have managed to break the link between rising motorization and road traffic deaths, with some managing to dramatically reduce such deaths. These achievements are the result of making infrastructure safer, improving the safety of vehicles, and implementing a number of other interventions known to be effective at reducing road traffic injuries. Having good quality data to monitor the impact of these efforts is also critical to demonstrating their success.

In addition to deaths on the roads, up to 50 million people incur nonfatal injuries each year as a result of road traffic crashes, while there are additional indirect health consequences that are associated with this growing epidemic. As vehicle ownership grows, many countries face the twin problems of traffic congestion and rising vehicle tailpipe emissions, resulting in higher rates of respiratory illness. Rising car ownership has also resulted in reduced physical activities such as walking and cycling, with associated health consequences.

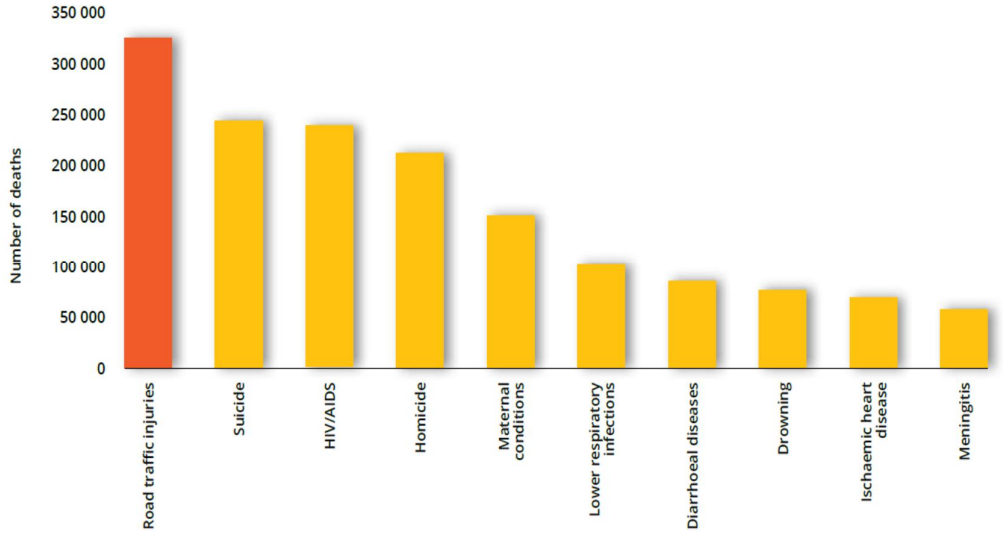


Figure 2.2 Top ten causes of death among people aged 15–29 years, 2012

2.3.2 Number of road traffic deaths

There were 1.25 million road traffic deaths globally in 2013 – a figure that has platitude since 2007 (see Figure 2.3).

This plateau must be seen against the backdrop of global population growth and motorization. The population increase of 4% between 2010 and 2013and an increase of 16% in registered vehicles over the same period suggest that efforts to slow the increase in road traffic deaths may have prevented deaths that would otherwise have occurred.

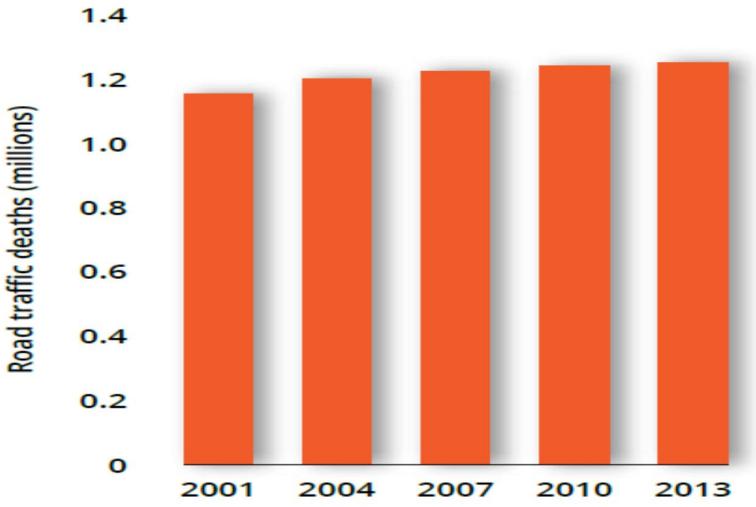


Figure 2.3 Number of road traffic deaths, worldwide, 2013

2.3.3 Road traffic deaths in Low- and middle-income countries

Ninety percent of road traffic deaths occur in low- and middle-income countries, and while these countries also account for 82% of the world's population, they nevertheless bear a disproportionate number of deaths relative to their level of motorization, as they account for only 54% of the world's registered vehicles (see Figure 2.4).

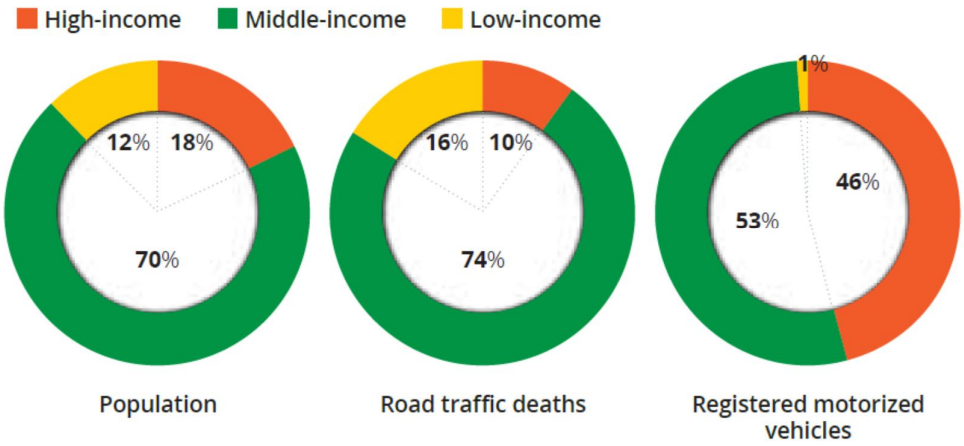


Figure 2.4 Population, road traffic deaths and registered motorized vehicles, by Country income status

2.3.4 The risk and Proportion of dying in a road crash remains highest in low- and middle-income countries

While absolute numbers of deaths are important in terms of seeing where road traffic deaths are occurring and being able to target efforts to prevent them, a more useful indicator is to compare the risk of dying as the result of a road traffic crash using rates per100 000 population. While the global rate for road traffic deaths is 17.4 per100 000, there is great disparity by income, with rates more than twice as high in low- and middle-income countries than in the world's high-income countries (see Figure 2.5).

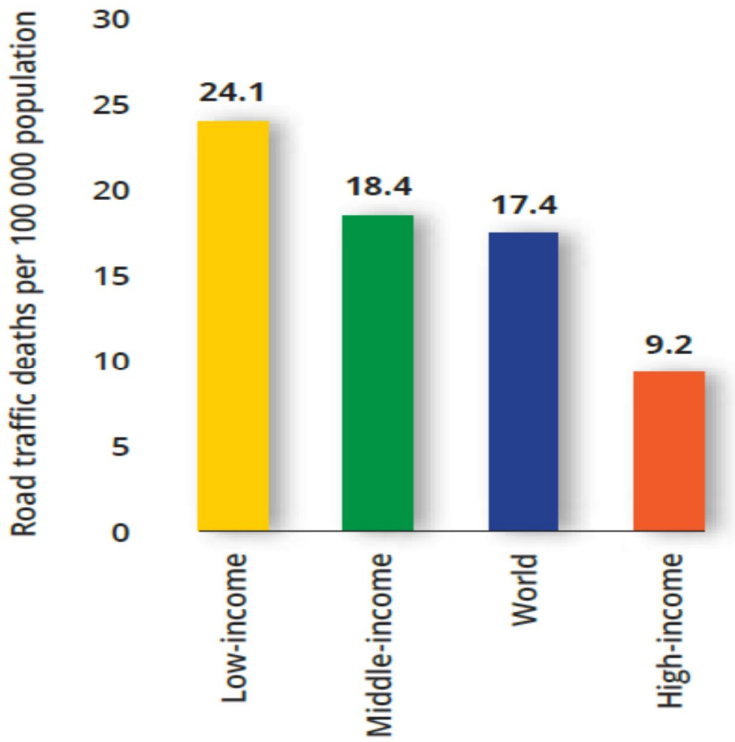


Figure 2.5 Road traffic deaths per 100 000 population, by country income status

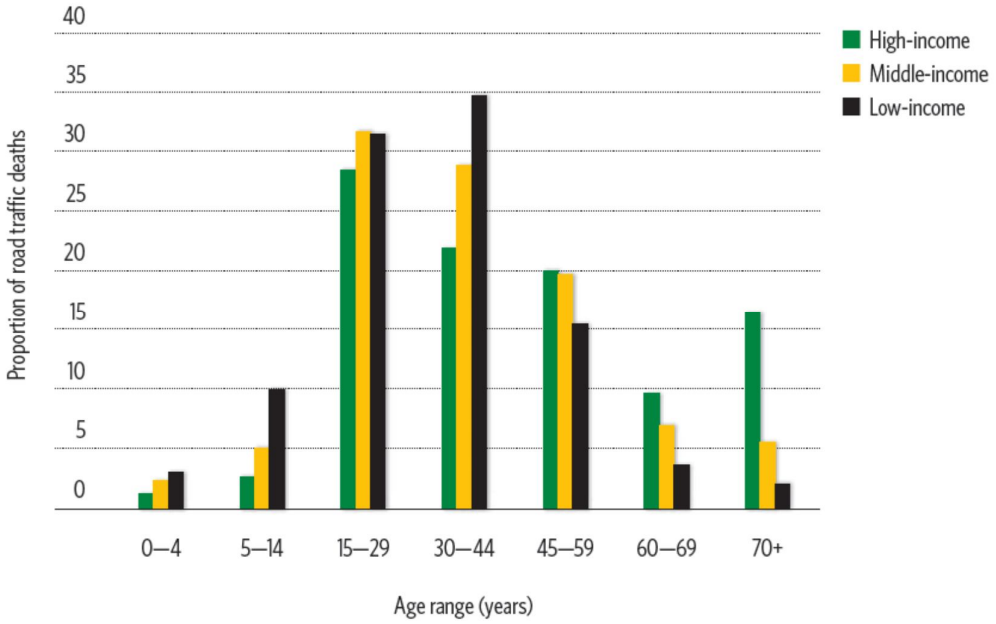


Figure 2.6 Proportion of road traffic deaths by age range and country income status

2.3.5 The risk of a road traffic death is highest in the African Region

The risk of a road traffic death varies significantly by region, and there has-been little change in the regional rates of death since 2010. The highest rates are still in the African Region, while the European Region has a rate far below the global average (9.3 per 100 000population, relative to the global rate of 17.4, see Figure 2.6).However, there continues to be a large disparity in rates within particular regions. For example, rates in some of the high-income countries in the Western Pacific Region (such as Australia) are among the lowest in the world, while some of the region's middle-income countries have rates high above the global average at24 per 100 000. Similarly, while high income countries generally have lower rates than low- and middle-income countries, high-income countries in the Eastern Mediterranean Region less-affluent neighbors in the region (22.4 compared to 19.7) and more than double the average rate of high-income countries globally (9.2). This suggests that in some of the more affluent Eastern Mediterranean countries, rapid economic development that has resulted in increased motorization android infrastructure construction has not been accompanied by sufficient investment in institutional capacity, nor in the interventions needed to cope with these changes and ensure that roads are safe. Section 2 of this report examines the extent to which interventions on key risk factors are adopted in different regions, while Section 3 considers the adoption of vehicle standards and infrastructure audits, all of which play an important role in determining overall road traffic fatality rates.

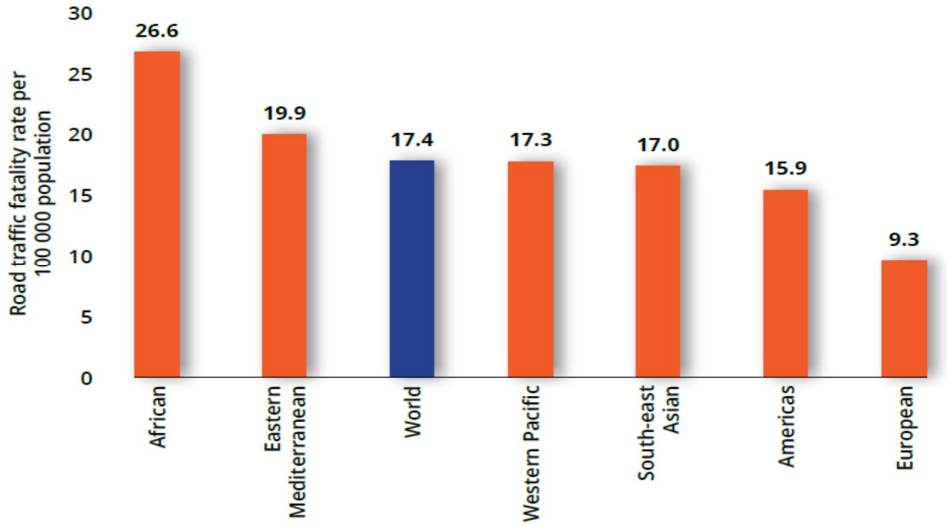


Figure 2.7 Road traffic fatality rates per 100 000 (2013), by WHO region

2.4THE PROBLEM OF TRAFFIC ACCIDENTS IN THE ARAB WORLD

Traffic accidents are one of the main obstacles that hinder development process due to damages, injuries and deaths especially in the Arab countries. Traffic accidents problems lie in its several economic, social and psychological impacts.

The WHO warns that the continuation of the current situation in the Arab region for traffic accidents, it will lead to increased numbers of deaths and injuries due to traffic accidents by 60% from what it is now and that the year 2020.

Libya and Saudi Arabia occupied the top two spots in the deaths of traffic accidents in the Arab world rate, according to the annual report issued by the World Health Organization in 2015.

According to the report, road accidents have killed in Libya 4398 , at a rate of 73.4 deaths per 100 thousand inhabitants, which makes it also had the highest rate in the world there is a rate unprecedented, or even approaching him last rate. As for Saudi Arabia, along came the second in the Arab world, the twenty-third globally, after it recorded during 2015 and the mortality rate of up to 27.4 cases per 100 thousand inhabitants, where 7661 people died from accidents. The mortality rate in Jordan is 26.3 deaths, while Oman recorded a mortality rate of 25.4 per 100 thousand people.

And was then Djibouti countries (24.7 rate, and 1030 deaths), Mauritania (24.5 rate, and 204 deaths) and Tunisia (24.4 rate, and 1505 deaths), Sudan (24.3 rate of 2281 deaths), Algeria mortality rate of 23.8, while the total number of road deaths by 9337 people.

Then solving Lebanon (at a rate of 22.6 0.630 deaths), and Yemen (21.5 .3239 deaths), Morocco (20.8 .3832 deaths), Iraq (20.2 0.5789 death).

Kuwait recorded a rate of 18.7 deaths per 100 thousand inhabitants, as a result of road accidents that 473 deaths numbered, while the rate in Qatar was 15.2 and the number of deaths reached 204 deaths.

Strange that Egypt ranked eighth Arab center at a rate of 12.8 deaths per 100 thousand inhabitants, and 8701 deaths were recorded during 2015. While the rate was 10.9 in the UAE due to 651 deaths, and Bahrain recorded 83 deaths at a rate of 8.0 deaths per 100 thousand inhabitants, and finally Palestine at a rate of 5.6 with a total of 133 deaths.

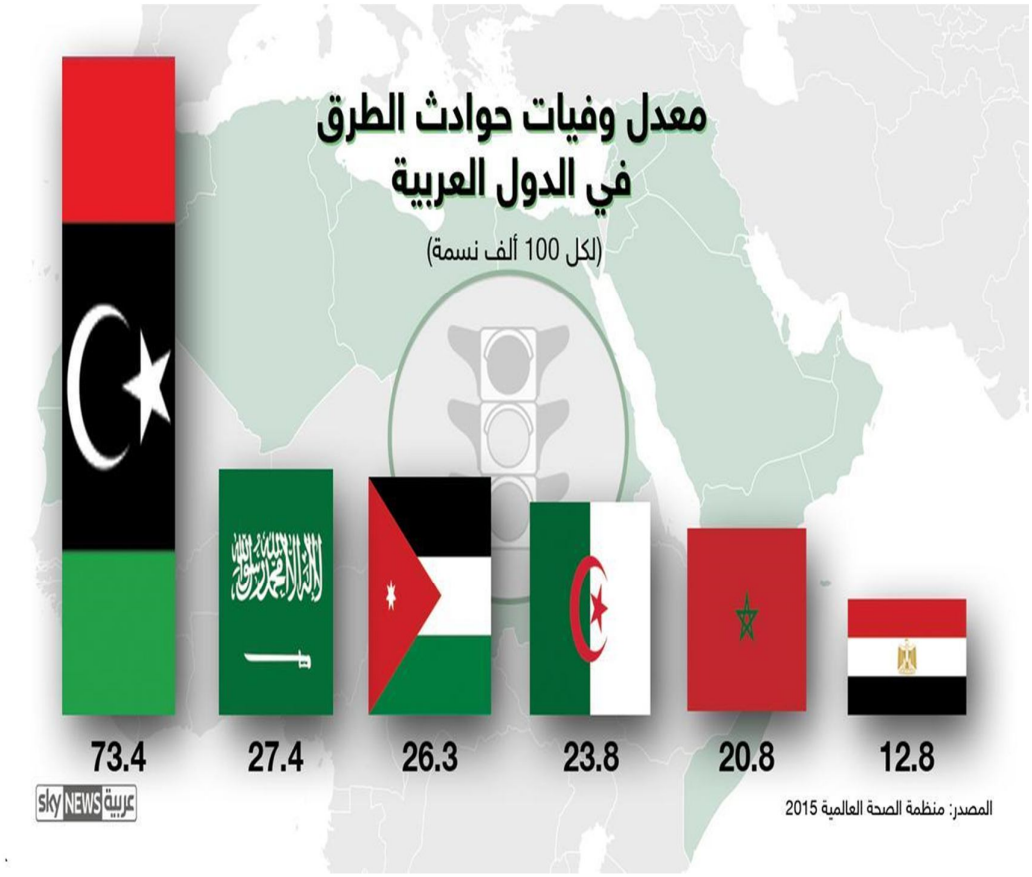


Figure 2.8 the mortality rate of traffic accidents in the Arab world

Table 2.2 a comparison of the most important indicators of the risk of traffic accidents, the Arab world

No	Country	N. death/N.accident	N. death per 100,000 people	N. death per 10,000 vehicles
1	United Arab Emirates	1.082	23.26	11.72
2	Bahrain	0.023	09.37	02.53
3	Kingdom of Saudi Arabia	0.150	17.36	08.95
4	Sultanate of Oman	0.086	22.78	11.10
5	Qatar	0.080	16.63	03.12
6	Kuwait	0.142	13.33	03.32
7	Syria	0.196	09.45	21.30
8	Lebanon	0.104	07.69	02.57
9	Iraq	0.239	06.52	13.53
10	Jordan	0.044	14.22	13.96
11	Egypt	0.261	08.33	18.71
12	Sudan	0.489	10.83	236.08
13	Libya	0.159	29.76	19.74
14	Tunisia	0.105	16.67	16.07
15	Algeria	0.071	12.28	12.06
16	Morocco	0.046	12.68	21.64
	Average index	0.142	14.45	26.03

Source: Traffic department's Arab world

2.5Causes of traffic accident and ways to reduce

2.5.1 The causes of traffic accidents

Traffic accidents rates vary depending on the circumstance, time and place where the incident is located, but the overall ratio approaching the following distribution:

- 80% back errors of drivers and pedestrians.
- 20% of vehicle malfunction or factors road.

Below we review the elements that cause traffic accidents:

First: the human element

1. Violation of traffic regulations: that commits traffic violations would significantly contribute to traffic accidents and many multiple examples of this, such as:
    - Over speed.
    - Informal Rotation
    - Wrong Overtaking
    - Non-compliance with the optical reference, and so on.

2. Driver Status: The status of a driver while driving the vehicle affecting their behavior, for example, emergency health conditions, or mental state is appropriate, or that they are driving their vehicle under the influence of drinking, drugs, or hypnotic drugs.
3. Delay in taking appropriate reaction and proper appreciation.
4. Non-compliance with the rules and etiquette of the road.
5. Low percentage of traffic awareness among some drivers.
6. Lack of driver's concentration while driving, for example, the use of mobile phones.

Second: The road.

Some road accidents belonging to a combination of factors, including the case of the road in terms of breadth of the field of vision, and the nature of the way if a curved or straight, up or what its obstructions and junctions and volume of traffic on it. The reasons that contribute to the occurrence of road accidents as follows:

1. Engineering of defects in the wrong design for the road, and the lack of shoulders in addition to the lack of proper planning when road construction.
2. Excavations caused by maintenance work.
3. The lack of adequate lighting.
4. The lack of signage and traffic.
5. Negligence in the maintenance of roads.
6. Sharp turns.

Third: The vehicle

Is the traffic operation tool, should the vehicle be ready technically to walk on the roads, and condition of the mechanical full free malfunctions represent the most important factors in the safety of road accidents, although global statistics indicate that the rate of traffic accidents, which was caused by a technical fault does not exceed (1.5 - 3.5) % but the seriousness resulting from such breakdowns injuries point to the importance of this factor.

Car defects that lead to traffic accidents as follows:

1. Not to be subject to periodic examination.
2. Non-compliance with the specifications and standards.
3. The lack of brakes and lights, signals and areas of rain validity.
4. Uncertainty about the safety of tires and air pressure.
5. Neglect in maintenance.

2.5.2 Top 25 causes of traffic Accidents them

1. Distracted Driving

The number one cause of car accidents is not a criminal that drove drunk, sped or ran a red light. Distracted drivers are the top cause of car accidents in the U.S. today. A distracted driver is a motorist that diverts his or her attention from the road, usually to talk on a cell phone, send a text message or eat food.

2. Speeding

You've seen them on the highway. Many drivers ignore the speed limit and drive 10, 20 and sometimes 30 mph over the limit. Speed kills, and traveling above the speed limit is an easy way to cause a car accident. The faster you drive, the slower your reaction time will be if you need to prevent an auto accident.

3. Drunk Driving

When you drink, you lose the ability to focus and function properly and it's very dangerous when operating a vehicle. Driving under the influence of alcohol causes car accidents every day, even when they are on the top causes that can be avoided. Always use a designated driver if you go out and drink.

4. Reckless Driving

If you don't drive carefully, and you may end up in a needless car accident. That's what often happens to reckless drivers who speed, change lanes too quickly or tailgate before causing a car accident. Reckless drivers are often impatient in traffic so be sure to take extra care around aggressive drivers.

5. Rain

If the weather gets bad so do the roads. Car accidents happen very often in the rain because water creates slick and dangerous surfaces for cars, trucks, and motorcycles and often causes automobiles to spin out of control or skid while braking. To avoid a car accident, drive extra careful when it rains.

6. Running Red Lights

When you're driving your car, red means stop and not doing so usually leads to car accidents. Drivers that run red lights, run the risk of causing wrongful death because they often cause side-impact collisions at high speeds. To avoid a car accident, look both ways for oncoming cars as you approach a green light.

7. Running Stop Signs

Stop signs should never be ignored, but when they are, serious car accidents are often the result. Each year, thousands of car accidents occur because one driver ran a stop sign. Many rollover accidents and side-impact car accidents result from drivers that run stop signs. You should always look both ways when proceeding through a stop sign.

8. Teenage Drivers

Youth is wasted on the young, but careful driving is never wasted on young drivers. Unfortunately, teenagers aren't often known for their carefulness. When teen drivers hit the roads they don't always know what to do and that lack of experience ends up causing car accidents.

9. Night Driving

Driving in the daylight can be hazardous, but driving at night nearly doubles the risk of a car accident occurring. When you can't see what's up ahead you don't know what to anticipate as you drive towards it. As the sun goes down, your awareness of the road and cars around you must go up.

10. Design Defects

No product is ever made perfectly, and cars are no different. Automobiles have hundreds of parts, and any of those defective parts can cause a serious car accident. Many automakers have had problems with design defects in the past, including Ford Explorer rollover accidents and Toyota's unintended acceleration crashes.

11. Unsafe Lane Changes

There will always come a time where you need to get over to another lane (i.e. exit from a freeway, get in the correct lane to make a turn, etc.). When drivers don't make safe lane changes properly, it often leads to a car accident. To prevent a needless car accident, use your turn signal, check your blind spots and always proceed carefully into the next lane.

12. Wrong-Way Driving

Everyone has lapses in judgment, but when behind the wheel of a car, those clouded instincts can be deadly. You can turn down a street thinking it is a normal right turn, when in actuality, it is a one-way street in the opposite direction. When you go the wrong way, everyone is in danger because as you head towards a car accident.

13. Improper Turns

The reason that we have stop lights, turn signals, and lanes designated for moving either right or left as opposed to straight is because when drivers ignore the rules of the road, car accidents are often the result. To prevent a car accident, always look for signs and obey the proper right-of-way before you make a turn.

14. Tailgating

Many drivers are impatient and reckless, driving so close to another car that they cannot react in time if the car in front of them brakes suddenly. Many fatal car accidents have occurred when a motorist dangerously tailgated another driver at high speeds. You can prevent these car accidents by giving the car in front of you a one-car-length buffer for every 10 mph you drive.

15. Driving Under the Influence of Drugs

It's not only alcohol that is dangerous when mixed with drivers on the road. Drugs, both legal and illegal, can impair your ability to fully function as a driver. If your mind isn't clear and you don't have complete control over your body, getting behind the wheel can lead to serious car accidents.

16. Ice

You're driving down the road, it's dark out and you want to get home for the warm fire. Next thing you know, your car is spinning dangerously out of control because you hit black ice. While San Diego hardly ever has ice, ice is a major cause of car accidents for cities with cold weather climates.

17. Snow

Snow's dangerous mixture of ice and water is a dangerous recipe for car accidents each winter storm. Like ice, snow is not something you usually encounter when driving in San Diego. Cities with cold winters know all-too-well just how dangerous snow can be for commuters.

18. Road Rage

Everyone has been angry at another driver for one reason or another, but some drivers let their rage overcome them. By tailgating another driver in anger or speeding past another driver only to pull in front of them and brake, these road "raggers" cause many needless car accidents each year.

19. Potholes

Motorists in San Diego are well aware of the dangers posed by potholes in the street. Drivers run the risk of losing control of their car or blowing out a tire when they drive over these potholes. If you see a pothole in your car's path, you can avoid a car accident by making sure that your tires do not drive over it.

20. Drowsy Driving

Driver fatigue isn't talked about a lot, but how well can we expect anyone to drive when they're having trouble staying awake. Most of the car accidents caused by drowsy driving occur at night. If you find yourself wanting to fall asleep at the wheel, pull over when it's safe and try to take a quick 30 minute power nap.

21. Tire Blowouts

Most highways are littered with the scattered remains of a tire blowout. Tire blowouts can cause you to lose control of your vehicle, and they are especially dangerous for bigger automobiles like semi-trucks. When encountering a tire blowout, try to maintain control of your vehicle and pull over safely and you will likely avoid a serious car accident.

22. Fog

Fog isn't the most common weather occurrence, and that's good news for car accidents statistics. Driving is a skill that requires the ability to see, but fog makes it extremely difficult to see sometimes more than a car length in front of you. Avoid car accidents by using your head lights — and never your high beams — when driving in the fog.

23. Deadly Curves

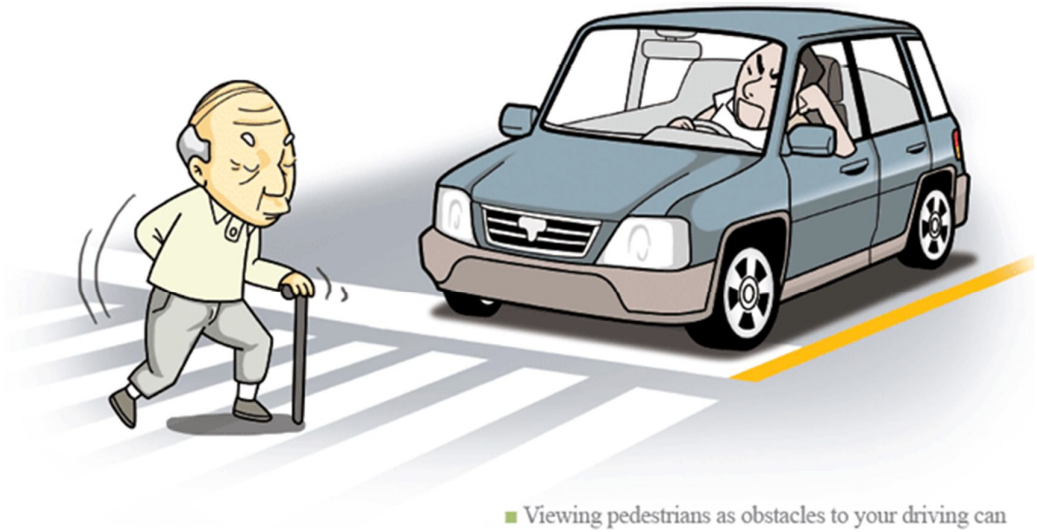
Some people call them dead man's curves, but everyone should be careful when approaching a curve. Many motorists have lost control of their cars along a dangerous curve and lost their lives in a car accident. So when you approach these signs take head of the posted speed limit and drive cautiously to avoid a car accident.

24. Animal Crossings

While drivers are required to know the rules of the roadway, wild animals do not take driver's education. Wild animals will wade out into the street, and it's up to you to make sure that you don't get into a car accident with them. Take caution when you see an animal crossing sign and use your high beams when traveling in rural, woody areas.

25. Street Racing

Glorified by the Fast and the Furious movie franchise, street racing is an underground culture of fast cars and deadly car accidents. With turbo engines and nitrous oxide boosters, cars often reach very high speeds during a street race, making any resulting car accident much more dangerous and unlikely to yield any survivors.



■ Viewing pedestrians as obstacles to your driving can lead to reckless driving.

2.5.3Ten ways to reduce traffic accidents

1. Improve signage

Every motorist is trying to get somewhere, and many of them aren't sure how to get there. While interstate signage is more or less uniformly good in that it is more or less uniform, rural highway and suburban signage is often quite poor.

Foot-long street signs were fine for city streets where traffic moved at 25 MPH, but 35-45 MPH suburban roads and 55 MPH country roads need bigger signs and more of them: one to announce the next street, one to mark the street at the corner, and one to mark the street beside the traffic light, if there is one. In areas where big trucks are common, extra signage is doubly necessary; trucks have gotten much bigger in the last 20 years and obscure signs to an equally greater degree. This suggestion isn't likely to reduce accidents by much, but it's so cheap it's worth doing anyway.

2. Raise speed limits on safe roads

This would be cheap *and* effective. By and large, major interstates are broad, well-maintained, smooth-flowing, and well-marked. Raising the speed limit on these roads for cars in daytime and good weather, would encourage motorists to leave dangerous back roads where they know they can drive fast because of limited police patrols. Moving traffic from back roads to major highways was a factor in the decrease of traffic accidents since the 1995 repeal of the national 55 MPH speed limit. Although many states now mandate lower speeds for trucks than for cars, only Texas makes the sensible leap to mandating lower speeds for night driving than for day.

3. Get drunk drivers off the road

Similarly cheap and similarly effective, discouraging people from driving drunk or otherwise impaired is a proven method of reducing traffic accidents (about half of motor vehicle accidents involve intoxicants). I don't support roadblock checks for impaired drivers—that's a case of surrendering too many liberties for too little gain—but public awareness and messages targeted at bartenders are effective. Just a campaign to ask people not to drive distracted—eating, reading a map, talking on a cell phone, arguing with passengers—would be helpful at little cost. Lower blood-

alcohol limits are helping on this front; making more people aware that even a little alcohol impairs their driving.

> But don't lose sight of the fact that the main thing is to get *really drunk* drivers off the road, not *slightly tipsy* ones.

4. Implement better roadway lighting

One major factor in motor accidents is poor visibility (half of all motor vehicle accidents are at night, even to the great majority of driving is done during the day), especially at intersections, where most accidents occur. If more rural highway intersections were lit, accidents at those intersections would go down. Target intersections with a history of accidents first for best effect and least cost.

5. Create more turn-only lanes

Every car that is stopped in the road to make a turn is an accident waiting to happen. An impaired or inattentive driver colliding with a car preparing for a turn is a major percentage of traffic accidents. Turn-only lanes require little extra roadway but can reduce accidents significantly, especially at intersections with poor visibility for oncoming traffic (around a curve or in a depression).

6. Improve driving conditions

Bad weather always causes a spike in traffic accidents and the cause often gets labeled as "driving too fast for conditions." State transportation departments could greatly reduce accidents by improving crumbling and pot-holed roads and clearing roads of debris, snow, and ice more efficiently (and closing roads or mandating special low speed limits in especially bad conditions). Intersections where gravel has accumulated are especially dangerous, since cars can easily slide into the intersection when trying to stop.

7. Eliminate stops

Highways are for driving. Any feature that brings all traffic from 70 MPH to 0 MPH is a 10-car pileup waiting to happen as well as a woefully inefficient use of roadway. Moving toll booths to exits is a good start; eliminating them entirely and paying for roads with ordinary taxes is better (you could still make long-haul trucks pull off to pay, as with weigh stations). Creating frontage roads can reduce or eliminate stop

lights; so can funneling traffic from two or three crossroads into a single new overpass. On urban and suburban roads, creating better crosswalks with warning lights that pedestrians can activate can reduce pedestrian traffic accidents significantly.

8. Create more divided highways

Any road in which a median separates oncoming lanes of traffic is far safer than ordinary roads. It creates a barrier or buffer that goes a long way toward keeping inattentive and impaired drivers from drifting across the center line and creating a head-on collision, which is nearly always fatal.

They don't have to be four-lane behemoths with clover-leaf junctions; just extra space between lanes with a rumble strip would reduce drifting across lanes and still allow for passing on two-lane rural highways (head-on collisions are almost never the result of passing maneuvers). Although still a new idea, more than a dozen states have begun to use centerline rumble strips, especially Pennsylvania, and report substantial reductions in crossover accidents.

9. Redesign bad intersections

If a crosswalk or lighting doesn't do the trick, a troublesome intersection may simply be designed badly. Paring back vegetation and signage, changing the angle at which the roads meet, or creating a jug handle or overpass are all options that can change the dynamics of traffic at that intersection and save lives. Just slapping a stoplight in there is not the right way to "fix" it.

10. Redesign bad roads

The US highway system was designed from scratch in the 1950s, and many highways have not changed much since then despite cases of urban sprawl. Traffic engineers have known for decades that left-hand exits create trouble, for example, and should be redesigned whenever there is an opportunity and when traffic snarls and accidents make it urgent. Just designating a highway as a limited-access highway can reduce suburban sprawl around them and avoid the installation of stop lights.

Of course, all of these things cost money—although some are very cheap—while writing speeding citations actually earns money. It's too bad that writing speeding citations doesn't actually save many lives.

These aren't the only ideas that could save lives. But the ideas I've presented here are ones that can be implemented by state and local governments. Improvements to vehicle safety, such as side-impact airbags, would also help, but are hard to mandate. Teaching young people to drive earlier using go-karts would also help by enabling them to better understand the limits of traction and the need for attention to the road. And vehicle safety inspections, although hard to implement, would help to reduce dangerous highway breakdowns.

2.6 THE EFECT OF PUBLIC TRANSPORT NETWORKS ON THE LAND USE PLANS

Urban Planning patterns are closely linked to roads, that represent traffic arteries, and road networks occupies an important place in the Urban space, roads are also important elements connecting parts of the region with each other, however the planning ideas put forward by the pioneers of planning town such as the strip city, gardens city and the future city, all of which confirm the relationship between urban planning and transport planning as represented by road networks. Here the question arises, "What is the effect of urban planning patterns in traffic violations?"

Various types of transport significantly affect city planning and its expansions as well as its population growth. One of the most important of these effects is done by city planners to solve traffic problems and mobility between different parts of the city, so as to better traffic flow provide safety for users of the road network and new ideas for urban planning patterns are offered for cities, where most of these patterns are dependent on road network that from urban fabric.

Urban Planning determines the details of urban structure of the city that constitutes the streets , open the space and buildings, The city which is built in high ground is different in planning compared to the city that is established in valleys, and we find that there are two types of city planning which are widely used:

Radial planning: the advantage of this type of planning is that it allows the expansion of cities around the central area so that the streets meet at the city centre, thus the centre is more and the type represents the old Islamic city planning, enough some European cities tend to use this pattern.

Grid Planning: the city is divides into several regular sections where streets cross longitudinally and sideways like the chess board. This type of planning appears in some European cities as well as in the American cities. Also it is applied in some oil cities of the Arabian Gulf.

The transport network is one of the major infrastructure elements which is formed by urban planning because there exists a close link between public transport and land use plan. The transport system plays an essential role in the city's development and future growth, many of the new extensions developed on major transportation lines. Lack of adequate public transport network leads to crippling or part of the urban functions. Therefore, any modification of the transportation lines or in any areas of the physical block will lead to a change in the traffic and in the population activity plans and may generate more traffic or impede its flow.

Movements of citizens require different means of transport systems, roads and vehicles to ease people movement However, the road network represents a basic element in the transportation system in the physical block because it constitutes approximately 25% of the total area of the city. The design of road network shall be based on the transportation plan and on the basis of traffic loads, the road network is divided into several sections; (1) fast and free express way (2) main streets (3) secondary streets and these serve residential neighborhoods and preferably there intersections be designed in the form (T) to reduce traffic accidents (4) local streets and these streets are used to provide entrances and exits and openings between the housing and most streets commonly used are (Loop) and the streets dead ends ((Cul De Sac (5) the service streets are usually parallel to the main street or secondary streets provide access to the buildings adjacent to these streets. The classifications do exist and there are several designations for fast roads, arterial roads and local roads.

CHAPTER 3
METHODOLOGY

3.1 DATA COLLECTION FROM THE MINISTRY OF THE INTERIOR

The traffic information official collection from the Ministry of Interior represented by the General Directorate of Traffic and this information is available in the annual report of the traffic accidents and violations in this booklet information about accidents and traffic violations each year separately, the numbers and types of traffic accidents, the age and sex of the deceased and the perpetrators of the rate of traffic accidents , the nature of the traffic accident, the causes of traffic accidents, the numbers and types of vehicles causing traffic accidents, more ways in which hesitate to traffic accidents, the number of licensed driving licenses and vehicles for the year.

3.2 THE QUESTIONNAIRE DESIGN

100 questionnaires was distributed among different segments of society as follows 30 university teacher , 30 engineer , 10 drivers of public vehicles, 10 final year students roads , 10 Traffic Police officers, and 10 from general random people.

3.2.1 Questions of questionnaire

3.2.1.1 Personal Information

- Gender
- Age
- Marital Status
- Educational level
- Do you own a car?
- Do you have availed driver's license?
- Have you ever been a traffic accident?

3.2.1.2 Cause of traffic accident

- Driving too fast
- Driving under the influence of alcohol and drugs
- Driving with fatigue or drowsiness or disease

- Driving during the rain and strong winds
- Reckless driving
- Using hand phone while driving
- Eating and drinking while driving
- Using headphones or higher recorded voice
- Lack of respect for traffic signals and traffic rules
- Wrong overtaking
- Narrow streets
- Defects on the streets (for example, cracks and holes .... etc.)
- Maintenance work on the street
- There is no adequate lighting for night
- There is no traffic signs at the intersections
- There is no pedestrian crossing lines
- The lack of traffic culture of road users (drivers and pedestrians)
- Log In some animals for the Right of Way
- other reasons

3.2.1.3 Application of traffic safety – Vehicle

Are the following means are present and used in your car

- Seat belt
- Brakes and the handbrake works well
- Tires (you take into account the size, type and year of production).
- Lamps (in terms of clarity, color and lighting level).
- Signals (right, left, huzer, long, short)
- Mirrors (right, left, center)
- Drain cleaners
- Interior door locks
- Internal indicators (for fuel, heat, oil, speedometer, etc. ....)
- Head restraints
- Child seats
- Airbags
- Spare wheel

- Hag and the key wheel
- Fire extinguisher
- First aid kit
- Triangle reflector
- hand lamp (Flashlight)
- Fire-resistant mattresses
- Door locking systems in the case of the coup

3.2.1.4 Application of traffic safety – Road

Are the following means available in roads that are going in Khartoum?

- Width of roads inadequate (lane greater than 3.5 meters).
- Number of traffic lanes is enough to traffic in coming and going.
- There are median to separate traffic from each other
- There are side protection bars in sharp curves
- Right of Way enough for future expansion
- There adequate night lighting
- There edges determine the width of the road (Curb)
- There shoulder to stop cars in the event of malfunctions or for a ride and get off
- There Slope longitudinal and transverse on the roads to divert rain from the road surface
- There drain longitudinal rainwater
- Traffic signs are available in all the streets
- There are traffic lights at all intersections and it's well designed
- There are roundabout and it's well designed
- There are lines crossing for pedestrians at intersections
- Are good routes and is not defective holes and cracks and other

3.2.1.5 The behavior of road user

Are you application the following behavior as a user of the road?

- Committed to linking a seat belt at all times
- Adherence to the specified speed
- I don't never talk by mobile while driving
- I drive defensively NOT aggressively
- I get my car regularly to the service station
- I don't let others frustrated me while driving
- I don't drive if I tired
- I don't driving at night
- I never interfere with car safety equipment
- I check before reversing
- When refueling switch off engine and mobile.
- I don't eat or drink while driving
- Adherence to the traffic laws of the signs and signals and other
- I concentrate and prepared at all times.
- will be attentive at intersections
- I gave the incorrect signals when changing direction
- I have a good background for vehicle mechanics and simple faults in the vehicle

3.2.1.6 Deferent Questions

- What is the punishment that supports and believes it helps to apply traffic safety?
- Who is responsible for the application of traffic safety?
- What are the best methods to control traffic?
- What is a technique that supports to increase traffic awareness?
- What are the best ways to control traffic?
- Is there an indulgence in the extraction and renewal of driving licenses?
- Do you look at the traffic law for 2010?

- Do you agree that the retirement age for the age pension is the withdrawal of driving license?
- Are you interested in traffic safety on the roads:

3.3 METHODOLOGY FOR RIVER TRANSPORT PROJECT

It Has been collecting information on the movement of people to and from different areas through a field study conducted by researcher has benefited the information from the General Administration of the passage, the researcher to choose the two path for river transport and identified the locations of berths proposed Nile, also has identified a number of river carriers and required the estimate the total cost of the project is expected income and annual net profit, as a researcher hired some of the information from the administration of river transport, but put a realistic plan in hand and the project could regain his capital in a period of eight years only.

3.4 METHODOLOGY FOR STRATEGIC PLAN FOR TRAFFIC SAFETY

Researcher See all of the Global Strategy for Traffic Safety and the strategy of Arab States for traffic safety and develop a plan for the strategy for the next five years on the light of the world and the Arab plan, taking into account the existing entities and ministries locally and responsibility of each hand toward traffic safety plan

CHAPTER 4
DATA COLLECTION AND ANALYSIS

4.1 STATISTICS OF TRAFFIC ACCIDENTS IN KHARTOUM STATE

The following statistics are taken from the annual report of the incidents and traffic violations for the years from 2010 to 2014 and that there are some statistics from previous years before 2010 and also sourced from the same booklet.

4.1.1 Number of personal death in Sudan (2010-2014)

Table 4.1 Number of personal death in Sudan (2010-2014)

	2010	2011	2012	2013	2014
Number of population	32923005	33975593	35055538	36010109	37557094
Number of vehicles	335784	358971	182217	320974	341580
Number of accident	20170	18223	17435	15839	12959
Number of injured	23501	22203	19837	21024	16793
Number of death	2758	2667	2482	2349	2223
Uninjured/N.accident	1.17	1.22	1.14	1.33	1.30
N. death/N.accident	0.14	0.15	0.14	0.15	0.17
Uninjured per 100,000 people	71.38	65.35	56.59	58.38	44.71
N. death per 100,000 people	8.38	7.85	7.08	6.52	5.92
Uninjured per 10,000 vehicles	699.88	618.52	1088.65	655.01	491.63
N. death per 10,000 vehicles	82.14	74.30	136.21	73.18	65.08

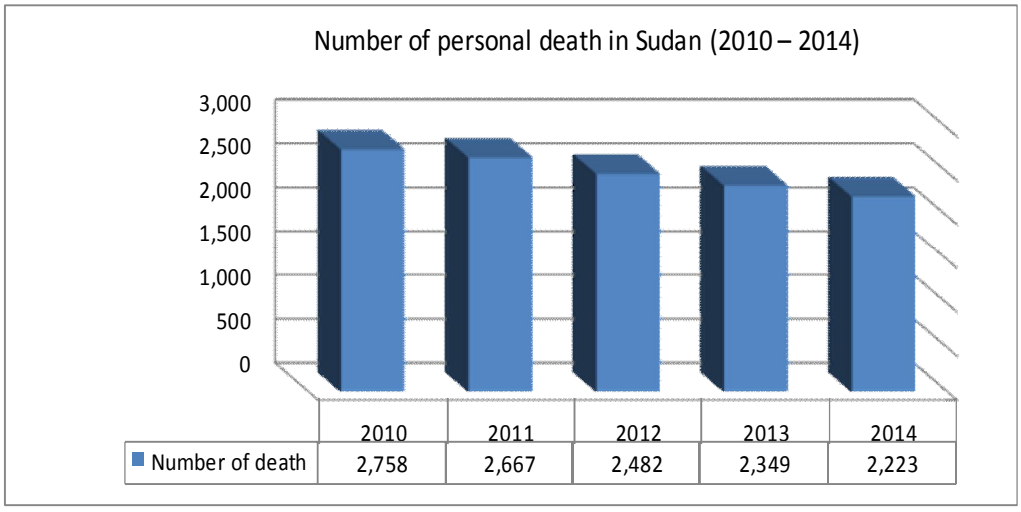


Figure 4.1 Number of personal death in Sudan (2010-2014)

From the table 4.1, figure 4.1 above we find that the year 2010 has the highest percentage of deaths due to traffic accidents, since the year 2010 to 2014 began a number of death accidents continues to drop.

4.1.2 Compared between traffic accident in Khartoum (2000-2014)

Table (4.2) Compared between types of traffic accidents in Khartoum (2000-2014)

Year	Drink	Damage	Simple	Gross	Death	Total
2000	94	8,115	2,794	2,233	471	**13,707**
2001	295	9,874	2,984	2,258	416	**15,827**
2002	393	10,918	3,179	2,328	462	**17,280**
2003	372	12,148	3,088	2,353	519	**18,480**
2004	302	15,187	3,338	2,480	651	**21,958**
2005	308	20,131	3,984	2,641	648	**27,712**
2006	338	24,922	4,969	3,052	748	**34,029**
2007	404	27,823	5,230	3,187	758	**37,402**
2008	429	29,399	5,272	3,266	810	**39,176**
2009	252	34,446	5,571	3,584	841	**44,694**
2010	260	33,752	6,156	3,695	891	**44,754**
2011	270	33,017	4,665	3,663	821	**42,436**
2012	245	32,903	4,651	3,058	768	**41,625**
2013	224	29,484	3,708	2,726	677	**36,819**
2014	181	29,250	3,473	2,804	709	**36,417**

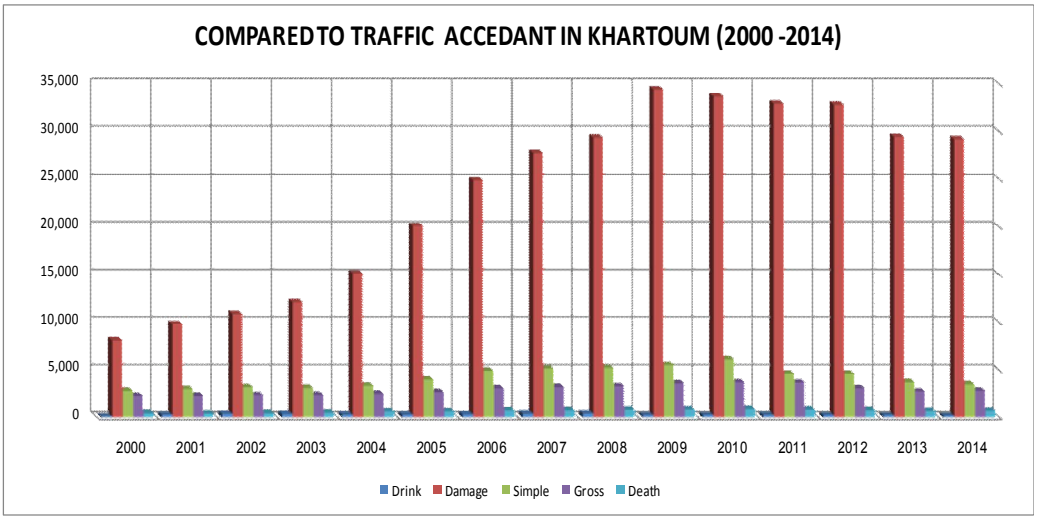


Figure 4.2 Compared between type of traffic accidents in Khartoum state (2000-2014)

From the table 4.2 and Figure 4.2, Figure 4.3 we find the number of traffic accidents of various types since 2000, began to increase until the years 2009 and 2010, then began a gradual decrease.

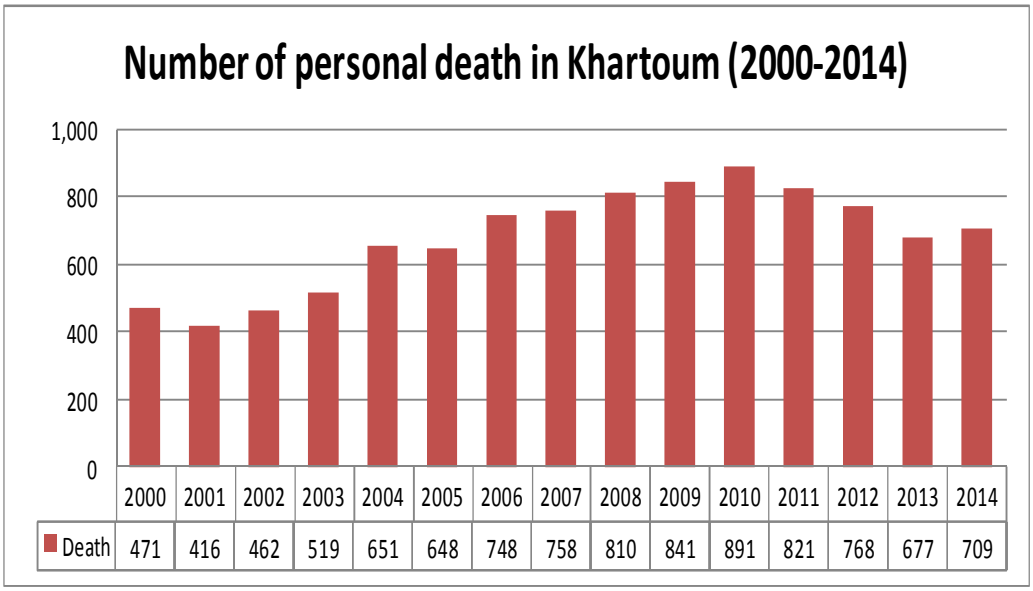


Figure 4.3 shows a Number of personal deaths in Khartoum state (2000-2014)

4.1.3 The age of the deceased in traffic accidents in Sudan (2010-2014)

Table 4.3 the ages of the deceased in traffic accidents in Sudan (2010-2014)

	< 10	11- 20	21-30	31- 40	41-50	51-60	61-70	71 - 80	> 80	Total
2010	319	249	616	593	410	252	180	75	64	2,758
2011	274	308	693	543	320	240	163	64	62	2,667
2012	259	277	580	498	344	241	166	53	64	2,482
2013	239	275	520	525	337	194	138	66	55	2,349
2014	256	131	597	449	265	211	107	48	16	2,080
Total	1347	1240	3006	2608	1676	1138	754	306	261	12,336
%	**10.9**	**10.1**	**24.4**	**21.1**	**13.6**	**9.2**	**6.1**	**2.5**	**2.1**	**100**

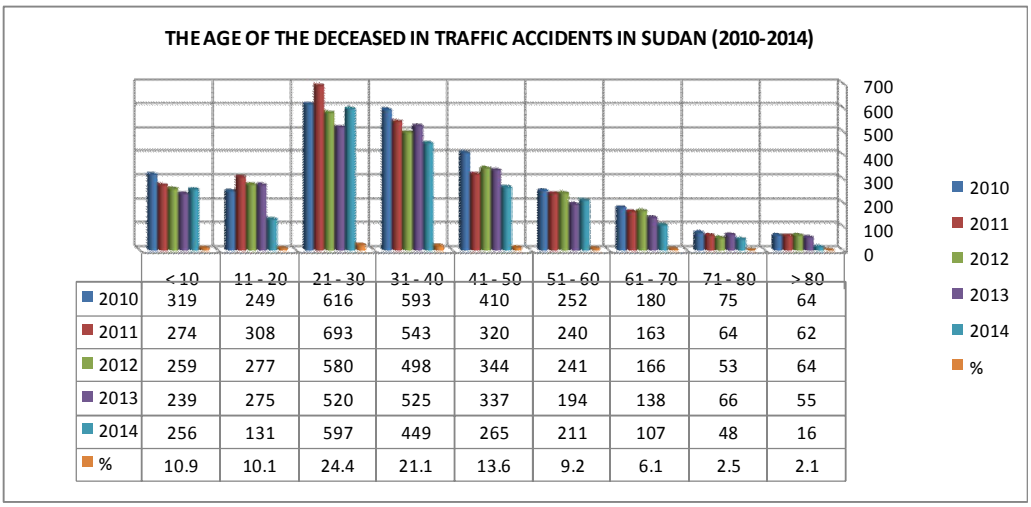


Figure 4.4 the ages of the deceased in traffic accidents in Sudan (2010-2014)

From the Table 4.3, Figure 4.4 we find the highest percentage of deceased in traffic accidents in Sudan at age group between (21-30) year with percentage 24.4%, Followed by age group between (31-40) year with percentage 21.1%, Accordingly the percentage of the deceased at the young people age (21- 40) year in last five years from (2010-2014) is percentage 45.5%.

4.1.4 The age of the perpetrators of accident death in Sudan (2010-2014)

Table 4.4 the ages of the perpetrators of accident death in Sudan (2010-2014)

	< 10	**11-20**	**21-30**	**31-40**	**41-50**	**51- 60**	**61- 70**	**71- 80**	**> 80**	Total
2010	12	203	662	609	348	169	66	52	17	2,138
2011	1	164	722	654	390	179	35	15	12	2,172
2012	10	127	670	626	399	197	57	6	6	2,098
2013	22	134	623	616	375	166	36	9	2	1,983
2014	7	118	512	588	412	151	19	6	0	1,813
Total	52	746	3189	3093	1924	862	213	88	37	10,204
%	**0.5**	**7.3**	**31.3**	**30.3**	**18.9**	**8.4**	**2.1**	**0.9**	**0.4**	**100**

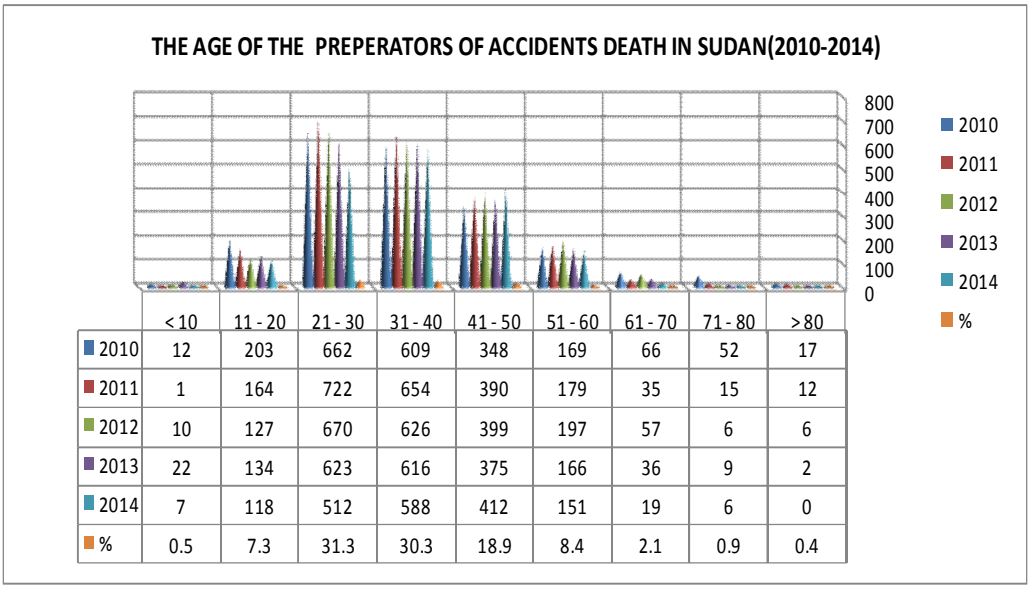


Figure 4.5 shows the age of the perpetrators of accident death in Sudan (2010-2014)

From the Table 4.4, Figure 4.5 we find the highest percentage of perpetrators accidents death in Sudan at age group between (21-30) year with percentage 31.3%, followed by age group between (31-40) year with percentage 30.3%, Accordingly the percentage of the perpetrators of accident death is young people age (21- 40) year in last five years from (2010-2014) is 61.6%.

4.1. 5 Type of public transport vehicle casing death (2010-2014)

Table 4.5 Type of public transport vehicle casing death (2010-2014)

YEAR	MINIBUS	BUS	RAGSHA	HAYES	TAXI	LIMOUSINE	TOTAL
2010	335	115	708	40	79	8	1285
2011	418	97	76	55	56	0	702
2012	364	142	72	28	50	1	657
2013	293	121	97	47	39	1	598
2014	334	131	53	21	19	0	558
Total	1744	606	1006	191	243	10	3800
%	45.9	15.9	26.5	5.0	6.4	0.3	100

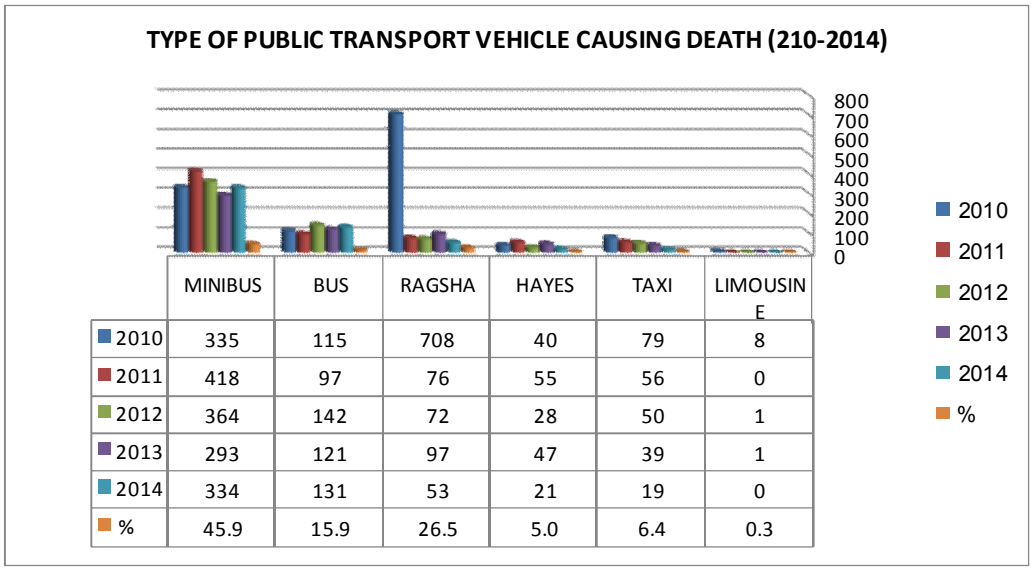


Figure 4.6 Type of public transport vehicle casing death (2010-2014)

From the Table 4.5, Figure 4.6 above we find the highest Type of public transport vehicle casing death is minibus with percentage 45.9%, followed by (ragsha) with percentage 26.5%.

4.1. 6 Type of commercials vehicle casing death (2010-2014)

Table 4.6 Type of commercials vehicle casing death (2010-2014)

YEAR	LOORY	TRUK	GLAB	DFAR	BOXI	TOTAL
2010	128	336	35	97	62	658
2011	133	97	42	108	76	456
2012	157	70	44	104	82	457
2013	163	95	40	99	45	442
2014	135	69	26	88	18	336
Total	716	667	187	496	283	2349
%	30.5	28.4	8.0	21.1	12.0	100.0

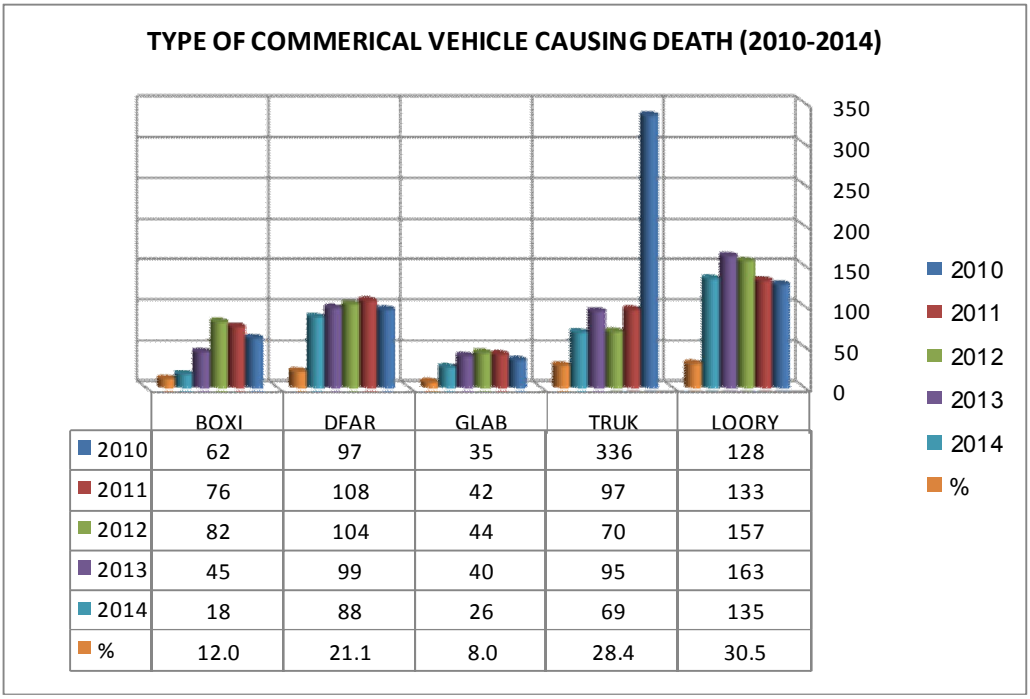


Figure 4.7 Type of commercials vehicle casing death (2010-2014)

From the Table 4.6, Figure 4.7 above we find the highest Type of commercials vehicle casing death is a lorry with percentage 30.9%, followed by the trucks with percentage 28.4%.

4.1.7 Comparison between numbers of death accidents of morning and night

Table 4.7 Comparison between numbers of death accidents at morning and night (2010-2014)

YEAR	MORNING	NIGHT	TOTAL
2010	1152	925	2077
2011	986	1081	2067
2012	998	1049	2047
2013	1102	750	1852
2014	1045	666	1711
Total	5283	4471	9754
%	54.2	45.8	100

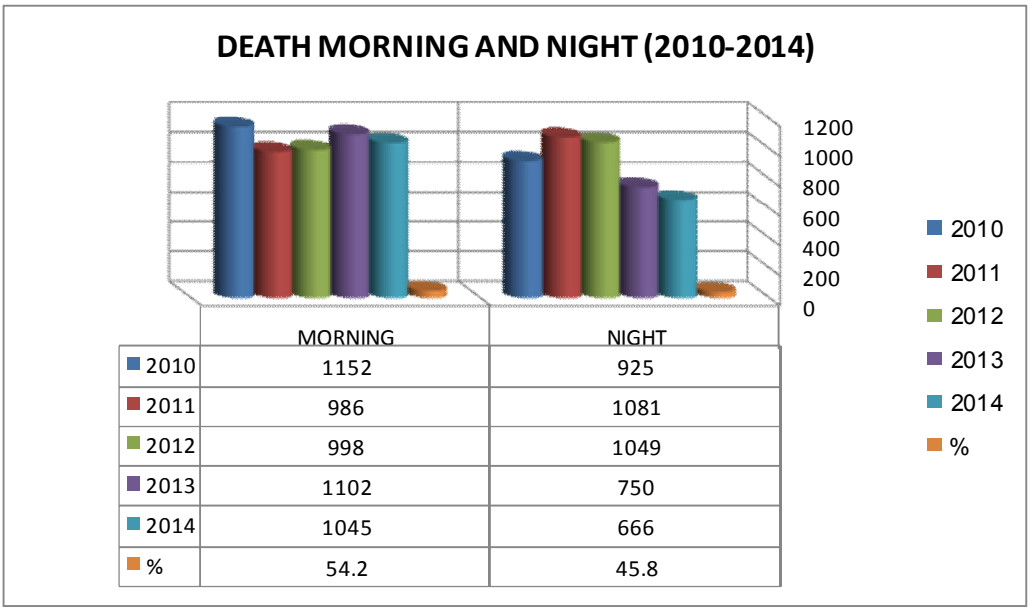


Table 4.8 Comparison between the numbers of death accidents at morning and night (2010 – 2014)

From the Table 4.7, Figure 4.8 above we find the highest numbers of death accidents happen at morning time with percentage 54.2%, followed by night time with percentage 45.8%.

4.1.8 The sex of the deceased due to traffic accidents in Sudan (2010-2014)

Table 4.8 Sex of the deceased due to traffic accidents in Sudan (2010-2014)

YEAR	MEN	WOMAN	CHILD	TOTAL
2010	1772	588	398	**2758**
2011	1756	503	408	**2667**
2012	1696	429	357	**2482**
2013	1574	404	371	**2349**
2014	1476	386	361	**2223**
TOTAL	**8274**	**2310**	**1895**	**12479**
%	**66.3**	**18.5**	**15.2**	**100.0**

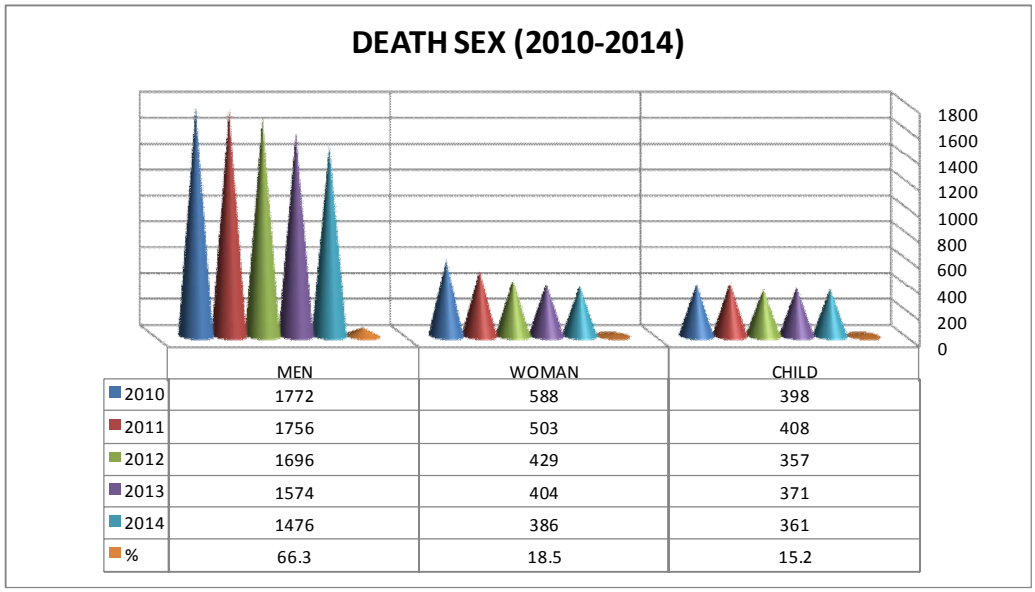


Figure 4.9 Sex of the deceased due to traffic accidents in Sudan (2010-2014)

From table 4.8, figure 4.9 we find the sex of the deceased in traffic accidents is the men with percentage 66.3%, women by 18.5% and children by 15.2%.

4.1.9 Causes of death traffic accidents in Sudan (2013-2014)

Table 4.9 Causes of death traffic accidents in Sudan (2013-2014)

Year	2013	%	2014	%	Ave %
Tire Explosion	139	7.5	83	4.9	6.2
Driving too fast	769	41.5	709	41.4	**41.5**
Wrong overtaking	121	6.5	71	4.1	5.3
Wrong deviation	114	6.2	124	7.2	6.7
Driving Negligently	677	36.6	662	38.7	**37.6**
Technical error	19	1.0	34	2.0	1.5
signal Overtaking traffic	0	0.0	9	0.5	0.3
Drugs and drinking	13	0.7	19	1.1	0.9
Total	1852	100.0	1711	100.0	100.0

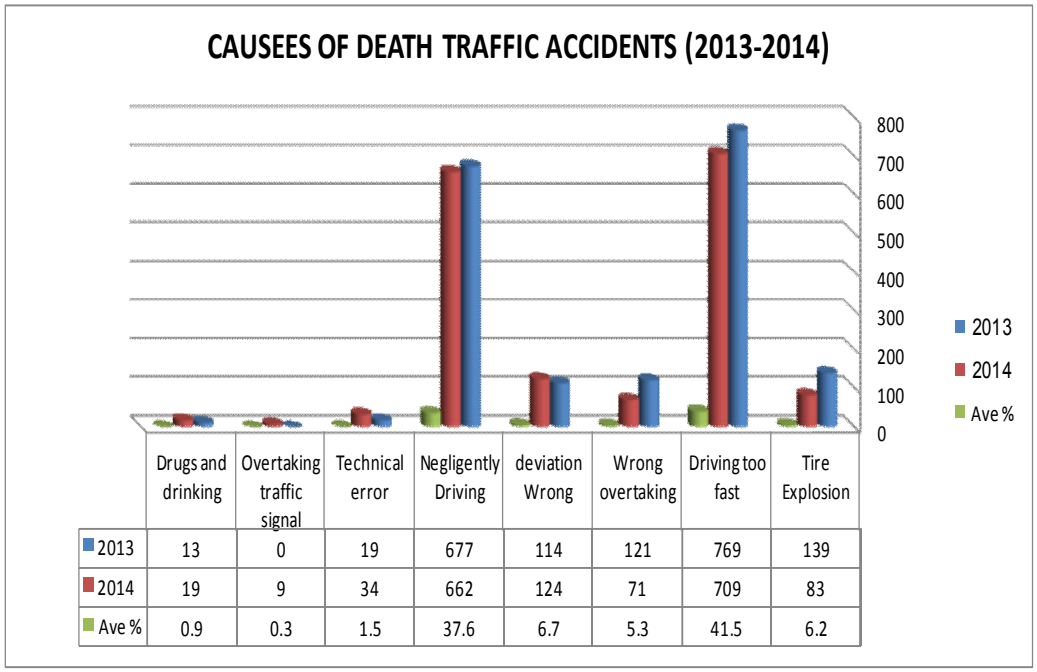


Figure 4.10 Causes of death traffic accidents in Sudan (2013-2014)

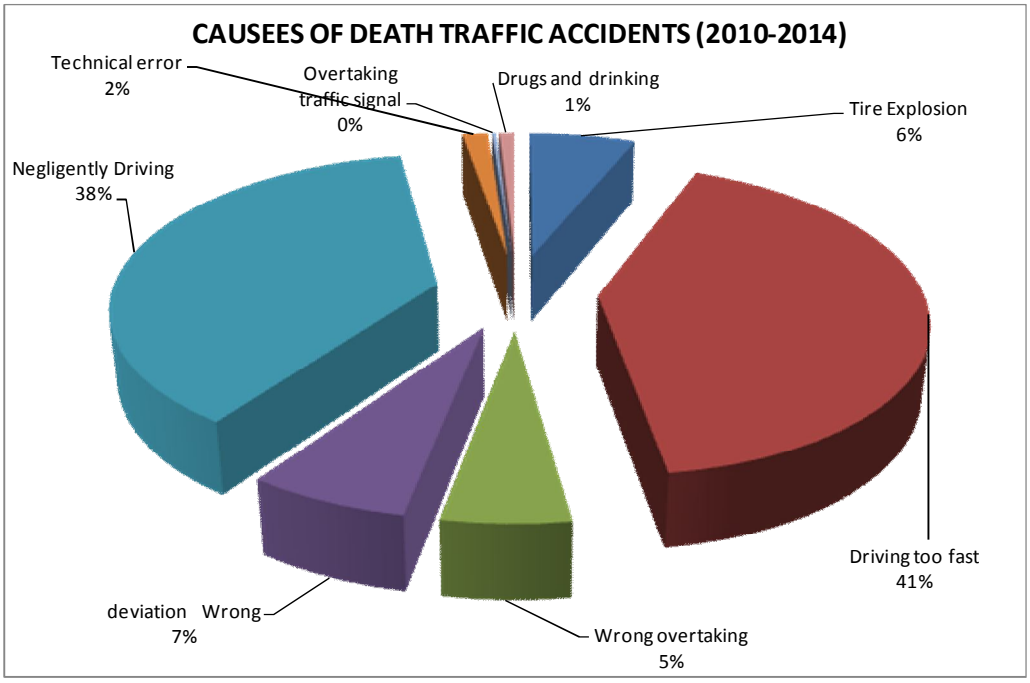


Figure 4.11 Causes of death traffic accidents in Sudan (2013-2014)

From table 4.9, figure 4.10, figure 4.11 we find that the most important causes of traffic accidents that cause death are excessive speed (driving too fast) and represent 41.5%, after that driving negligently and represent 37.6%.

4. 2 QUESTIONNAIR RESULTS AND ANALYSIS

4.2.1 QUESTIONNAIR RESULTS

4. 2.1.1 Personal Information

Gender

Male	91
Female	09

Age

Less than 20	0
20 to 30	28
30 to 40	54
40 to 50	11
More than 50	07

Marital Status

Married	57
Unmarried	43

Educational level

Unenlightened	0
Primary	0
Secondary	12
Graduate	73
Postgraduate	15

Do you own a car?

Yes	66
No	34

Do you have availed driver's license

Yes	93
No	07

Have you ever been a traffic accident

Yes	42
No	58

4.2.1.2 Cause of traffic accident

Table 4.10 Questionnaire results - Cause of traffic accident

NO.	Cause of traffic accident	Major	Secondary	Not reason
1	Driving too fast	89	11	0
2	Driving under the influence of alcohol and drugs	100	0	0
3	Driving with fatigue or drowsiness or disease	100	0	0
4	Driving during the rain and strong winds	90	10	0
5	Reckless driving	100	0	0
6	Using hand phone while driving	72	20	08
7	Eating and drinking while driving	50	40	10
8	Using headphones or higher recorded voice	81	19	0
9	Lack of respect for traffic signals and traffic rules	95	05	0
10	Wrong overtaking	88	12	0
11	Narrow streets	75	25	0
12	Defects on the streets (for example, cracks and holes .... etc.)	50	45	05
13	Maintenance work on the street	67	30	03
14	There is no adequate lighting for night	40	40	20
15	There is no traffic signs at the intersections	80	20	0
16	There is no pedestrian crossing lines	70	20	10
17	The lack of traffic culture of road users (drivers and pedestrians)	75	25	0
18	Log In some animals for the Right of Way	40	60	0
19	other reasons			

4.2.1.3 Application of traffic safety – Vehicle

Table 4.11 Questionnaire results - Application of traffic safety – Vehicle

NO.	Are the following means are present and used in your car	Yes	No
1	Seat belt	100	0
2	Brakes and the handbrake work well.	100	0
3	Tires (you take into account the size, type and year of production).	75	25
4	Lamps (in terms of clarity, color and lighting level).	78	22
5	Signals (right, left, huzer, long, short)	95	05
6	Mirrors (right, left, center)	100	0
7	Rain cleaners	86	14
8	Interior door locks	97	03
9	Internal indicators (for fuel, heat, oil, speedometer, etc. ....)	88	12
10	Head restraints	07	93
11	Child seats	02	98
12	Airbags	05	95
13	Spare wheel	100	0
14	Hag and the key wheel	100	0
15	Fire extinguisher	85	15
16	First aid kit	06	94
17	Triangle reflector	12	88
18	hand lamp (Flashlight)	03	97
19	Fire-resistant mattresses	0	100
20	Door locking systems in the case of the coup	0	100

4.2.1.4 Application of traffic safety – Road

Table 4.12 Questionnaire results - Application of traffic safety – road

NO.	Are the following means available in roads that are going in Khartoum	Yes	No
1	Width of roads inadequate (lane greater than 3.5 meters).	21	79
2	Number of traffic lanes is enough to traffic in coming and going.	10	90
3	There are median to separate traffic from each other	30	70
4	There are side protection bars in sharp curves	05	95
5	Right of Way enough for future expansion	0	100
6	There adequate night lighting	20	80
7	There edges determine the width of the road (Curb)	33	67
8	There shoulder to stop cars in the event of malfunctions or for a ride and get off	50	50
9	There Slope longitudinal and transverse on the roads to divert rain from the road surface	13	87
10	There drain longitudinal rainwater	15	85
11	Traffic signs are available in all the streets	45	55
12	There are traffic lights at all intersections and it's well designed	20	80
13	There are roundabout and it's well designed	05	95
14	There are lines crossing for pedestrians at intersections	0	100
15	Are good routes and is not defective holes and cracks and other	05	95

4.2.1.5 The behavior of road user

Table 4.13 Questionnaire results - The behavior of road user

NO.	Are you application the following behavior as a user of the road?	Yes	No
1	Committed to linking a seat belt at all times	55	45
2	Adherence to the specified speed	75	25
3	I don't never talk by mobile while driving	10	90
4	I drive defensively NOT aggressively	75	25
5	I get my car regularly to the service station	80	20
6	I don't let others frustrated me while driving	65	35
7	I don't drive if I tired	80	20
8	I don't driving at night	15	85
9	I never interfere with car safety equipment	100	0
10	I check before reversing	100	0
11	When refueling switch off engine and mobile.	0	100
12	I don't eat or drink while driving	90	10
13	Adherence to the traffic laws of the signs and signals and other	57	43
14	I concentrate and prepared at all times.	82	18
15	will be attentive at intersections	100	0
16	I gave the incorrect signals when changing direction	100	0
17	I have a good background for vehicle mechanics and simple faults in the vehicle	73	27

4.2.1.6 Deferent Questions

What is the punishment that supports and believes it helps to apply traffic safety?

Increase financial fine	70
Pull the license for a specified period according to the violation	25
prison	05

Who is responsible for the application of traffic safety?

Traffic police	0
Vehicle driver	0
Road Engineering	0
All	100

What are the best methods to control traffic?

Surveillance Cameras	0
Radar	0
The spread of policemen	0
All	100

What is a technique that supports to increase traffic awareness?

TV and radio programs	53
seminars and lectures	07
magazines, brochures and leaflets	15
a written and oral exam when renewing the license	25

What are the best ways to control traffic?

surveillance cameras	07
Radars	05
policemen spread	08
All	80

Is there an indulgence in the extraction and renewal of driving licenses?

Yes	77
No	23

Do you look at the traffic law for 2010?

Yes	08
No	92

Do you agree that the retirement age for the age pension is the withdrawal of driving license

Yes	98
No	02

Are you interested in traffic safety on the roads:

Yes	100
No	0

4.2.2 QUESTIONNAIR ANALYSIS

4.2.2.1 Personal Information

The questionnaire results of personal information such as (Gender, Age, Marital Status, Educational level, own a vehicle, have availed driver's license, have been a traffic accident), were shoed in the Fig.4.12, Fig.4.13, Fig.4.14, Fig.4.15, Fig.4.16, Fig.4.17 & Fig.4.18. A percentage of 91% of the targeted sample were male, while 9% of the sample were female have shown in Fig.4.12. Fig.4.13 shows, the percentage of 54 % of the targeted sample were age between (30 to 40), 28% between (20 to 30), 11% between (40 to 50), 07% more than 50 year, Fig.4.14 shows, a percentage 57 % of the targeted sample is married, 43% of them is not married. Fig.4.15 shows, a percentage of 73 % of targeted sample is graduate studies level, 15 % post graduate and 12% secondary studies level. Fig.4.16 shows, a percentage of 64 % of targeted sample is own a vehicle, 36% don't have a vehicle. Fig.4.17 shows, a percentage of 93 % of targeted sample is have availed driver's license, 07% don't have an availed driver's license. Fig.4.18 shows, a percentage of 42 % of targeted sample is have been a traffic accident, 58% don't have been ever a traffic accident.

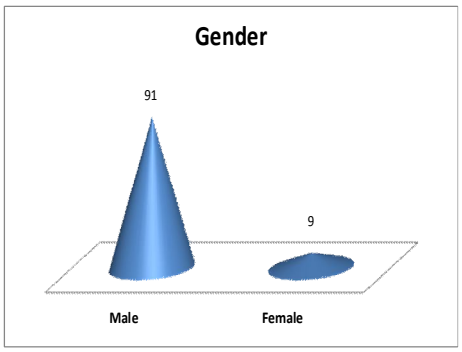


Fig. 4.12 Personal information (gender)

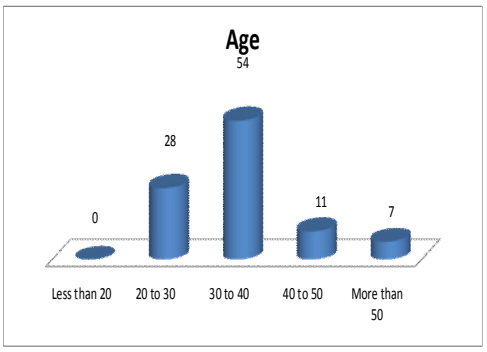


Fig. 4.13 Personal information (Age)

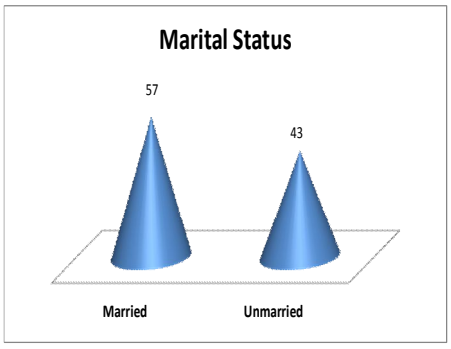


Fig. 4.14 Personal information (Marital Status)

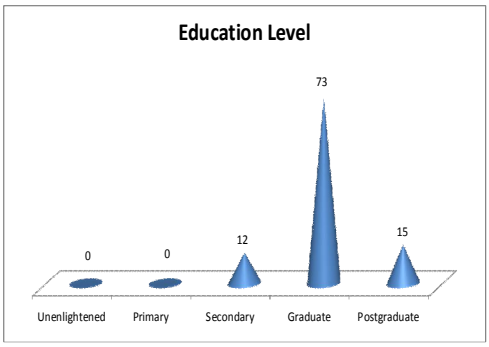


Fig. 4.15 Personal information (Education Level)

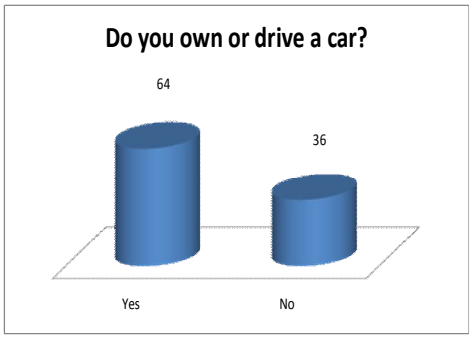


Fig. 4.16 Personal information (Owning a vehicle)

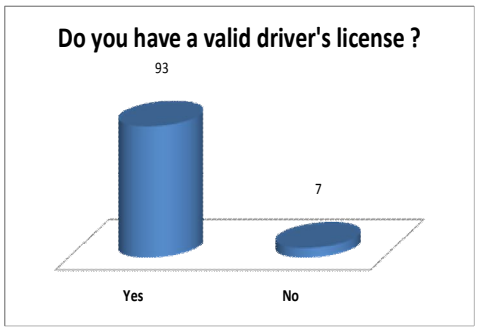


Fig. 4.17 Personal information (driver's license)

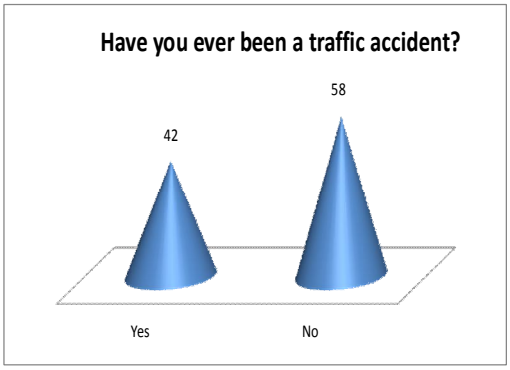


Fig. 4.18 Personal information (traffic accident)

4.2.2.2 Causes of traffic accidents

The questionnaire results of Causes of traffic accidents were shoed in the Fig.4.19. We find A percentage of 100 % of the targeted sample were unanimous that it is a major cause of traffic accidents is Driving under the influence of alcohol and drugs, Driving with fatigue or drowsiness or disease, Reckless driving. A percentage of 95 % for Lack of respect for traffic signals and traffic rules, 90% for Driving during the rain and strong winds, 89% for Driving too fast, 88% for Wrong overtaking.

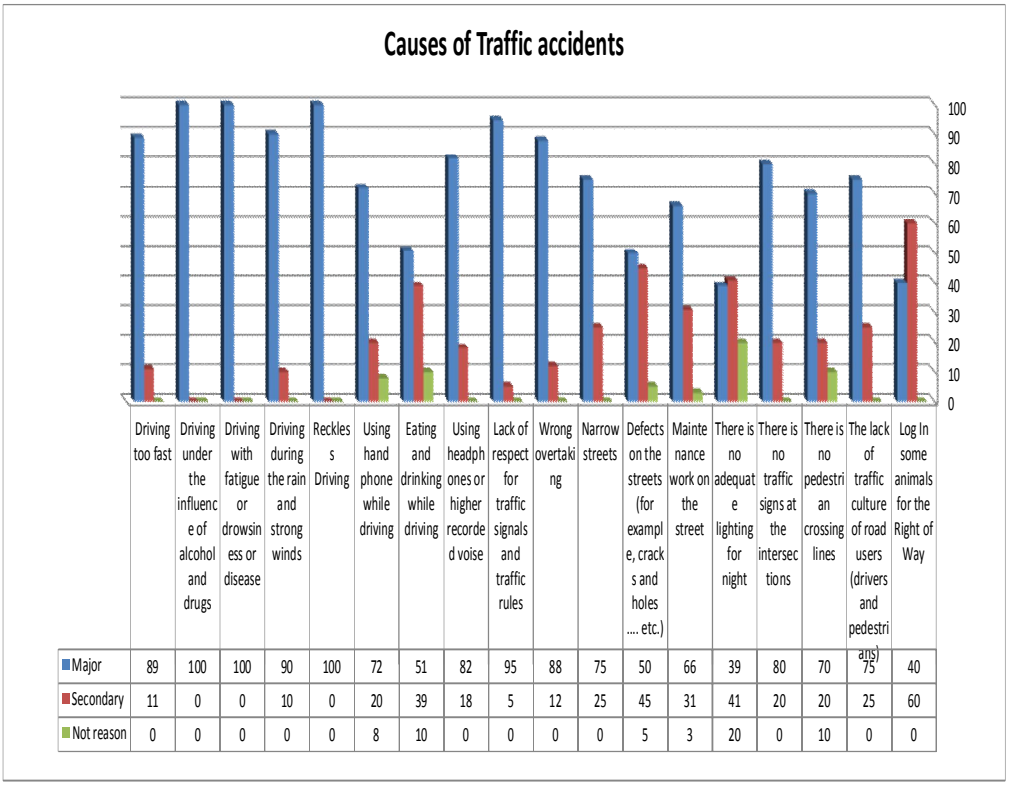


Fig.4.19 Causes of Traffic Accidents

4.2.2.3 Application of traffic safety – Vehicle

The questionnaire results of the Application of traffic safety – Vehicle, were shoed in the Fig.4.20. We find a percentage of 100 % of the targeted sample they have a Seat belt, Brakes and the handbrake work well, Mirrors (right, left, and center), Spare wheel and Hag and the key wheel. A percentage of 97 % they have Interior door locks, 95 % they have Signals (right, left, huzer, long, short), 95 % they have Internal indicators (for fuel, heat, oil, speedometer, etc. ....). we also find that 100% of the targeted sample they don't have Fire-resistant mattresses, Door locking systems in the case of the coup, 98% they don't have Child seats, 97% they don't have hand lamp (Flashlight), 95% they don't have Airbags.

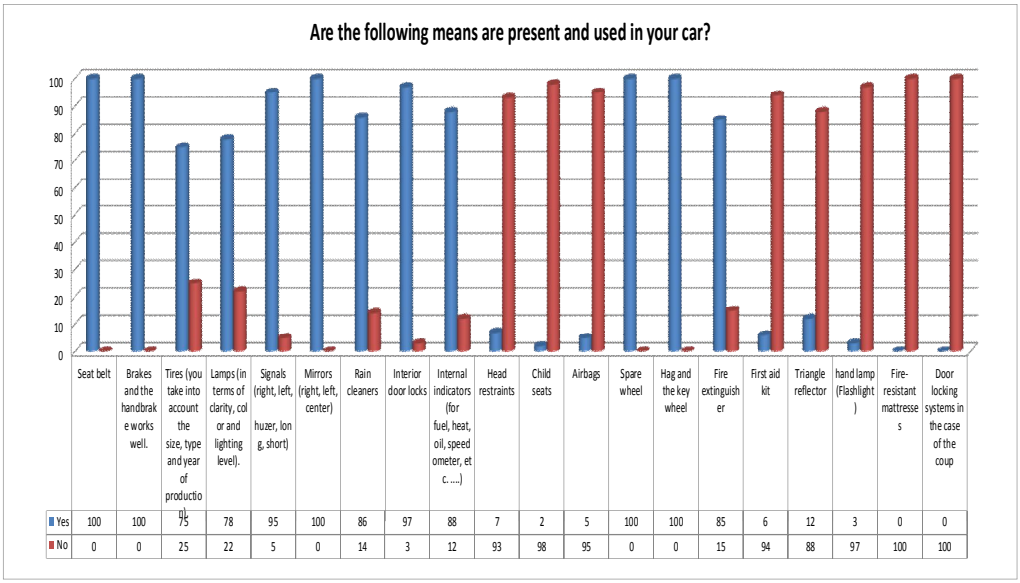


Fig.4.20 Application of traffic safety – Vehicle

4.2.2.4 Application of traffic safety – Road

The questionnaire results the Application of traffic safety – Road, were shoed in the Fig.4.21. We find a percentage of 100 % of the targeted sample they say that these items are not available; Right of Way enough for future expansion, There are lines crossing for pedestrians at intersections. 95% they say there are no side protection bars in sharp curves, there are no roundabout and it's bad designed, bad roads and is defective holes and cracks and other. 90% they say the Number of traffic lanes is not enough to traffic in coming and going.

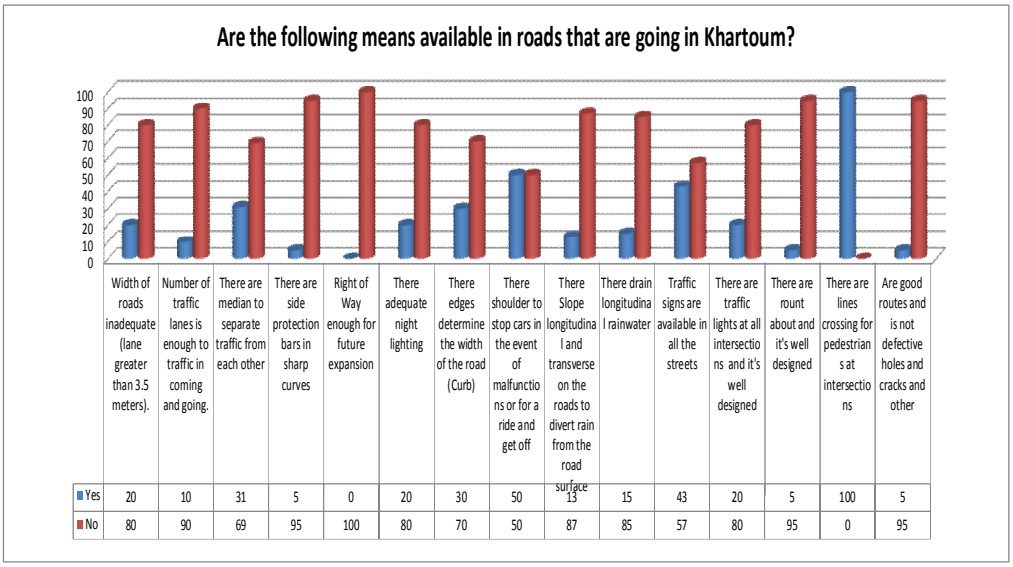
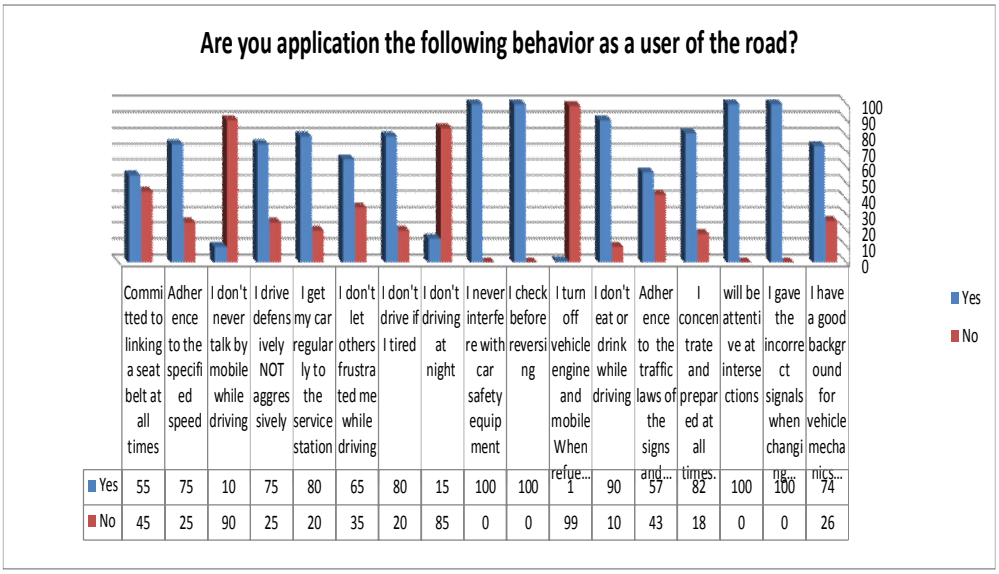


Fig.4.21 Application of traffic safety – Road

4.2.2.5 The behavior of road user

The questionnaire results the behavior of road user, were shoed in the Fig.4.22 We find a percentage of 100 % of the targeted sample they say I never interfere with car safety equipment, I check before reversing, will be attentive at intersections and I gave the incorrect signals when changing direction. We also find that 99% of the targeted samples they say not turn off vehicle engine and mobile when refueling.90% of the targeted samples them talking by mobile while driving.



	Committed to linking a seat belt at all times	Adherence to the specified speed	I don't never talk by mobile while driving	I drive defensively NOT aggressively	I get my car regularly to the service station	I don't let others frustrated me while driving	I don't drive if I tired	I don't driving at night	I never interfere with car safety equipment	I check before reversing	I turn off vehicle engine and mobile When refue...	I don't eat or drink while driving	Adherence to the traffic laws of the signs and...	I concentrate and prepared at all times.	will be attentive at intersections	I gave the incorrect signals when changing...	I have a good background for vehicle mechanics...
Yes	55	75	10	75	80	65	80	15	100	100	1	90	57	82	100	100	74
No	45	25	90	25	20	35	20	85	0	0	99	10	43	18	0	0	26

Fig.4.22 The behavior of road user

4.2.2.6 Deferent questions

The questionnaire results of Deferent questions (includes what is the punishment that supports and believes it helps to apply traffic safety? Who is responsible for the application of traffic safety?, What are the best methods to control traffic?, What is a technique that supports to increase traffic awareness?, Is there an indulgence in the extraction and renewal of driving licenses?, Do you look at the traffic law for 2010?, Do you agree that the retirement age for the age pension is the withdrawal of driving license and Are you interested in traffic safety on the roads), were shoed in the Fig.4.23, Fig.4.24, Fig.4.25, Fig.4.26, Fig.4.27, Fig.4.28, Fig.4.29, Fig.4.30. We find a percentage of 72 % of the targeted sample they supports punishment by increase financial fine. 100% of the targeted sample they say the application of traffic safety

responsible for Traffic police, Vehicle driver and Road Engineering. 100% they say the best methods to control traffic are Surveillance Cameras, Radar and The spread of policemen. 52% they say the technique that supports to increase traffic awareness is TV and radio programs. 77% they say there is an indulgence in the extraction and renewal of driving licenses. 92% don't look at the traffic law for 2010. 98% they agree that the retirement age for the age pension is the withdrawal of driving license. 100% of the targeted sample they interested in traffic safety on the roads.

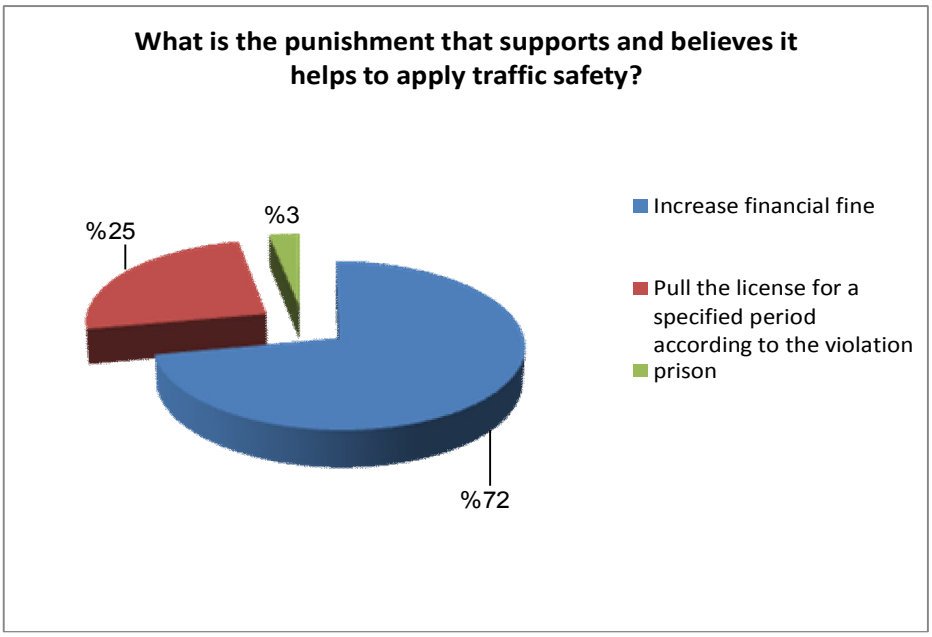


Fig.4.23 Result of question (What is the punishment that supports and believes it helps to apply traffic safety?)

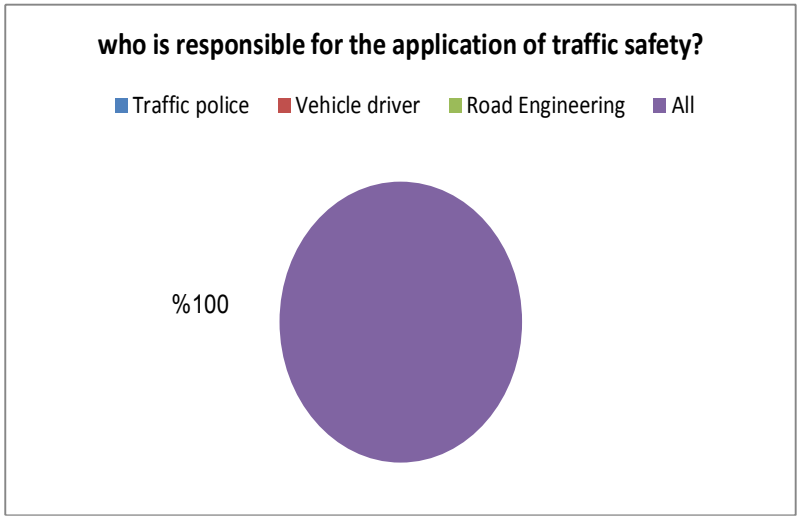


Fig.4.24 Result of question (Who is responsible for the application of traffic safety?)

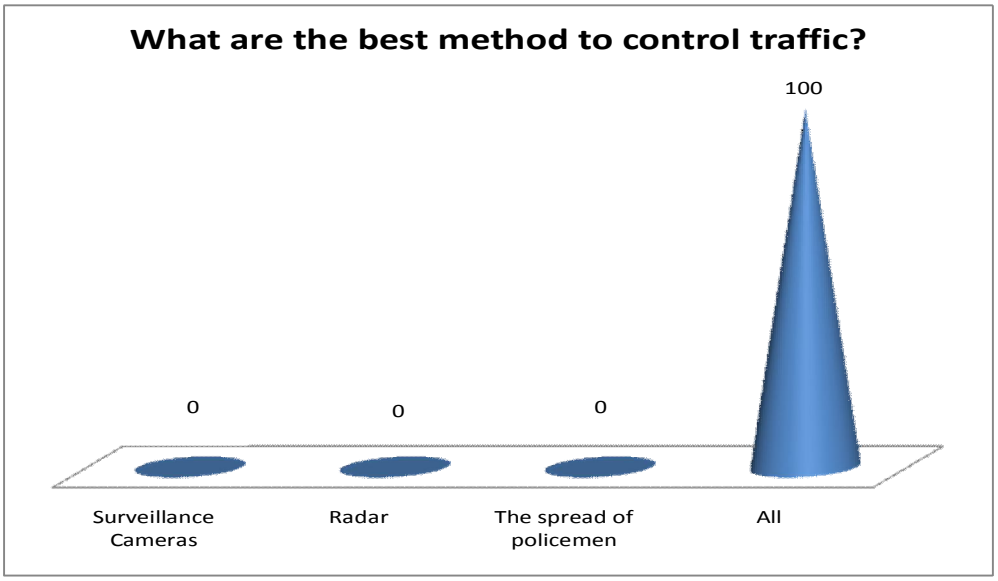


Fig.4.25 Result of question (What is the best method to control traffic?)

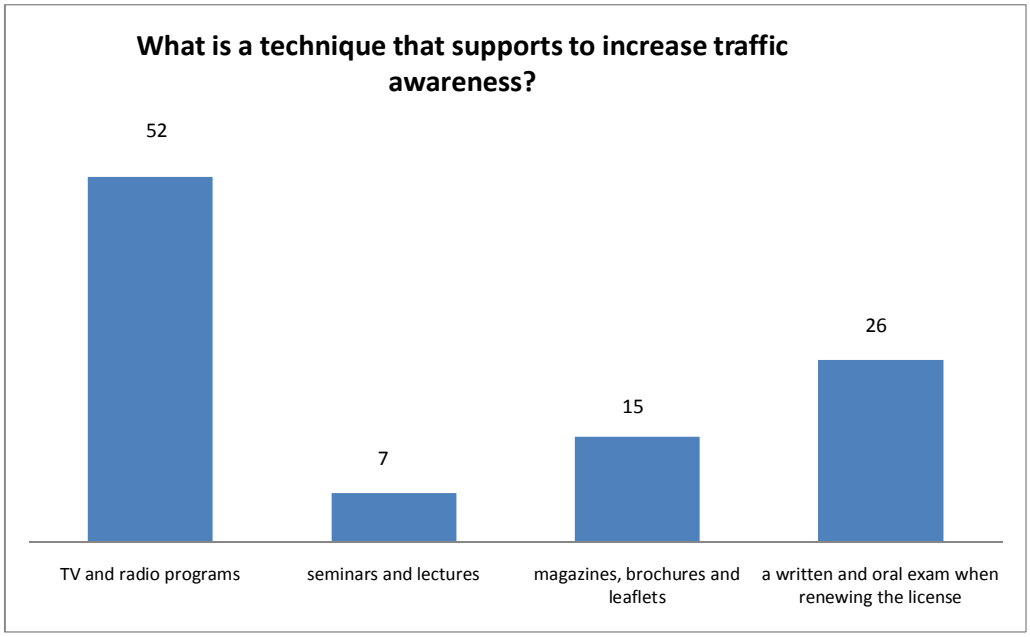


Fig.4.26 Result of question (What is a technique that supports to increase traffic awareness?)

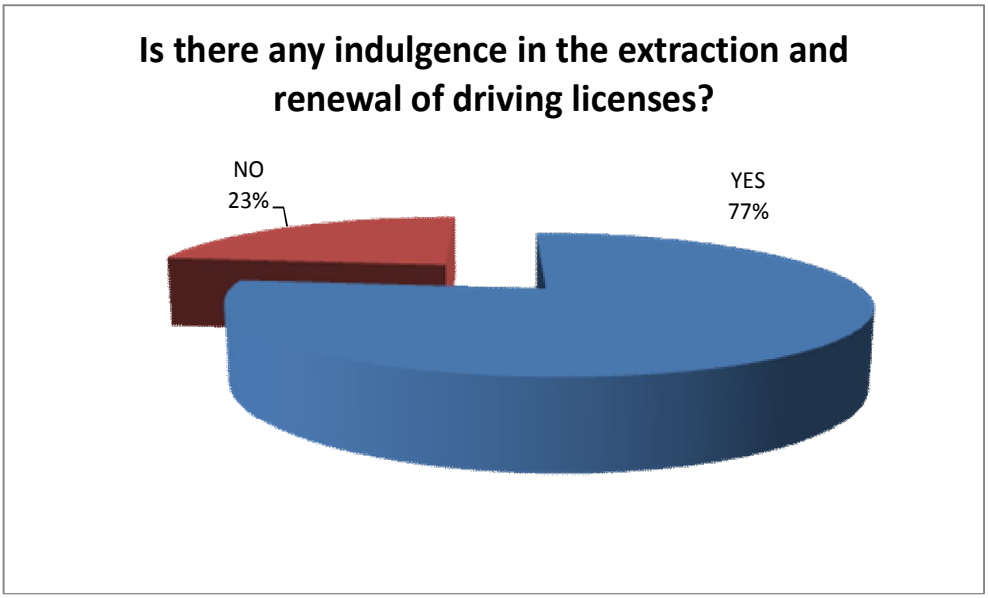


Fig.4.27 Result of question (Is there an indulgence in the extraction and renewal of driving licenses?)

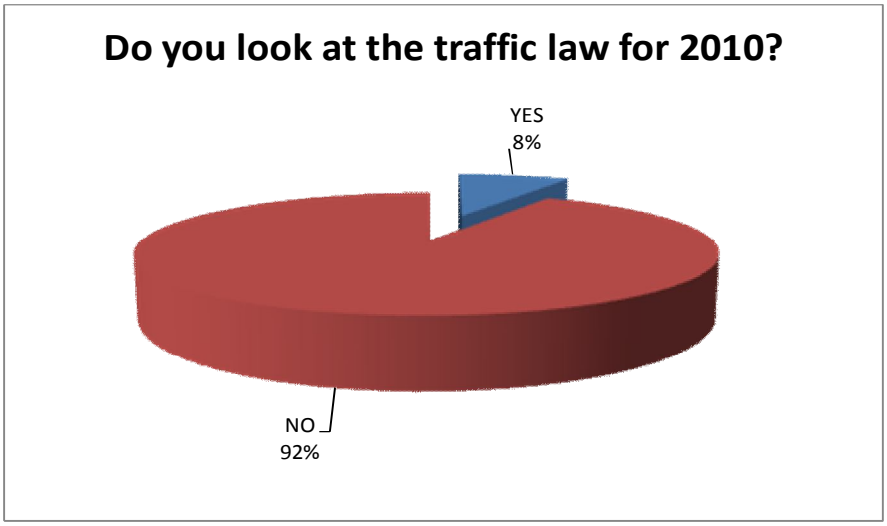


Fig.4.28 Result of question (Do you look at the traffic law for 2010?)

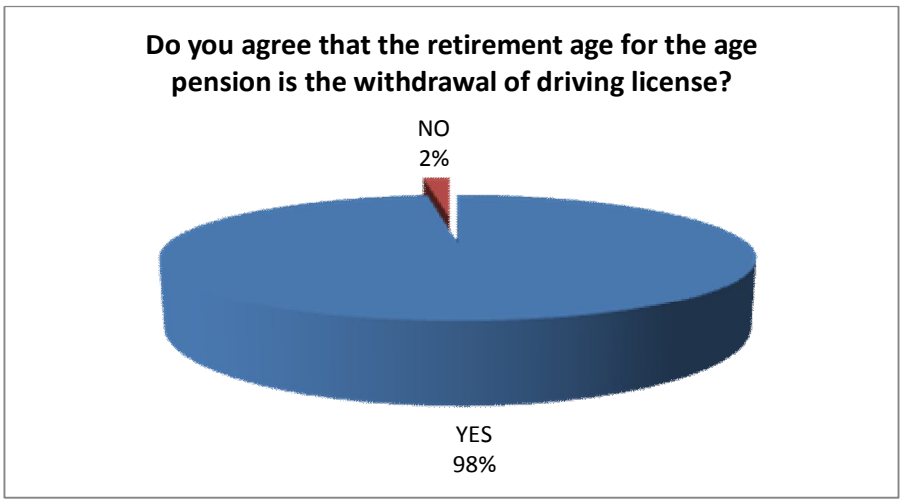


Fig.4.29 Result of question (Do you agree that the retirement age for the age pension is the withdrawal of driving license?)

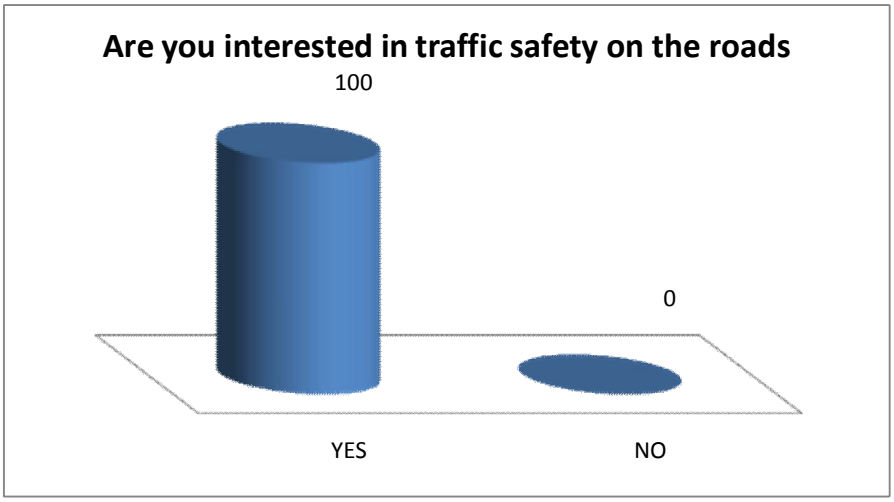


Fig.4.30 Result of question (Are you interested in traffic safety on the roads?)

4.2.2.7 Summary

By analyzing the results of the questionnaire, the results of the study are summarized as follows: -

- Top ten causes of traffic Accidents in Khartoum – Sudan is (1.Reckless Driving, 2.Driving with fatigue or disease, 3.Driving under the influence of alcohol and drugs, 4.Lack of respect for traffic signals and traffic rules, 5.Driving during the rain and strong winds, 6. Driving too fast, 7. Wrong overtaking, 8. Using headphones or higher recorded voice, 9. no traffic signs at the intersections, 10. Narrow streets and the lack of traffic culture of road users (drivers and pedestrians).

- Application of traffic safety on vehicle is applied with percentage of 100 % just at five elements from 20 elements (25%); 1.Seat belt, 2.Brakes and the handbrake work well, 3.Mirrors (right, left, and center), 4.Spare wheel and 5.Hag and the key wheel. And don't applied with percentage of 100 % just at two element from 20 elements (10%); 1.Fire-resistant mattresses, 2.Door locking systems in the case of the coup. And applied partially for other elements.
- Application of traffic safety on roads is applied with percentage of 0 %. And don't applied with two element from 15 elements (13.3%); percentage of 100 % of the targeted sample they say that these items are not available; 1.Right of Way enough for future expansion, 2.There are lines crossing for pedestrians at intersections. And applied partially for other elements.
- Behavior of road user is applied just at four elements from 17 elements (23.5%); a percentage of 100 % of the targeted sample they say 1. I never interfere with car safety equipment, 2. I check before reversing, 3. Will be attentive at intersections 4. I gave the incorrect signals when changing direction. And applied partially for other elements.
- We find a percentage of 72 % of the targeted sample they supports punishment by increase financial fine. 100% of the targeted sample they say the application of traffic safety responsible for Traffic police, Vehicle driver and Road Engineering. 100% they say the best methods to control traffic are Surveillance Cameras, Radar and The spread of policemen. 52% they say the technique that supports to increase traffic awareness is TV and radio programs. 77% they say there is an indulgence in the extraction and renewal of driving licenses. 92% don't look at the traffic law for 2010. 98% they agree that the retirement age for the age pension is the withdrawal of driving license. 100% of the targeted sample they interested in traffic safety on the roads.

4.2.3 A comparison between the results of the questionnaire information that has been obtained from the General Directorate of traffic.

4.2.3.1 Causes of traffic Accidents

According to the questionnaire; top ten causes of traffic Accidents in Khartoum – Sudan is (1.Reckless Driving, 2.Driving with fatigue or disease, 3.Driving under the influence of alcohol and drugs, 4.Lack of respect for traffic signals and traffic rules, 5.Driving during the rain and strong winds, 6. Driving too fast, 7. Wrong overtaking, 8. Using headphones or higher recorded voice, 9. no traffic signs at the intersections, 10. Narrow streets and the lack of traffic culture of road users (drivers and pedestrians).

According to General Directorate of traffic top eight causes of traffic Accidents in Khartoum – Sudan is (1. Driving too fast, 2. Negligently Driving, 3. deviation Wrong, 4.Tire Explosion, 5.Wrong overtaking, 6. Technical error,7. Drugs and drinking, 8. Overtaking traffic signal).

Discussion

We find that many of the causes of traffic accidents overlapping with each other for example reckless driver driving a vehicle too quickly and to overtake a truck and collided with a vehicle coming from the other direction then can not be certain that the cause of the accident Is reckless driving or speeding or overtaking wrong and we find that the causes of accidents, as interpreted by the administration General traffic need a lot of revisions to the fact that the traffic accident form is very weak and the information that it needs to update continuously until the benefit of researchers in the field of traffic safety.

4.2.3.2 Application of traffic safety

There is no information in the annual report accidents and traffic offenses booklet pertaining to the application of traffic safety in the three traffic elements: the road and the vehicle and road user From this standpoint, we call that included this information in a traffic accident form until we are sure of the real cause of the accident for example, if the driver who caused in a traffic accident seatbelt wearing

tempered the severity of the collision and probably not injured any harm even though the site by lighting adequate traffic accident may not happened, and so.

4.3 THE PROPOSAL STRATIGIC PLAN OF TRAFFIC SAFETY (2017-2021)

4.3.1 Strategic Objective:

The principal of the national strategic objective is to reduce the number of deaths and injuries due to traffic accidents in Sudan in general and Khartoum state especially by 50% from what it is now by the year 2021, and should be taking the necessary actions to develop plans, programs and mechanisms to get them in the end to the target or better, to be in each year compared to the number of deaths and injuries due to traffic accidents, to see the amount of improvements on the level of traffic safety.

The proposed national strategy based on two plans:

First: short-term plan

1. Awareness and guidance.
2. Traffic control.
3. Locate traffic accidents sites
4. First aid and health supplies.

Second: long-term plan.

1. The development of the public transport system.
2. the development and modernization of the road network

4.3.2 Short-term plan

This plan contains important and urgent points, working to improve traffic safety in the state of Khartoum, Sudan in general and start with the beginning of the validity of the strategic plan directly and intensely and continue for the duration of the Strategic Plan period (five years) and include this plan in four phases:

Phase one: Awareness and guidance	Concerned party	2017	2018	2019	2020	2021
Activity 1: expansion of the input traffic safety programs in primary and secondary education curricula, with a focus on children's curriculum for nursery and primary school, which have a positive impact in the origination of traffic safety principles in the hearts of young people.	General Directorate of Traffic + The Ministry of Education					
Activity 2: subscription concerned with traffic safety in the preparation of awareness programs to road users, and provides year-round media-print and audio-visual.	General Directorate of Traffic + Ministry of Information					
Activity 3: publish poetry competitions in newspapers, radio and television between readers, listeners and viewers about traffic safety. And made her valuable prizes attract citizens educate the traffic and see what he writes about traffic safety.	General Directorate of Traffic + Ministry of Information					
Activity 4: The Contribution of civil associations and sports clubs to raise traffic awareness among employees of these entities by holding seminars, conferences and meetings that each new exposure in the field of traffic safety. And in the presence of characters known to the public, such as newspaper columnists and artists, sports heroes and others.	General Directorate of Traffic + Ministry of Culture					
Activity 5: exhorted known book on writing articles and short stories, which aims to increase traffic awareness among their readers.	Ministry of Culture					
Activity 6: development of mandatory training sessions for drivers of repeat traffic accidents.	General Directorate of Traffic					

Phase two / Traffic control	Concerned party	2017	2018	2019	2020	2021
Activity 1: taking the tools of modern traffic control system, such as black dots, which are a kind of extra deterrence, where the focus is on the driver itself and behaviors.	General Directorate of Traffic					
Activity 2: Mainstream use of modern technologies such as traffic control radars and cameras on roads that abound on serious traffic accidents.	General Directorate of Traffic					
Activity 3: Modify the financial value to bypass the maximum speed on the roads to scale and increase by overtaking on the speed limit.	General Directorate of Traffic + Legislative Council					
Activity 4: activation of the special legal materials violators of traffic rules and regulations and the application of these laws to everyone without exception.	General Directorate of Traffic					
Activity 5: intensify traffic patrols on the main roads and provide them with modern cars and introduce air control of these roads continuously.	General Directorate of Traffic					
Activity 6: emphasis on the use of safety equipment in vehicles), safety belts, a fire extinguisher, a special children's seats, ... etc)	General Directorate of Traffic					

Phase three / Locate traffic accidents sites	Concerned party	2017	2018	2019	2020	2021
Activity 1: Follow-up to the daily monitoring of serious traffic accidents using maps points (Accident Spot Maps) that show the severity of accidents and sites, which they can distinguish locations where frequent traffic accidents and the type of injuries by using colored adhesive.	General Directorate of Traffic					
Activity 2: make use of geographic information systems (GIS) in the analysis of traffic accidents	General Directorate of Traffic					

Phase four / First aid and health supplies	Concerned party	2017	2018	2019	2020	2021
Activity 1: increasing aid centers on the highways between cities and providing them with modern cars equipped with the pre-requisites first modern private traffic accidents.	Ministry of Health					
Activity 2: raise the efficiency of paramedics in dealing with cases of people injured in traffic accidents, especially eloquent injuries, increasing numbers of cadres trained paramedics on the latest methods and means that work to save those injured in traffic accidents and to provide appropriate assistance at the scene.	Ministry of Health					
Activity 3: equipping the hospitals with all new and modern ambulance affected by traffic accidents.	Ministry of Health					
Activity 4: providing hospitals and doctors who specialize in dealing with road traffic injuries.	Ministry of Health					

4.3.3 Long-term plan.

This plan includes two phases; the development of public transport and the development of the road network, and both phases are working to improve traffic safety level over the long term, And because these stages need large financial amounts must be phasing five years has been the extent of need for more than this period and can be customized public transport system or a percentage of it for the benefit of the private sector in order to achieved these stages in the shortest possible time:

Phase one / development of public transport	Concerned party	2017	2018	2019	2020	2021
Activity 1: supporting public transport by buses with large capacities especially within the state of Khartoum and other cities large, so as to reduce dependence on private transport minimalistic	The Ministry of Transport, Roads and Bridges					
Activity 2: Prevent the old public transport vehicles to work on mass transit lines between the cities.	General Directorate of Traffic					
Activity 3: interest in school transportation in all stages of education, so as to maintain the students and they are not exposed to the risk of traffic accidents.	The Ministry of Education					
Activity 4: development of modern transport networks in Khartoum state, such as the subway, river transport and railways.	The Ministry of Transport, Roads and Bridges					
Activity 5: Add a modern transport networks between cities, such as the rapid electric trains and railway lines Modern.	The Ministry of Transport, Roads and Bridges					

Phase Two / development of the road network	Concerned party	2017	2018	2019	2020	2021
Activity 1: Re-create the roads in which it reduced traffic safety levels significantly and is difficult to improve the level of this network in its current form.	The Ministry of Transport, Roads and Bridges					
Activity 2: expansion of existing road network, create new connections the best technical specifications, to facilitate traffic flow and relieve pressure on the existing road network.	The Ministry of Transport, Roads and Bridges					
Activity 3: road improvement and maintenance on a regular basis and provide them with safety requirements.	The Ministry of Transport, Roads and Bridges					

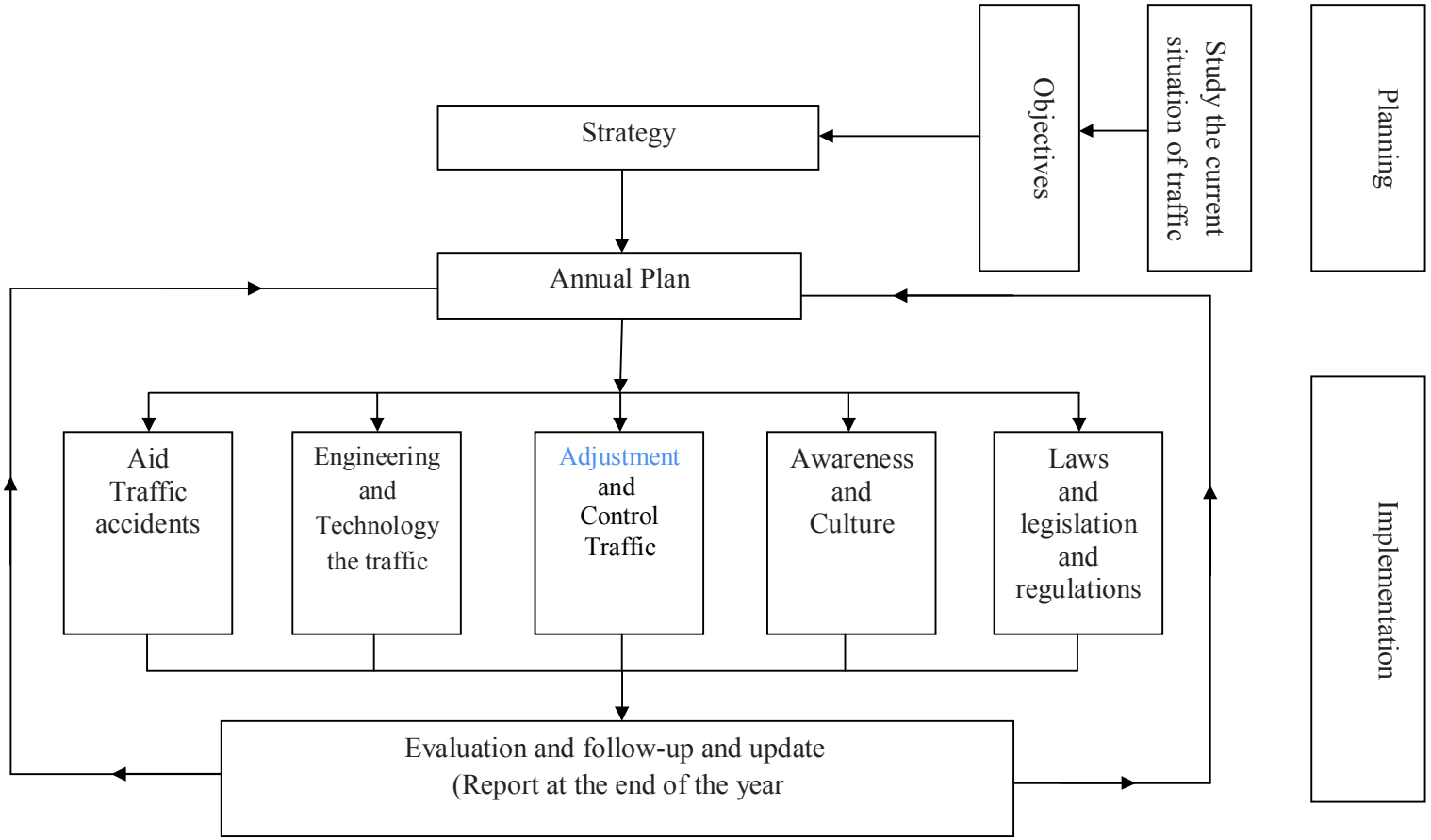


Figure 4.31 a proposal strategic plan of traffic safety

CHAPTER 5
STUDY OF RIVER TRANSPORT PROJECT

5.1 BACKGROUND

There is no doubt that Khartoum State is the most populous state in Sudan. The population is about seven million and five hundred thousand peoples, of the total forty million of the population of Sudan, equivalent to almost 19% of the population of Sudan, and this massive amount of the population requires the use of an efficient and effective transport system.

We find that the urban transport system in Khartoum State depends only on road transport by vehicles. And other transport systems such as transport by rail, tram and river transport. These systems are entirely absent from the service of citizens.

This situation makes the public transport system in Khartoum State is very underdeveloped. Therefore, Khartoum state suffers at the present time from interviewing the high demand for public transport for lack of transportation capabilities remaining unchanged, passenger waiting in transportation stations for a long time in order to get a seat in public transport vehicles. This as well as the slow speed of traffic notes that every part in Khartoum state suffers the suffering of different properties depending on its location and the nature of urban activities. There are severe congestion and bottlenecks and frequent traffic accidents and deadly respiratory diseases rise and the high cost of transportation.

The reasons for the failure of the public transport system in Khartoum State are:

- Limited road network paved with lacking Khartoum state integrated transport systems, which usually consists of several styles complementing each other Intermodal Connections of The state of Khartoum just rely on one system using vehicles that run in roads and the state of Khartoum does not support the private sector in order to run various public transport systems and there is no coordination in this regard with investors.
- The erosion of the public transport fleet as it does not have a high capacity of the motor mobility and the public transport lines do not cover a wide geographical area, and there is no variety and multiple options.

- The difficulty of access to and from transmission lines accessibility system is not reliability.
- Planners 'ignore for public transport systems in urban plans despite the fact that the road network planning is on the basis that integrates with transport networks in the order and sequence of the network. There is no current road pattern and clear classification in between. It is usually organizing traffic so that it goes from areas with less traffic flow to areas that generate big movement in the order and sequence.

And so in this section we will focus on the establishment of river transport system to promote public transport in the state of Khartoum. I have followed the study methodology to collect information from the reality on the numbers of the population to the daily mandate and movement to and from different areas and along the river path in the cities of the state, and has analyzed this information and then predicted the river transport requirements in the state of Khartoum from anchorages and river carriers.

The use of movement across the river depends on the local river's geography and the nature of the climatic zone, and it is known that the transport by boat found in Sudan, long ago, and along the Nile and has been in various stages of the history of Sudan, but river transport has evolved significantly during the Turkish rule in Egypt and the beginning of bilateral governance, and river transport was the most important means of transportation due to the validity of the Nile River for navigation.

The importance of river transportation in the state of Khartoum:

1. Ease of use and the ability to improve transport and increase the capacity of rivers, trails through the expansion and cleaning streams and rivers operations.
2. Ease of integration with transportation to communicate with any other means of road transport or rail through the establishment of ports and processing and linking them by road and rail networks in a way that will increase the flexibility of river transport.
3. Low cost and economic feasibility.

The importance of river transport is largely economical and viable when it is used. It is the most important low operating costs due to lower energy used for the movement

as well as the large quantities transmitted compared with other modes.It is the cheapest means of transport and a friend of the environment, and covers large, long and remote distances and generally the low-cost for river transport is due to the technical and economic advantages in terms of:

- low cost of the simplified design of the River Busses, we find that the single river sandal carries five times the weight while (for example) the rail wagon iron bear the weight of 1.5.
- Economical at fuel consumption.
- Life span of River Busses is equivalent to about four times the life span for trucks and other means of transportation on the road.
- Transportation is safer and less in terms of the number of accidents and in terms of pollution, especially air pollution.
- Transport large transport capacity.(see Figure 5.1, Table 5.1)

Figure 5.1 Passenger and cargo carriers

Table 5.1 Comparison between different types of transport capacity

Types of transportation	Load (Tons)	Driving force (a horse)
River transport unit (tractor +4 Sandals)	2,000	940
Cargo train (50 vehicles)	1,500	1,850
The fleet of trucks (66 trucks)	1,980	16,170
Fleet planes (62 cargo plane)	1,884	72,000

If we compare between the vehicular transport and rail transport to the difficulties relating to the infrastructure of the creation or use of land, we find that the river transport system is characterized as:

 Does not need to disarm the territory and does not need river bridges and tunnels or bridges are not above intersections and does not require the construction of roads.
 Introduces a new facet of transportation which helps to meet the growing demand for transportation and transportation in the state.
 Alleviate traffic pressure on the roads.
 Lower construction and maintenance costs and achieve a positive economic return
 Encourages tourism.
 Less pollution.

5.2 SPECIAL FEATURE THAT ENCOURAGE THE USE OF RIVER TRANSPORT IN KHARTOUM STATE

1. The geographical location of Khartoum State, where three rivers pass to form in favor of a water artery of transportation and communications (see Figure 5.2, A, B).

Figure 5.2.A Rivers in Khartoum State

Figure 5.2.B Rivers in Khartoum State

2. The direction of development along the three rivers, we find that there are many of the districts of the densely populated neighboring rivers, as well as agricultural and industrial production areas and markets.

3. The most important destination places for passengers are adjacent to the Nile.

4. It can encourage the private sector to invest in the field of river transportation by providing a perfect model of river transport and local manufacturing.

5.3 ESTABLISHMENT OF ASYSTEM OF RIVER TRANSPORT REQUIRMENTS

- Establishment of an infrastructure for river transport (marinas manufacture or import river carriers) and by making the reclamation of the watercourse and continue to clean navigational sewage and configure navigational signs due to the fluctuation of the amount of water in the three rivers: the White Nile, the Blue Nile and the Nile River. The reclamation of the waterway is the most important element of river transport industry and a crucial factor in the success of the project, so it must work to begin to study and identify obstacles and ways to remove them.
- Study the project of interfaces of the River in Khartoum State.

- Study heights of bridges that are now on the three rivers from its highest level of the flood waters and whether the time appropriate to carriers passing underneath.
- Allow owners of local river carriers with large and small capacities to work with qualifications laid down by the river transport management.
- Import more carriers and encourage river carriers manufacture locally and so similar to what happens in buses importation in the state of Khartoum.
- Development of laws and regulations governing river navigation in Khartoum state.
- Technical inspection and licensing of river carriers and identify different kinds of activities.
- Determine the technical specifications of the river carriers for imported and manufactured locally.
- Issuing driving licenses to drivers of rivercarriers.
- Conduct studies and research developed for river transport in the field of public transport, cargo transport & tourism.
- Develop technical specifications and terms of reference for the design and implementation of the anchors in conformity with the standard specifications.
- Determine the responsibility of project management for review and vacation designs provided by the authority entrusted to design and supervise the implementation of the design in accordance with the technical specifications of the standard approved by the river transport management.
- Determine anchors sites in coordination with the competent authorities in accordance with the structural scheme, identifying priority of implementation as in need in river transport project.
- Supervising the management and operation of anchors by specific entities from the private or public sector.
- work files for river transport includes: river carriers, working in the field of river transport companies, working in the field of river transport and qualifications of staff by each discipline, classification of river transport experts and other.

5.4 THE ECONOMIC FEASIBILITY OF THE PROJECT OF RIVER TRANSPORT IN KHARTOUM STATE

5.4.1 The proposed navigational paths:

- **First track:** It covers areas (Soba East Bridge, Al Mansheiya Bridge, Armed Forces Bridge, Blue Nile Bridge, Totti Bridge, Almaorada, alzaeem al-Azhari Bridge and Alhalfaya Bridge)(see Figure 5.3).
- **Second track:** running from (Jebel Aulia Dam, Salha, Alkalakla andalgaba station to meet with the first track in the Almaorada station) (see Figure 5.3).

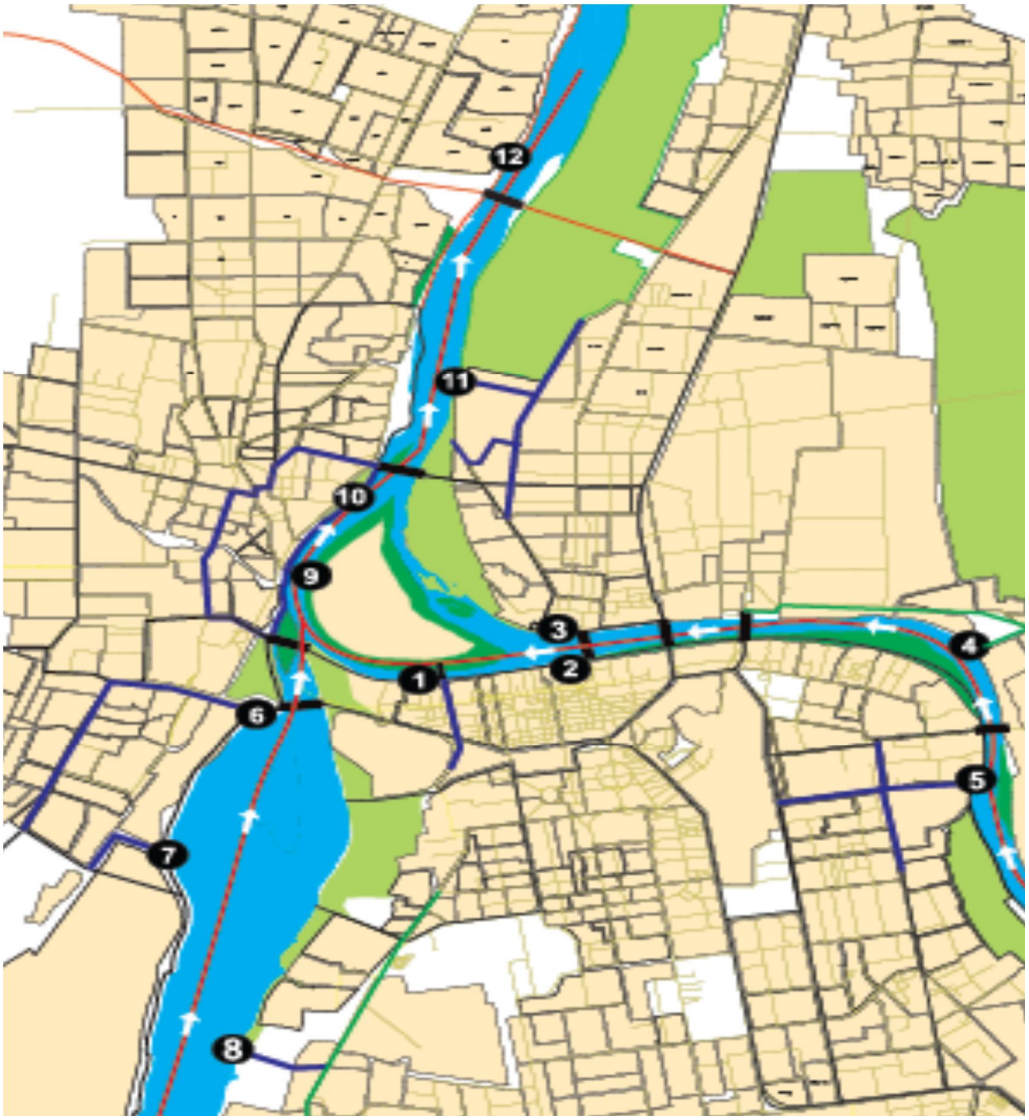


Figure 5.3 Reverie pathways and anchors proposed

5.4.2 River Anchors

The study proposes the creation of a number 12 Anchorages was chosen based on its proximity to the main streets of the existing so easily associated with transport and other anchors are; Soba East Bridge, Al Mansheiya Bridge, Armed Forces Bridge, Blue Nile Bridge, Totti Bridge, Almaorada, alzaeem al-Azhari Bridge, Alhalfaya Bridge, Jebel Aulia Dam, Salha, Alkalakla and algaba station.

The construction of anchors will give added tourist national capital, overlooking the Nile and is of economic dimensions and socially attractive to citizens and tourists and functional missions for moving safely when entering and exit of passengers, and to reduce the cost of construction of anchors, the study recommends that the construction of anchors should be on land and then linking these anchors with extensions up to a parking place on the river carrier that these extensions should be designed to the highest degree of safety.

- **Central Anchor:** Algabastation with area of 5,000 square meters.
- **Principle anchors:** Soba East Bridge, Al Mansheiya Bridge, Armed Forces Bridge, Blue Nile Bridge, Totti Bridge, Almaorada, alzaeem al-Azhari Bridge, Alhalfaya Bridge, Jebel Aulia Dam, Salha, Alkalakla with area of 2000 square meters for any anchor.

5.4.3 River Carriers

The study imports carriers with large capacities and suggests (100 capacity to 150 passengers) that can be imported in the first phase and manufactured in the future, also allows private investment to the sector in the supply of river carriers through a specific agreement guaranteeing the state their share and under certain conditions. The river carrier in terms of security, safety, comfort and punctuality, permanent availability and preservation of the environment and others, also allows for owners of carriers now a considerable number (in the range of 75 to 100 tanker) and different capacities ranging from 25 to 120 passengers and dedicated mostly for tourism Nile and a few of them for cargo.

The study found that the number of river carriers required is 52 passenger river carriers of two tracks (as in Table 4.4), also allows the carriers with small capacities

to work after complying safety conditions required to help reduce bottlenecks at peak hours.

5.4.4 Maintenance Centers

They must be available in both anchors in the 12 centers for maintenance and there will be a major maintenance center in the main station (forest station), in addition to maintenance centers moving along the tracks proposed.

5.4.5 Fuel Station

The study proposes a fixed fuel stations in each of the 12 anchors.

5.4.6 Lifespan of the project

- Pavements in anchors estimated life span is 100 years.
- Facilities of anchors estimated life span is 70 years.
- The river carriers estimated life span is 25 years.

5.4.7 Areas covered by river transport project are:

(Soba East, Almansheya, Cober, Totti, Almaorada, Alshohada, Karrari, Alhafaya, Jabalawlya, Salha, Alkalakla, Khartoum Central station).

The areas listed above represent the initial phase of the river transport; it is proposed to start the river carriersin a limited number of tracks then the expansion of the river transport system to become an effective public transport in the state of Khartoum, because people need to know this system first.

5.4.8 Estimating the number of river carriers and passenger volume in each path.

First track: (Soba East Bridge, Al Mansheiya Bridge, Armed Forces Bridge, Blue Nile Bridge, Totti Bridge, Almaorada, alzaeem al-Azhari Bridge and Alhalfaya Bridge).

Table (5.2): The number of passengers in the first track

Area	Number of large buses(25 peoples)	Number of trips	Total number of large buses	Number of passengers carried per day
Soba East	43	3	129	3225
Al Mansheiya	59	1	767	19175
kooper	45	12	540	13500
Totti	10	10	100	2500
Almaorada	25	5	75	1875
Alshohada	70	14	980	24500
Abrouf	25	6	150	3750
Alhatana	20	6	120	3000
Karrari	20	6	120	3000
Alhalfaya	50	10	500	12500
TOTAL				**87,025.0**

The study suggests that the river transport project covers 20% of the users of land transport lines (roads) and it will be the target number that deported 87,025 * 0.2 = 17,405 passengers. We also will consider that this number will flow regularly from 6 am to 6 pm that means 12 hours a day. The traffic flow will be at a rate of 17,405/12 = 1,450 person per hour for eight berths an average of 180 people per hour per Anchor. Since the path length in the range of 40 km can be estimated as a journey time of 60 minutes overall ride and the descent of the passengers.

As the river carrier capacity in the range of 100 people, so you must provide a number (1450/100) = 15 river carrier, 100 people capacity of this line, and as the circular movement so we need for 15 tanker and another opposite direction of the track, and it is the number of carriers required for this track is 30 river carriers.

Second track: (JebalAulia Dam, Salha, Alkalakla and algaba station to meet with the first track in the Almaorada station)

Table (5.3): The number of passengers in the second track

Area	Number of large buses(25 peoples)	Number of trips	Total number of large buses	Number of passengers carried per day
Jebel Awlia	100	6	600	15000
Salha	60	12	720	18000
Alkalakla	120	10	1200	30000
TOTAL				**63,000**

The study suggests that the river transport project covers 20% of the users of land transport lines (roads) and it will be the target number that deported 36,000 * 0.2 = 12,600 passengers. We will also consider that this number will flow regularly from 6 am to 6 pm which means 12 hours a day. The traffic flow will be at a rate of 12,600/12 = 1,050 person per hour for eight berths an average of 260 people per hour per Anchor.
Since the path length in the range of 30 km can be estimated journey time of 60 minutes overall ride and the descent of the passengers.

As the river carrier capacity in the range of 100 people, so you must provide a number (1050/100) = 11 river carrier, 100 people capacity of this line, and as the circular movement so we need for 11 tanker and another opposite direction of the track, and it is the number of carriers required for this track is 22 river carriers.

As the first and second tracks meet at the Almaorada station we will consider that the second track will end up at this station in the sense that it will be a transformational station.

Table 5.4: Summary of the number of beneficiaries and the number of carriers

Track No.	Beneficiary areas of the track	The number of people beneficiaries	Number of carriers river
1	Soba East, Almansheya, Coper, Totti, Almaorada, Alshohada, karrari, Alhafaya,	17,405	30
2	Jabalawlya, Salha, Alkalakla, Khartoum Central station	12,600	22
Total		**30,000**	**52**

5.4.9 Obstacles of river transport project

- Water fluctuation of the three rivers that pass in the capital city Khartoum, which requires the work of reclamation of the watercourse and the work of anchors to accommodate this fluctuation.
- Amount of dams built on rivers example of this ALNAHDA Dam, which has an impact on the amount of water flowing north to Egypt. This has a positive effect.
- Bridges on the rivers are now three and a height from the highest level of water flooding for the time rate is over carriers from the bottom.
- High cost of the project and the difficulty of financing that can be overcome by external funding or internal investment or to allow the owners of carriers to operate the project in exchange for a certain agreement.

5.4.10 Project cost and payback period

The total cost of the project consists of:

1. The Cost of reclamation of the river track.
2. The Cost of construction of anchors.
3. The cost of buying river carriers.
4. Operational cost and maintenance cost.
5. The cost of river transport management salaries.
6. The cost of maintenance of facilities.

1. **Cost of reclamation of the river track.**

Table 5.5 The Cost of reclamation of the river track.

No.	**Item**	**Unit**	quantity	**Unit Price (USD$)**	**Total (USD$)**
1	The Cost of reclamation of the river track	Km	70	9,375.0	656,250.0

2. **The Cost of construction of anchors**

Table 5.6 The Cost of construction of anchors

Central anchor (one anchor)					
No.	**Item**	**Unit**	quantity	**Unit Price (USD$)**	**Total (USD$)**
1	Foundations and embankments	M²	2,000.0	35.0	70,000.0
2	Terraces & external processors.	M²	500.0	65.0	32,500.0
3	Wall + gates	M.L	200.0	95.0	19,000.0
4	Service facilities	M²	500.0	65.0	32,500.0
Total					**154,000.0**
Main anchors(11 anchors)					
1	Foundations and embankments	M²	1,000.0	35.0	35,000.0
2	Terraces & external processors.	M²	300.0	65.0	19,500.0
3	Wall + gates	M.L	100.0	95.0	9,500.0
4	Service facilities	M²	300	65.0	19,500.0
Total					**83,500.0**
Total for 11 anchors					**918,500.0**
Total cost for all 12 anchors					**1,072,500.0**
Invisible work 10%					**107,250.0**
Design and supervision of 5%					**53,625.0**
The final cost per 12 anchors					**1,233,375.0**

3. The cost of buying River carriers.

Table 5.7 The cost of buying River carriers.

No.	Item	Unit	quantity	Unit Price (USD$)	Total (USD$)
1	River carrier's capacity of 100 people.	Number	52	125,000.0	6,500,000.0

Remark:

To minimize the amount required to buy the carriers could allow foreign and local investors to import and operate carriers in exchange for contract certain conditions with river transport management.

It can allow small river carriers to operate, after passing all the required technical conditions laid down by the river and transport management.

4. Operational cost and maintenance cost.

Table 5.8 Operational cost and maintenance cost

No.	Item	Unit	Monthly consumption	Unit Price (USD$)	Monthly Cost (USD$)	Annual cost (USD$)
1	Fuel	liter	2,400	0.20	480.0	5,760.0
2	Oil and refineries	Gallon	3	11.0	33.0	396.0
3	Maintenance	Operation	-	-	188.0	2,256.0
4	Salaries and incentives	Operation	5,000.0	1	315.0	3,780.0
Total for one River carrier						**12,192.0**
Total for all (52) River carriers						**633,984.0**

5. The cost of river transport management salaries.

Table 5.9 The cost of river transport management salaries

No.	Item	Unit	Number	Ave. monthly salary(USD$)	Cost per Month(USD$)	Annual cost (USD$)
1	salaries	Number	250	300.0	75,000.0	900,000.0

6. The cost of maintenance of facilities

Table 5.10the cost of maintenance of facilities

No.	Item	Unit	Number	Ave. monthly salary(USD$)	Cost per Month(USD$)	Annual cost (USD$)
1	maintenance of facilities	Number	12	125.0	1,500.0	18,000.0

Total cost of the project (fixed assets)

Table 5.11 Total cost of the project (fixed assets)

No.	Item	Cost (USD$)
1	The Cost of reclamation of the river track.	656,250.0
2	The Cost of construction of anchors	1,233,375.0
3	The cost of buying River carriers	6,500,000.0
Total cost of fixed assets		**8,389,625.00**

Total operating cost of the project (annual cost)

Table 5.12 Total operating cost of the project (annual cost)

No.	Item	Cost (USD$)
1	Operational cost and maintenance cost	633,984.0
2	Salaries and Incentives	900,000.0
3	Facilities maintenance	18,000.0
Total operating cost of the project		**1,551,984.00**

5.4.11 the project revenue

Annual income expected

Table 5.13 Annual income

No.	Item	Annual revenue(USD$)
1	Passenger revenues The daily number of passengers = 30,000 Average ticket price = 0.3(USD$) 360 days on year	3,240,000.0
2	Revenues of the services centers Shops = 300,0 (USD$)for one anchor monthly Other = 250.0 (USD$)for one anchor monthly Number of anchors =12	6,600.0
3	The benefits of the tourist and business trips 10 tours per month = 3,000.0(USD$) 10 commercial per month = 2,000.0(USD$)	60,000.0
The total projected annual revenue		**3,306,600.00**

Project Cash flow

Table 5.14 Project Cash flow

Item	Amount (USD$)
Annual revenue	3,306,600.00
Costs (annual operating)	1,551,984.00
Cash flow before deducting depreciation and taxes	1,754,616.00
Annual depreciation (table 4.14)	156,296.50
Net taxable profit	1,598,319.50
Tax 17%	271,714.32
Net profit	**1,326,605.19**

Annual depreciation of the project

Table 5.15 Annual depreciation of the project

No.	Types of depreciation	**Asset Value (USD$)**	Scrap value	Lifespan (years)	Amount**(USD$)**
1	The Cost of reclamation of the river track.	656,250.0	-	100	6,562.5
2	The Cost of construction of anchors	1,233,375.0	246,675.0	50	19,734.0
3	The cost of buying River carriers	6,500,000.0	3,250,000.0	25	130,000.0
Total					**156,296.50**

5.4.12 the period of recovery of capital

The cost of fixed assets = 8,389,625.00(USD$)

Annual net profit = 1,326,605.19(USD$)

Redemption of capital period (8,389,625.00/ 1,326,605.19) = **7years**

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

1. The number of traffic accidents that cause death since 2000, continues to increase till it reached its highest value in 2010 and then these numbers began in continuous declining, dropping in the year 2014 by 19.4% from 2010.
2. The number of traffic accidents of various types since 2000, began to increase until the years 2009 and 2010, then began a gradual decrease.
3. The highest percentage of deceased in traffic accidents in Sudan at age group between (21-30) year with percentage 24.4%, Followed by age group between (31-40) year with percentage 21.1%, Accordingly the percentage of the deceased at the young people age (21- 40) year in last five years from (2010-2014) is percentage 45.5%.
4. The highest percentage of perpetrators accidents death in Sudan at age group between (21-30) year with percentage 31.3%, followed by age group between (31-40) year with percentage 30.3%, Accordingly the percentage of the perpetrators of accident death is young people age (21- 40) year in last five years from (2010-2014) is 61.6%.
5. The highest Type of public transport vehicle casing death is minibus with percentage 45.9%, followed by (ragsha) with percentage 26.5%.
6. The highest Type of commercials vehicle casing death is a lorry with percentage 30.9%, followed by the trucks with percentage 28.4%.
7. Highest numbers of death accidents happen at morning time with percentage 54.2%, followed by night time with percentage 45.8%.
8. Sex of the deceased in traffic accidents in last five years from (2010-2014); men with percentage 66.3%, women by 18.5% and children by 15.2%.
9. The most important causes of traffic accidents that cause death are excessive speed (driving too fast) and represent 41.5%, after that driving negligently and represent 37.6%.
10. Top ten causes of traffic accidents in Khartoum state according to questionnaire results is; Reckless driving, Driving with fatigue or disease, Driving under the influence of alcohol and drugs, Lack of respect for traffic

signals and traffic rules, Driving during the rain and strong winds, Driving too fast, Wrong overtaking, Using headphones or higher recorded voice and There is no traffic signs at the intersections.

11. The extent of the traffic safety application - vehicle according to questionnaire results; we find a percentage of 100 % of the targeted sample they have a Seat belt, Brakes and the handbrake work well, Mirrors (right, left, and center), Spare wheel and Hag and the key wheel. A percentage of 97 % they have Interior door locks, 95 % they have Signals (right, left, huzer, long, short), 95 % they have Internal indicators (for fuel, heat, oil, speedometer, etc. ....). we also find that 100% of the targeted sample they don't have Fire-resistant mattresses, Door locking systems in the case of the coup, 98% they don't have Child seats, 97% they don't have hand lamp (Flashlight), 95% they don't have Airbags.
12. The extent of the traffic safety application - road according to questionnaire results; We find a percentage of 100 % of the targeted sample they say that these items are not available; Right of Way enough for future expansion, There are lines crossing for pedestrians at intersections. 95% they say there are no side protection bars in sharp curves, there are no roundabout and it's bad designed, bad roads and is defective holes and cracks and other. 90% they say the Number of traffic lanes is not enough to traffic in coming and going.
13. The behavior of road user according to questionnaire results; We find a percentage of 100 % of the targeted sample they say I never interfere with car safety equipment, I check before reversing, will be attentive at intersections and I gave the incorrect signals when changing direction. We also find that 99% of the targeted samples they say not turn off vehicle engine and mobile when refueling.90% of the targeted samples them talking by mobile while driving.
14. In the section on the different questions; We find a percentage of 72 % of the targeted sample they supports punishment by increase financial fine. 100% of the targeted sample they say the application of traffic safety responsible for Traffic police, Vehicle driver and Road Engineering. 100% they say the best methods to control traffic are Surveillance Cameras, Radar and The spread of policemen. 52% they say the technique that supports to increase traffic

awareness is TV and radio programs. 77% they say there is an indulgence in the extraction and renewal of driving licenses. 92% don't look at the traffic law for 2010. 98% they agree that the retirement age for the age pension is the withdrawal of driving license. 100% of the targeted sample they interested in traffic safety on the roads.

6.2 RECOMMENDATIONS

General Recommendations

Roads:

- Improve signage, Raise speed limits on safe roads, Implement better roadway lighting, Create more turn-only lanes, Eliminate stops, Create more divided highways, Redesign bad intersections and roads,
- Installation of reflectors ground illuminated (cats eyes) to select the tracks at night.
- Installation of steel barriers, especially at places of curves to ward off any risk.
- Planting roadside windbreaks and prevent the accumulation of dust on the roads and planting centrist islands to prevent the lighting effect in the opposite direction.
- Monitoring of traffic accidents on the road network, analyze and identify black spots and then repeated incidents and to develop the proper engineering solutions.
- Study the causes of road accidents caused by roads distresses and analysis and development of appropriate engineering solutions.
- Maintenance and continuous evaluation of the roads and intersections.

Vehicle:

- Improve traffic safety level by focusing on vehicle maintenance.
- The importance of the follow-up to subject vehicles Technical Inspection periodic.
- Use of public transport as a means of alternative transport within Khartoum state.
- The main concern with equipment that must be met in the vehicle when its design, such as:
    - A stent designed to absorb the shock when the incident occurred.
    - The existence of special shock-sponge inside the vehicle.
    - Seat belt.
    - Air Cushion

Road Users

- Get drunk drivers off the road, Improve driving conditions.
- The need to include awareness and traffic safety programs within the introductory lectures traffic regulations in different media.
- Emphasize the traffic awareness through the definition of danger resulting from the violation of traffic regulations, and the definition of that system but developed to achieve traffic safety for all.
- Keenness of awareness campaigns on the road user defined size of what they offer state of the potential for congestion in order to achieve security, which forces the users of the road sensors the size of the tasks on the State of appreciation and handled responsibly conscious.
- The related traffic operation bodies need to persevere to spread traffic awareness among road users through awareness-raising channels, and follow through.
- Emphasize the socialization in the various stages of education about the importance of adhering to traffic and security systems to ensure the security and safety of all.
- Inflicting traffic police qualifying courses and multi-disciplinary training, for example, special courses in the area of awareness in the field of traffic awareness and education, and the other in defensive driving to do their job to the fullest while being careful to keep up with every new science in security and traffic technology.
- Put thoughtful programs on scientific and practical levels, especially members of the traffic police field to accommodate the concept of traffic safety and methods of implementing and monitoring irregularities.
- Regular inspection of vehicle and drivers

The Supreme Council for Traffic Safety

- Control of issuance of driving license
- Modifying traffic laws and their organizations is compatible with international standards.

- Strictly enforcing traffic laws to discipline the traffic in and out of the state of Khartoum.
- Strict foundations for driving licenses and the need to get certified training courses and a thorough medical examination before getting a license.
- A review of current systems in Driving Schools and the development of procedures for the extraction of driving licenses.
- Coordination and cooperation in the planning and implementation to solve the traffic problems on both the short and long term.
- Enriching the research aspect of securing the safety of traffic on the roads and the establishment of research and studies traffic center.
- The involvement of professional engineers in the field of traffic engineering with the traffic police to establish a joint center that specializes in finding radical solutions to the problems of traffic intersections places.
- The use of modern systems for traffic control.
- Confrontation deterrent to drivers of vehicles of violators systems and traffic rules.

Future Recommendations

- Adopt transportation model for Khartoum State.
- Procedure more research in the field of river transportation.
- Conduct research and studies in the field of railway transport and the metro in Khartoum State.
- Giving traffic information to universities and research centers periodically and regularly to conduct more studies are valuable field of traffic accidents and ways to minimize them or prevent them.

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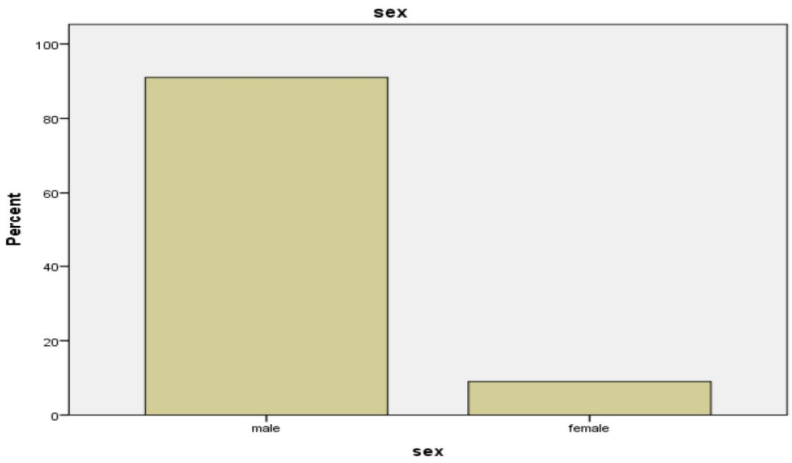
Appendix A: Questionnaire analysis

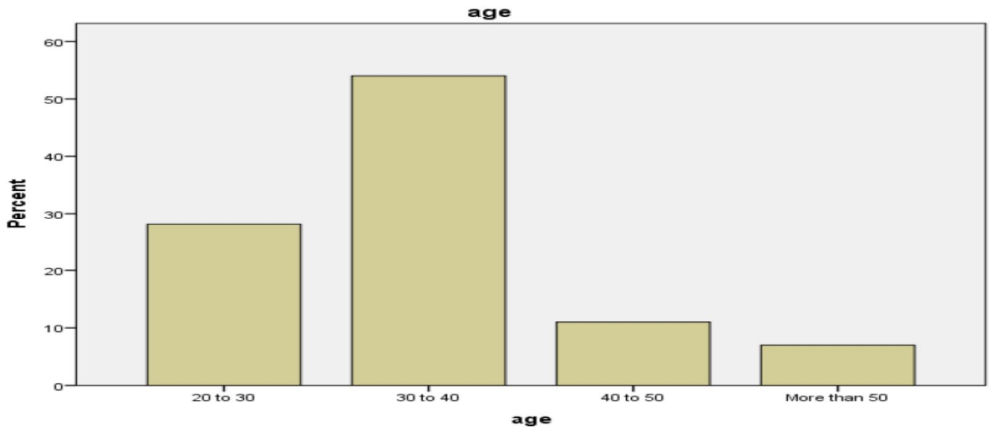
sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	male	91	91.0	91.0	91.0
	female	9	9.0	9.0	100.0
	Total	100	100.0	100.0	



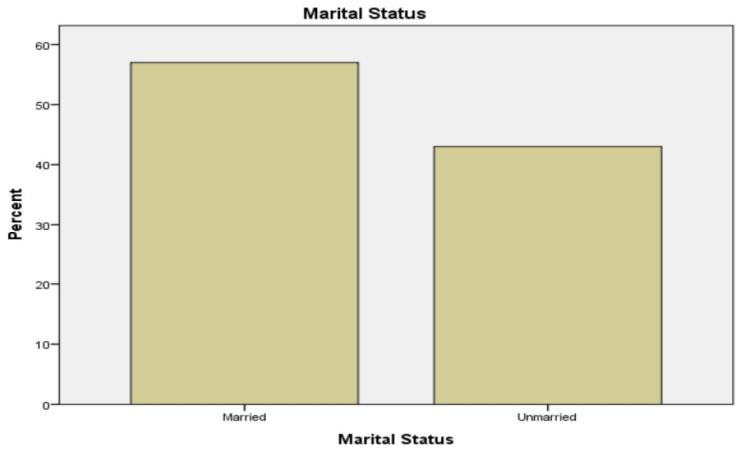
age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	20 to 30	28	28.0	28.0	28.0
	30 to 40	54	54.0	54.0	82.0
	40 to 50	11	11.0	11.0	93.0
	More than 50	7	7.0	7.0	100.0
	Total	100	100.0	100.0	



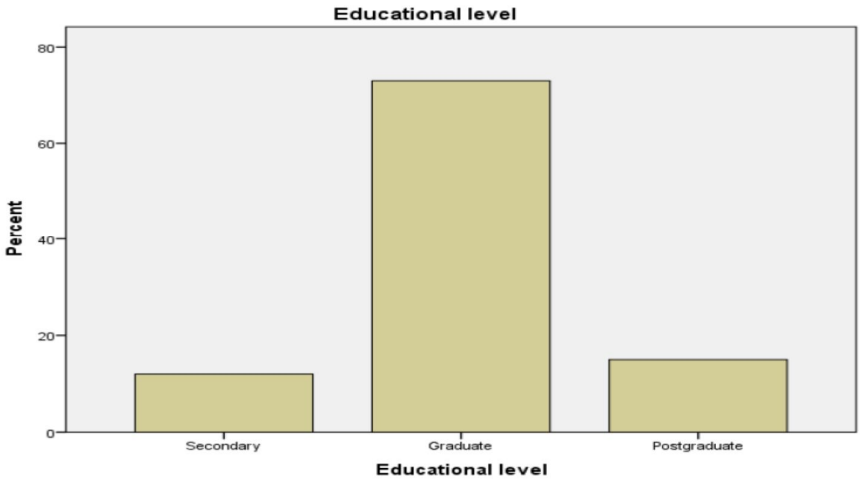
Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Married	57	57.0	57.0	57.0
	Unmarried	43	43.0	43.0	100.0
	Total	100	100.0	100.0	



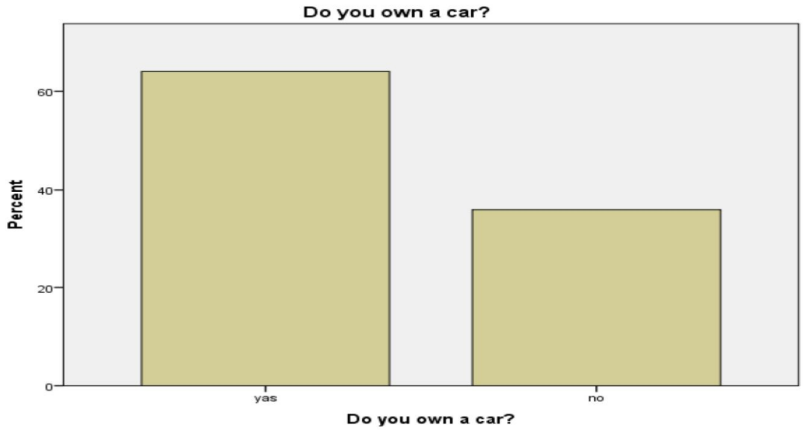
Educational level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Secondary	12	12.0	12.0	12.0
	Graduate	73	73.0	73.0	85.0
	Postgraduate	15	15.0	15.0	100.0
	Total	100	100.0	100.0	



Do you own a car?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	64	64.0	64.0	64.0
	no	36	36.0	36.0	100.0
	Total	100	100.0	100.0	

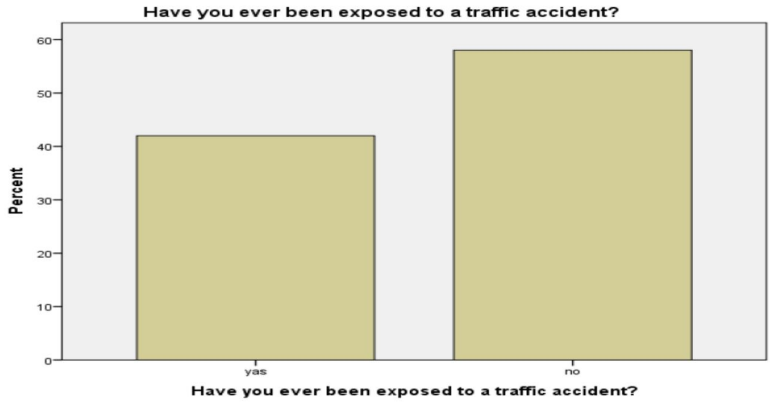


Do you have availed driver's license?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	93	93.0	93.0	93.0
	no	7	7.0	7.0	100.0
	Total	100	100.0	100.0	

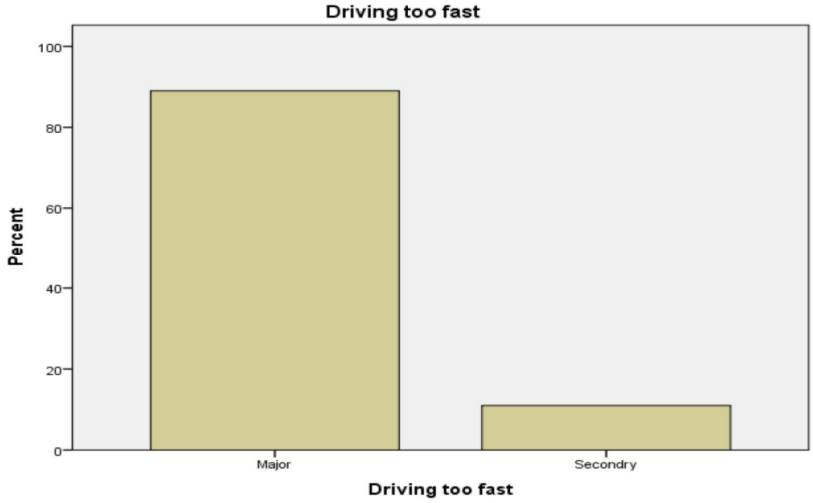
Have you ever been exposed to a traffic accident?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	42	42.0	42.0	42.0
	no	58	58.0	58.0	100.0
	Total	100	100.0	100.0	



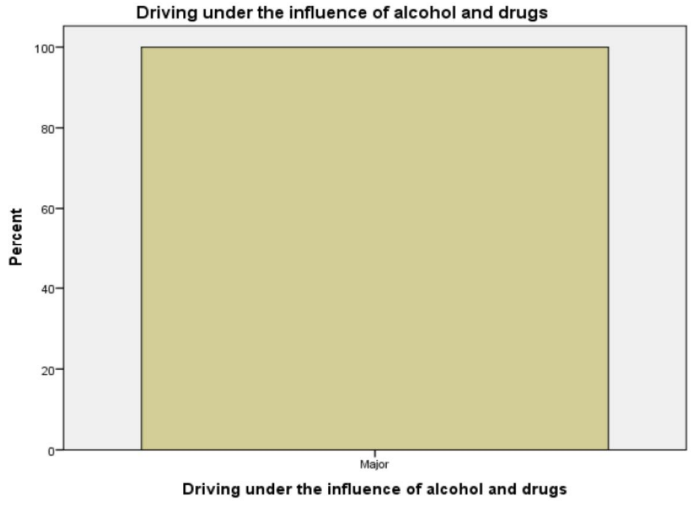
Driving too fast

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	89	89.0	89.0	89.0
	Secondary	11	11.0	11.0	100.0
	Total	100	100.0	100.0	



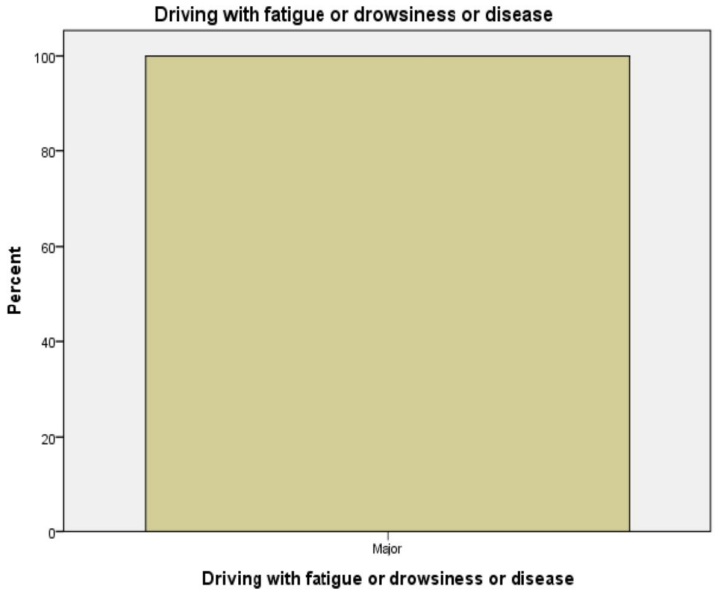
Driving under the influence of alcohol and drugs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	100	100.0	100.0	100.0



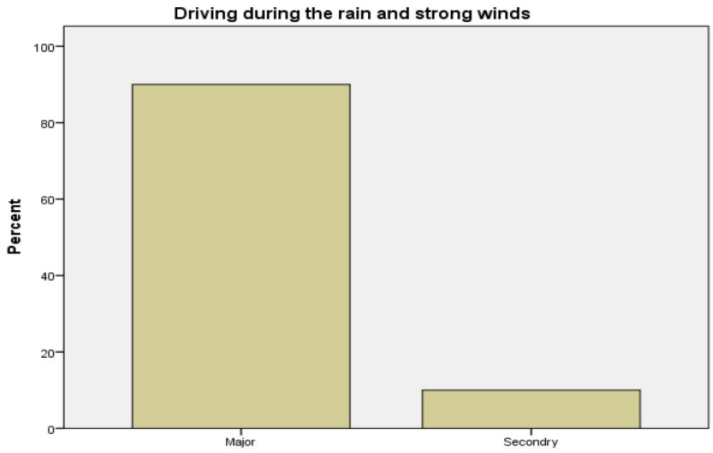
Driving with fatigue or drowsiness or disease

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	100	100.0	100.0	100.0



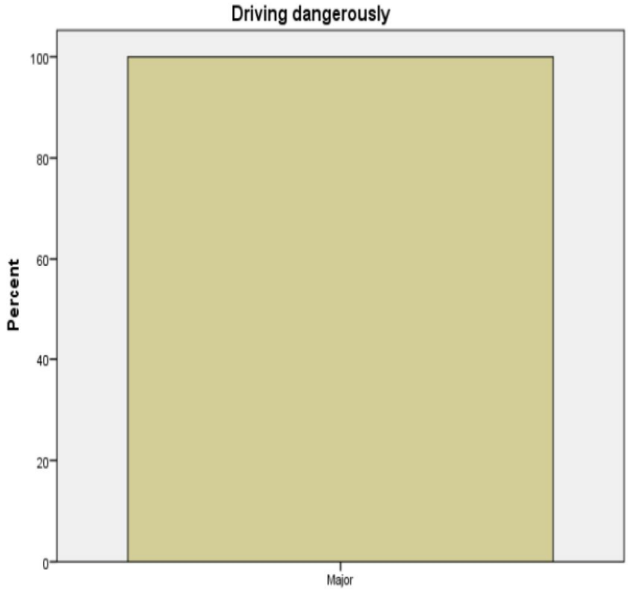
Driving during the rain and strong winds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	90	90.0	90.0	90.0
	Secondry	10	10.0	10.0	100.0
	Total	100	100.0	100.0	



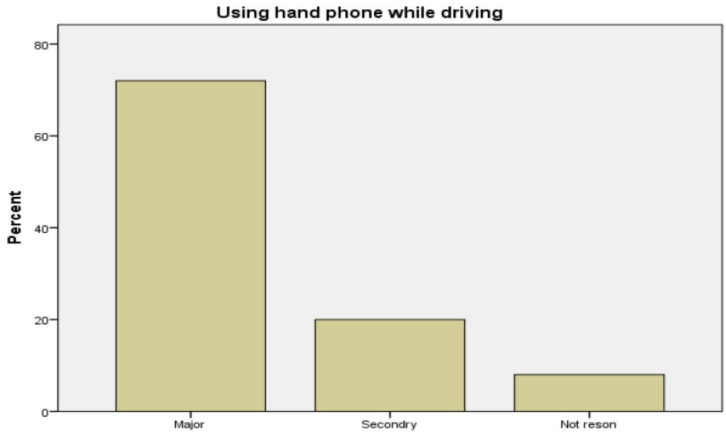
Driving dangerously

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	100	100.0	100.0	100.0



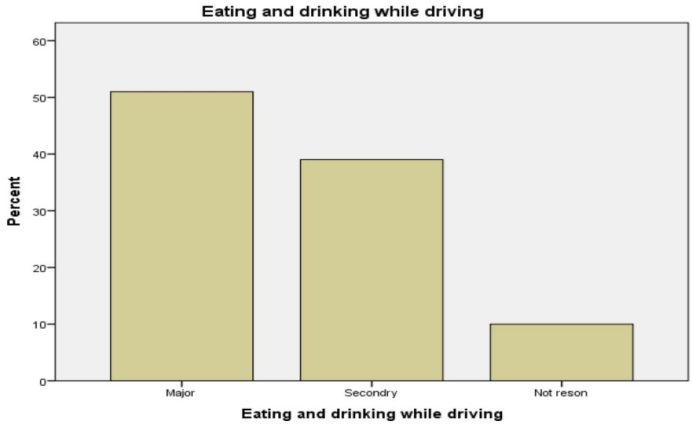
Using hand phone while driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	72	72.0	72.0	72.0
	Secondry	20	20.0	20.0	92.0
	Not reson	8	8.0	8.0	100.0
	Total	100	100.0	100.0	



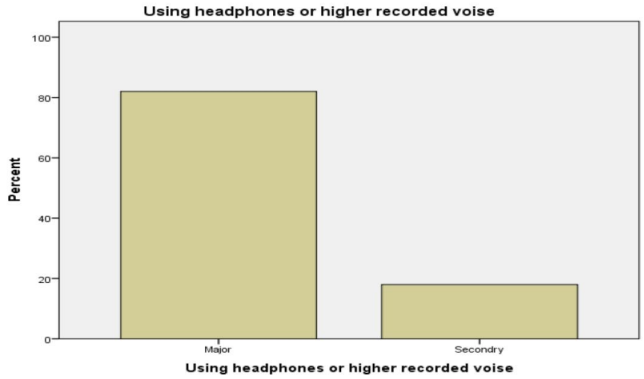
Eating and drinking while driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	51	51.0	51.0	51.0
	Secondry	39	39.0	39.0	90.0
	Not reson	10	10.0	10.0	100.0
	Total	100	100.0	100.0	



Using headphones or higher recorded voise

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	82	82.0	82.0	82.0
	Secondry	18	18.0	18.0	100.0
	Total	100	100.0	100.0	

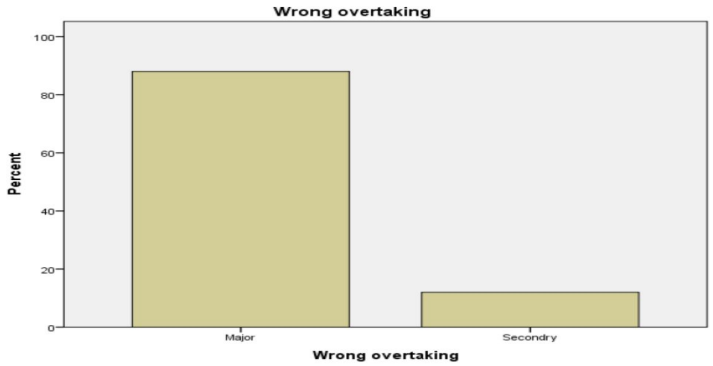


Lack of respect for traffic signals and traffic rules

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	95	95.0	95.0	95.0
	Secondry	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

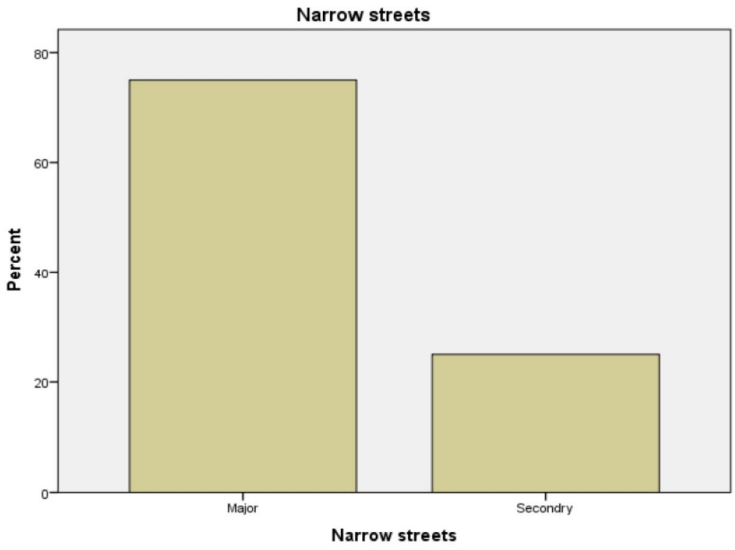
Wrong overtaking

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	88	88.0	88.0	88.0
	Secondry	12	12.0	12.0	100.0
	Total	100	100.0	100.0	



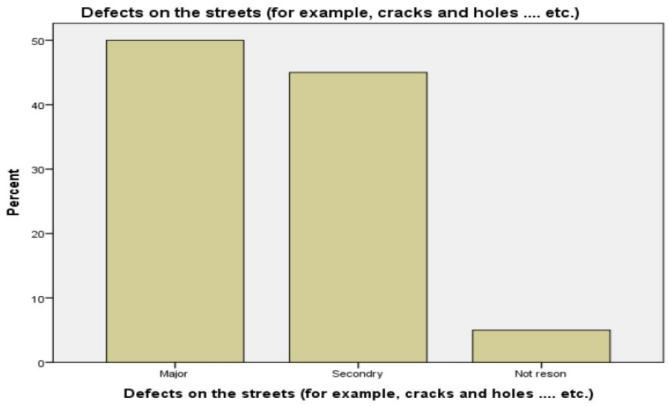
Narrow streets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	75	75.0	75.0	75.0
	Secondry	25	25.0	25.0	100.0
	Total	100	100.0	100.0	



Defects on the streets (for example, cracks and holes .... etc.)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	50	50.0	50.0	50.0
	Secondry	45	45.0	45.0	95.0
	Not reson	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

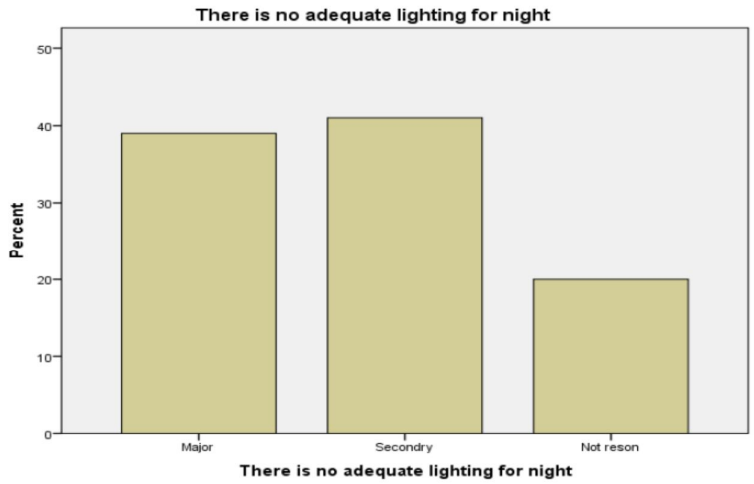


Maintenance work on the street

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	66	66.0	66.0	66.0
	Secondry	31	31.0	31.0	97.0
	Not reson	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

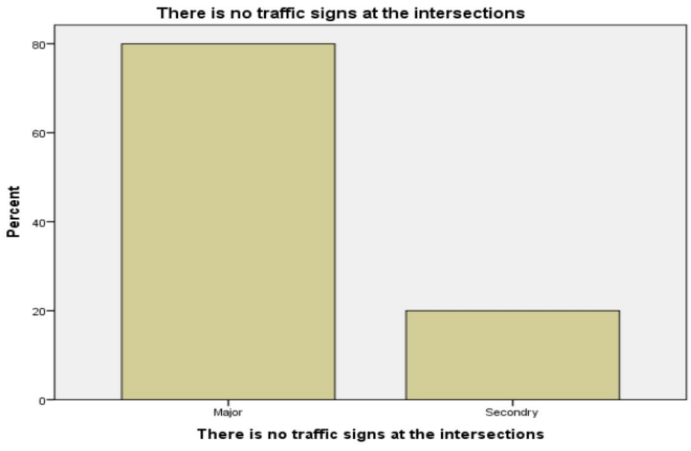
There is no adequate lighting for night

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	39	39.0	39.0	39.0
	Secondry	41	41.0	41.0	80.0
	Not reson	20	20.0	20.0	100.0
	Total	100	100.0	100.0	



There is no traffic signs at the intersections

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	80	80.0	80.0	80.0
	Secondry	20	20.0	20.0	100.0
	Total	100	100.0	100.0	

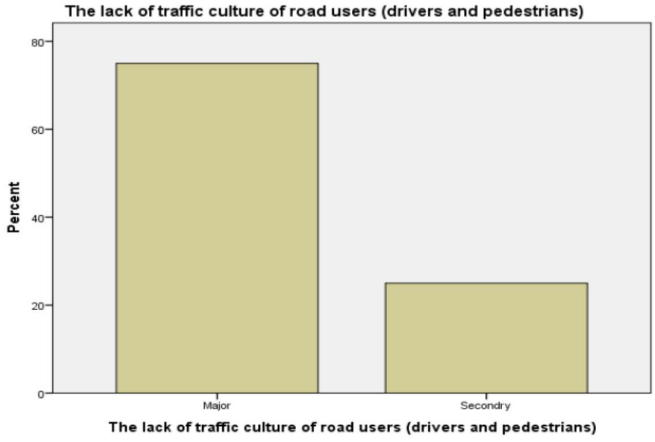


There is no pedestrian crossing lines

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	70	70.0	70.0	70.0
	Secondry	20	20.0	20.0	90.0
	Not reson	10	10.0	10.0	100.0
	Total	100	100.0	100.0	

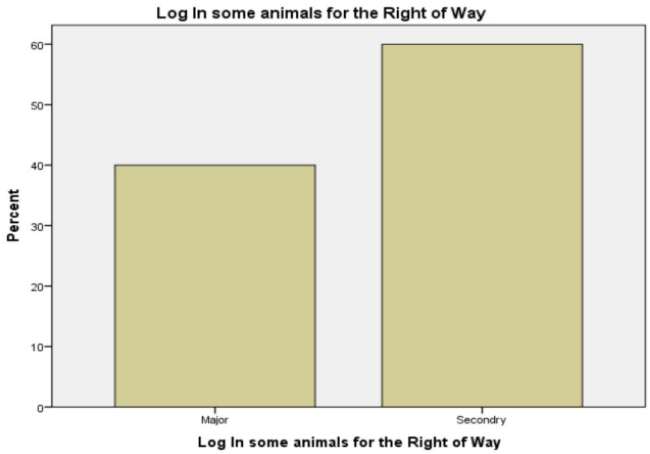
The lack of traffic culture of road users (drivers and pedestrians)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	75	75.0	75.0	75.0
	Secondry	25	25.0	25.0	100.0
	Total	100	100.0	100.0	



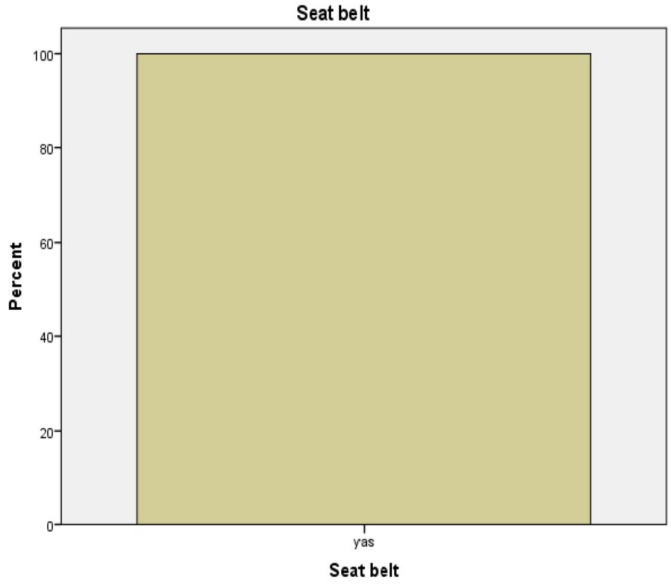
Log In some animals for the Right of Way

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Major	40	40.0	40.0	40.0
	Secondry	60	60.0	60.0	100.0
	Total	100	100.0	100.0	



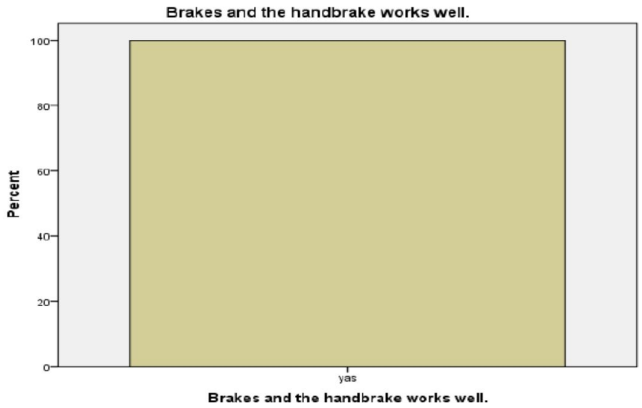
Seat belt

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	100	100.0	100.0	100.0



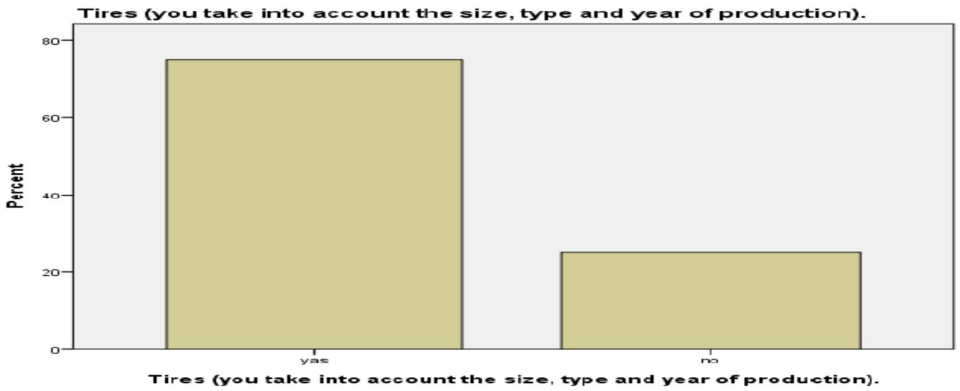
Brakes and the handbrake works well.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	100	100.0	100.0	100.0



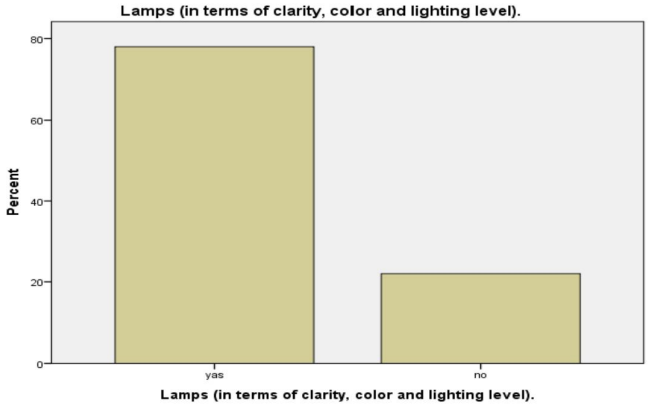
Tires (you take into account the size, type and year of production).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	75	75.0	75.0	75.0
	no	25	25.0	25.0	100.0
	Total	100	100.0	100.0	



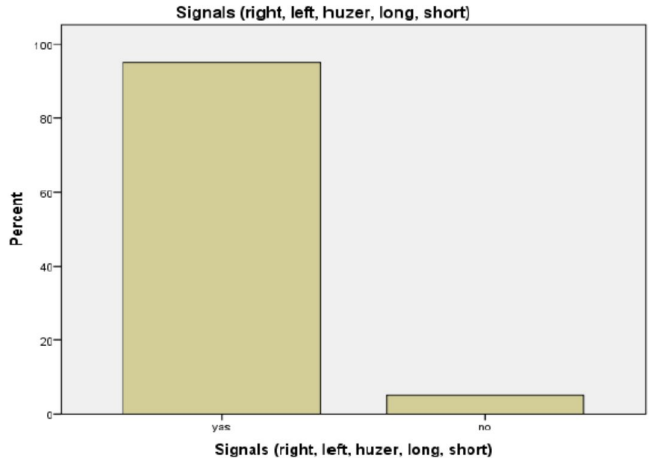
Lamps (in terms of clarity, color and lighting level).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	78	78.0	78.0	78.0
	no	22	22.0	22.0	100.0
	Total	100	100.0	100.0	



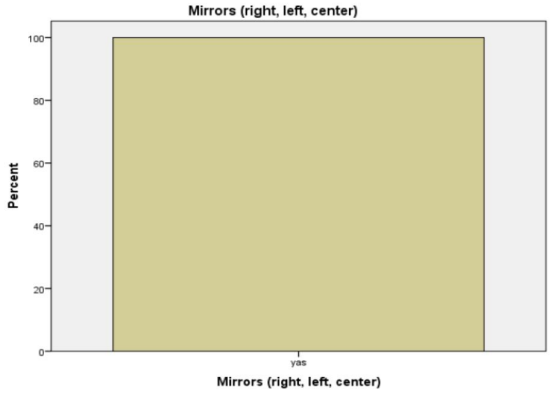
Signals (right, left, huzer, long, short)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	95	95.0	95.0	95.0
	no	5	5.0	5.0	100.0
	Total	100	100.0	100.0	



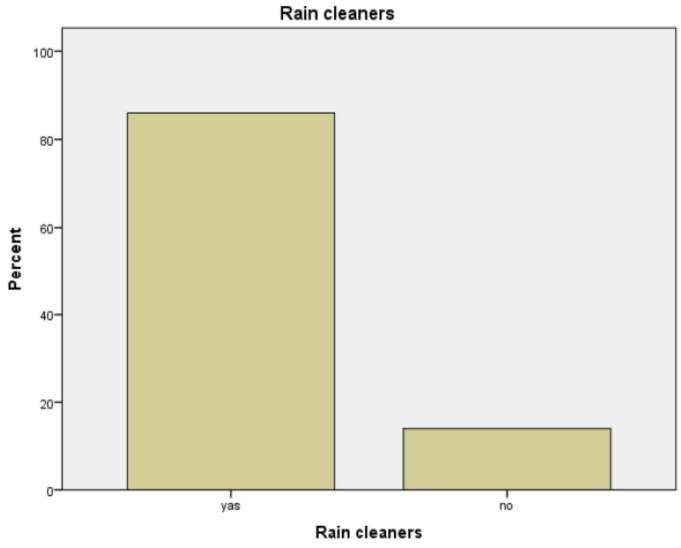
Mirrors (right, left, center)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	100	100.0	100.0	100.0



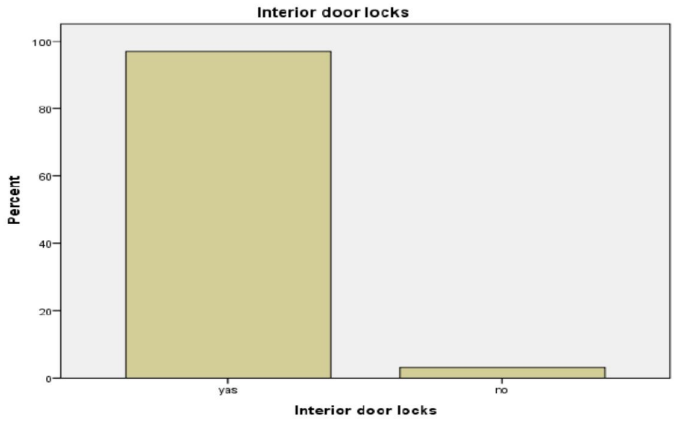
Rain cleaners

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	86	86.0	86.0	86.0
	no	14	14.0	14.0	100.0
	Total	100	100.0	100.0	



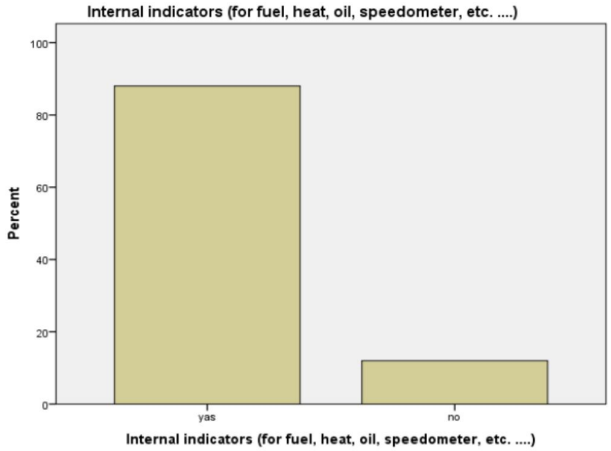
Interior door locks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	97	97.0	97.0	97.0
	no	3	3.0	3.0	100.0
	Total	100	100.0	100.0	



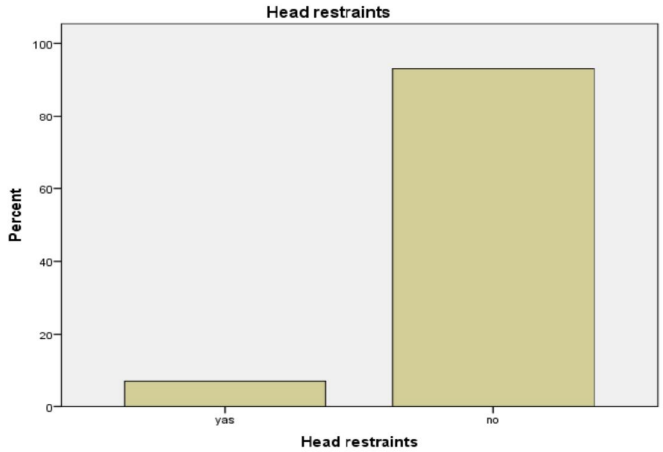
Internal indicators (for fuel, heat, oil, speedometer, etc. ....)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	88	88.0	88.0	88.0
	no	12	12.0	12.0	100.0
	Total	100	100.0	100.0	



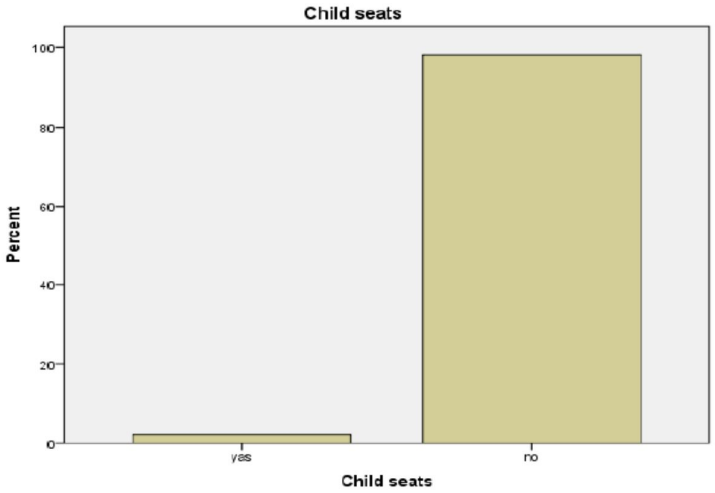
Head restraints

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	7	7.0	7.0	7.0
	no	93	93.0	93.0	100.0
	Total	100	100.0	100.0	



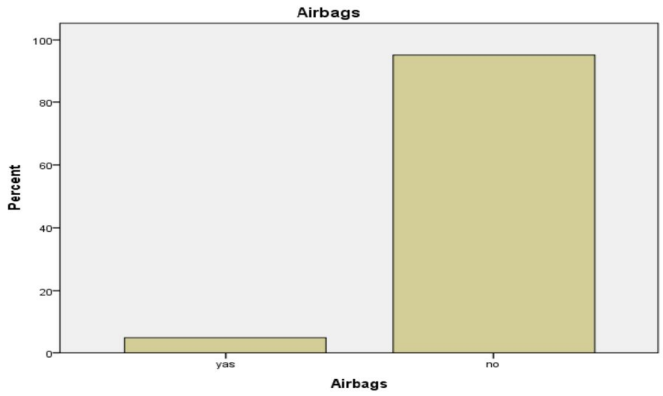
Child seats

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	2	2.0	2.0	2.0
	no	98	98.0	98.0	100.0
	Total	100	100.0	100.0	



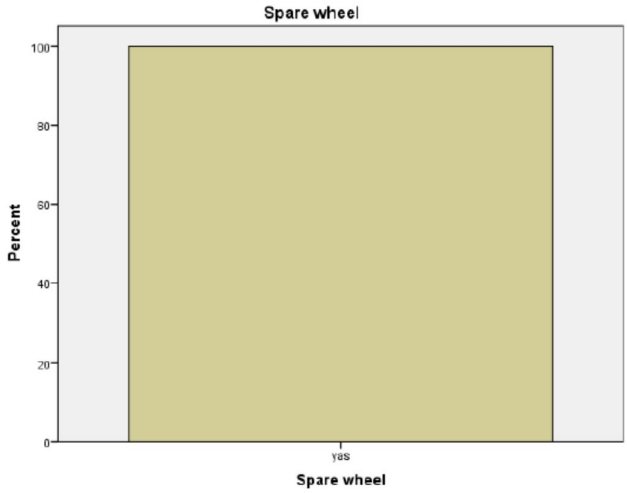
Airbags

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	5	5.0	5.0	5.0
	no	95	95.0	95.0	100.0
	Total	100	100.0	100.0	



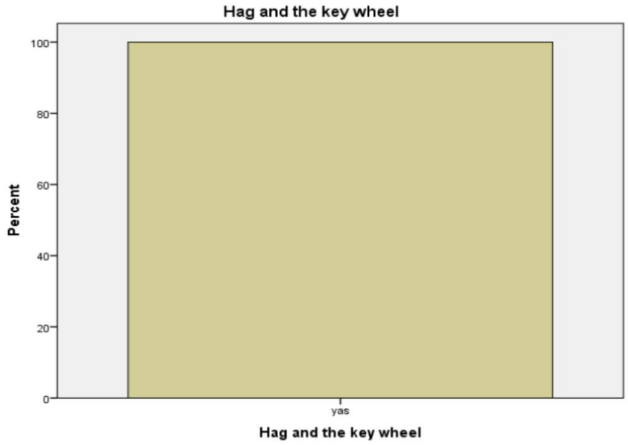
Spare wheel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	100	100.0	100.0	100.0



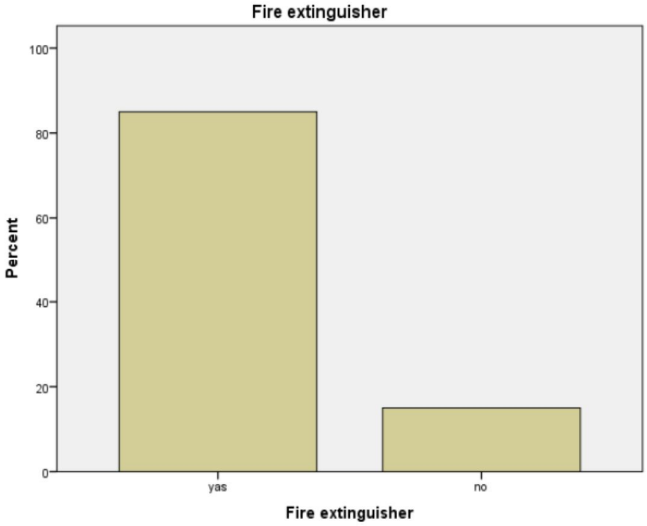
Hag and the key wheel

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	100	100.0	100.0	100.0



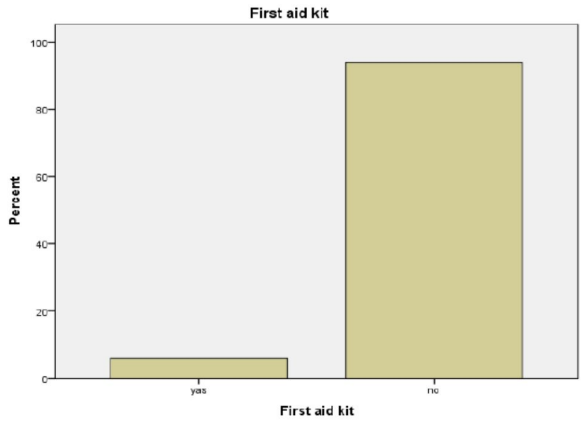
Fire extinguisher

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	85	85.0	85.0	85.0
	no	15	15.0	15.0	100.0
	Total	100	100.0	100.0	



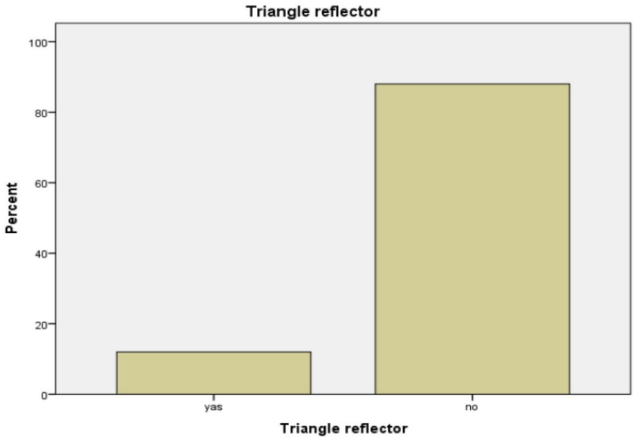
First aid kit

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	6	6.0	6.0	6.0
	no	94	94.0	94.0	100.0
	Total	100	100.0	100.0	



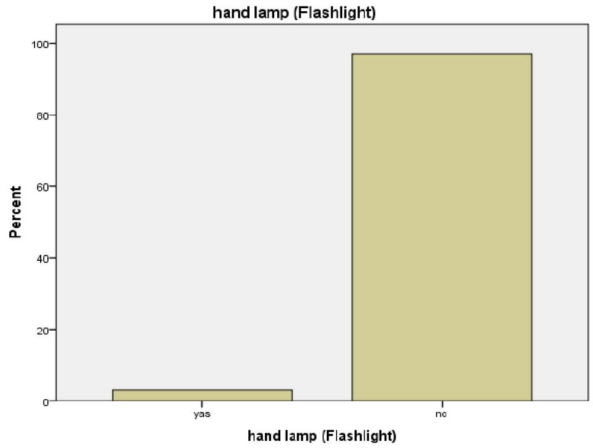
Triangle reflector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	12	12.0	12.0	12.0
	no	88	88.0	88.0	100.0
	Total	100	100.0	100.0	



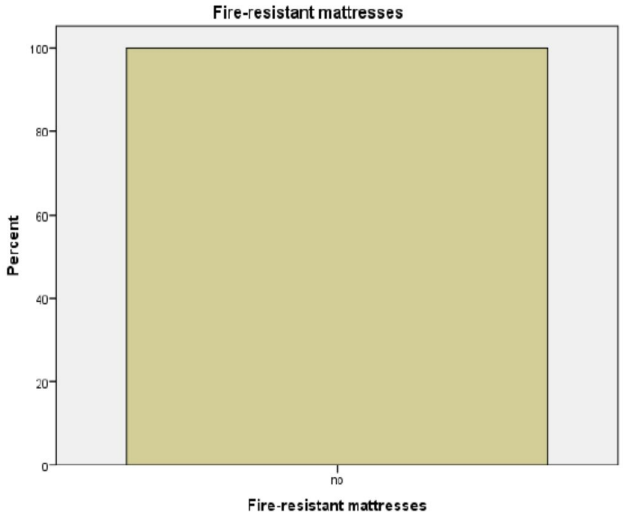
hand lamp (Flashlight)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	3	3.0	3.0	3.0
	no	97	97.0	97.0	100.0
	Total	100	100.0	100.0	



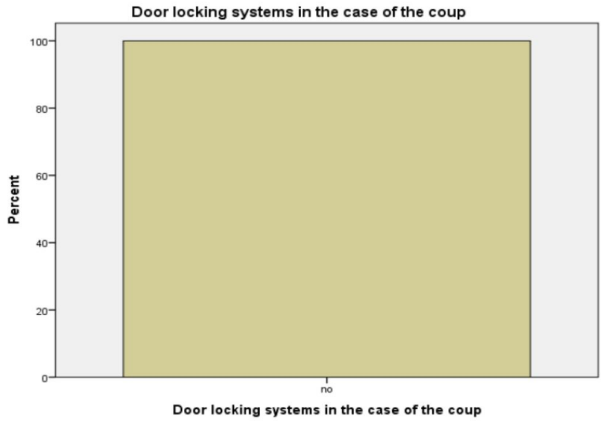
Fire-resistant mattresses

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0



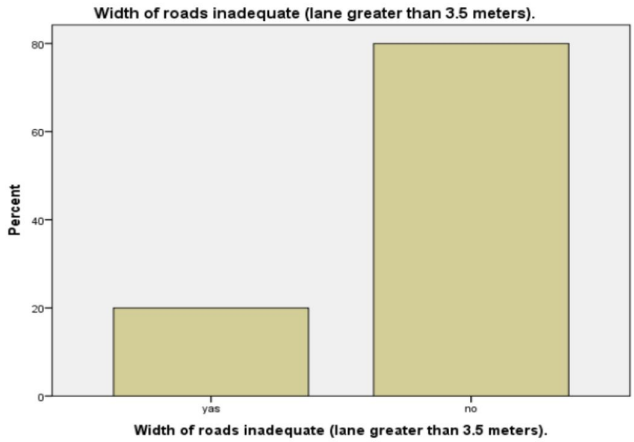
Door locking systems in the case of the coup

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0



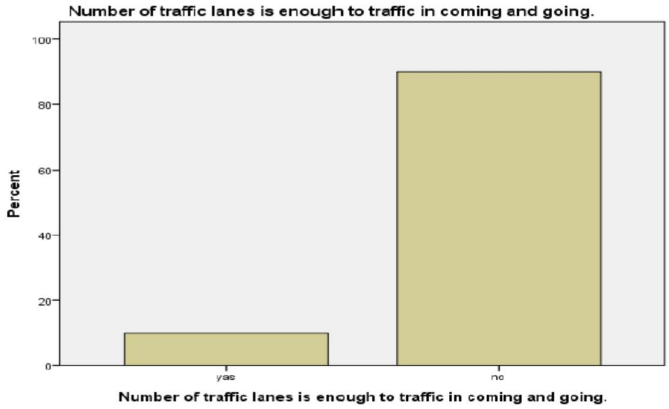
Width of roads inadequate (lane greater than 3.5 meters).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	20	20.0	20.0	20.0
	no	80	80.0	80.0	100.0
	Total	100	100.0	100.0	



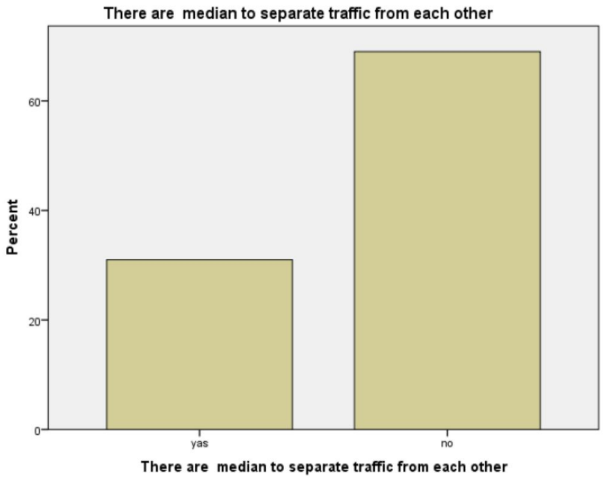
Number of traffic lanes is enough to traffic in coming and going.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	10	10.0	10.0	10.0
	no	90	90.0	90.0	100.0
	Total	100	100.0	100.0	



There are median to separate traffic from each other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	31	31.0	31.0	31.0
	no	69	69.0	69.0	100.0
	Total	100	100.0	100.0	

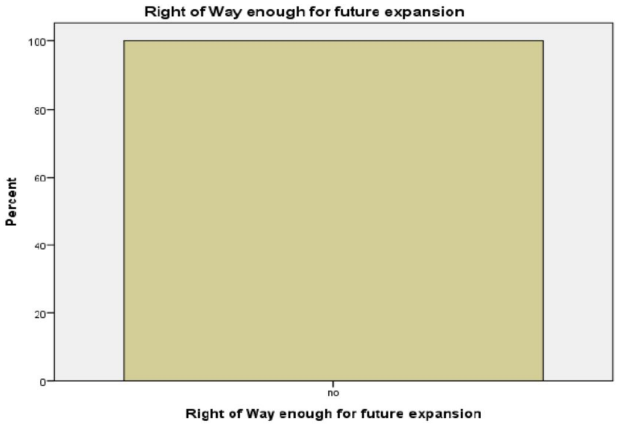


There are side protection bars in sharp curves

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	5	5.0	5.0	5.0
	no	95	95.0	95.0	100.0
	Total	100	100.0	100.0	

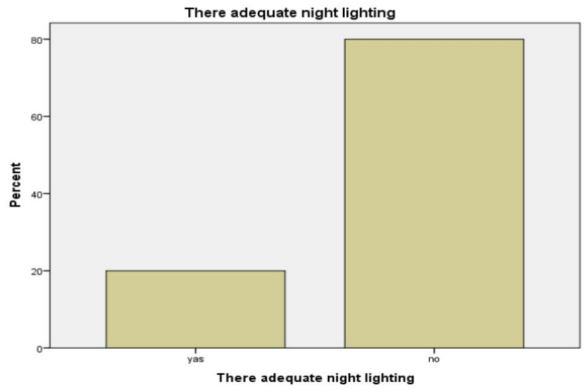
Right of Way enough for future expansion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0



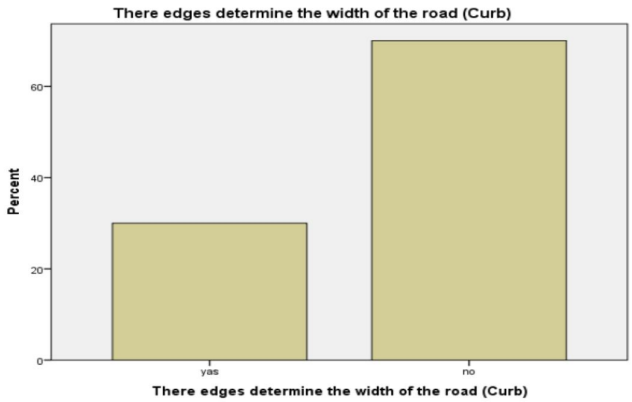
There adequate night lighting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	20	20.0	20.0	20.0
	no	80	80.0	80.0	100.0
	Total	100	100.0	100.0	



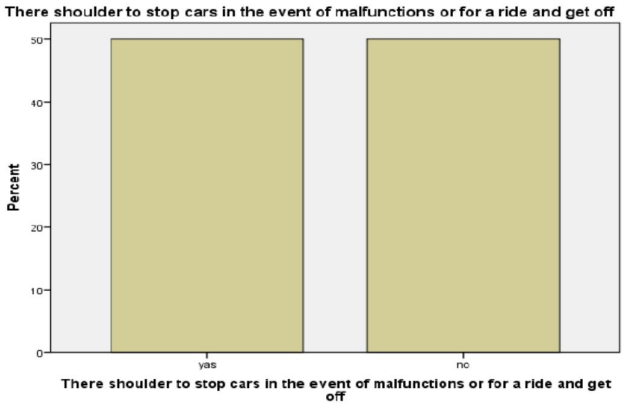
There edges determine the width of the road (Curb)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	30	30.0	30.0	30.0
	no	70	70.0	70.0	100.0
	Total	100	100.0	100.0	



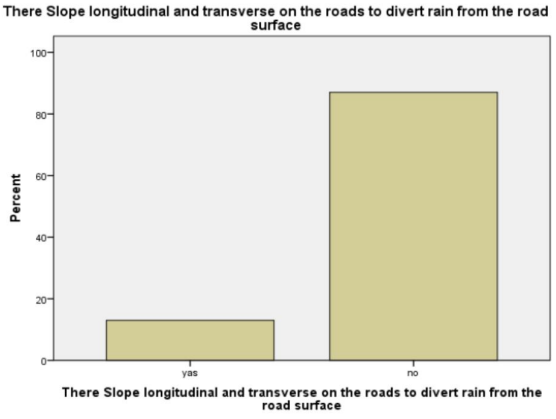
There shoulder to stop cars in the event of malfunctions or for a ride and get off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	50	50.0	50.0	50.0
	no	50	50.0	50.0	100.0
	Total	100	100.0	100.0	



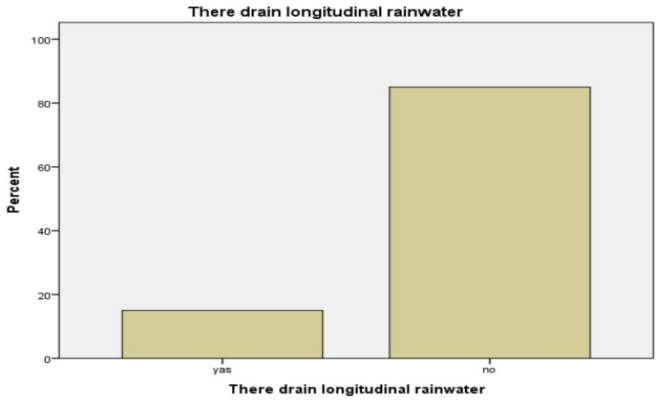
There Slope longitudinal and transverse on the roads to divert rain from the road surface

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	13	13.0	13.0	13.0
	no	87	87.0	87.0	100.0
	Total	100	100.0	100.0	



There drain longitudinal rainwater

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	15	15.0	15.0	15.0
	no	85	85.0	85.0	100.0
	Total	100	100.0	100.0	

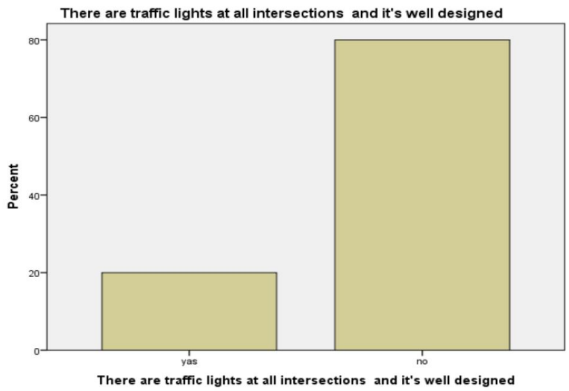


Traffic signs are available in all the streets

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	43	43.0	43.0	43.0
	no	57	57.0	57.0	100.0
	Total	100	100.0	100.0	

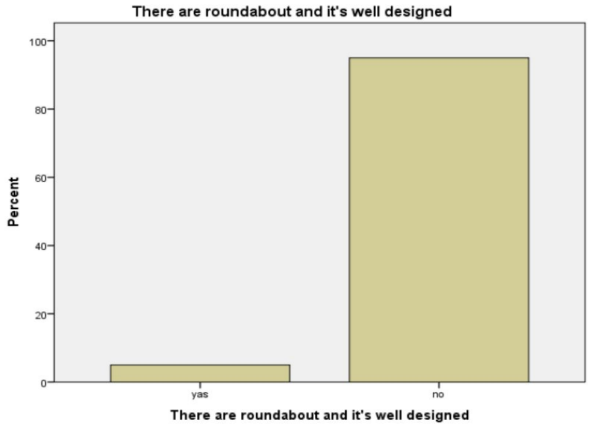
There are traffic lights at all intersections and it's well designed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	20	20.0	20.0	20.0
	no	80	80.0	80.0	100.0
	Total	100	100.0	100.0	



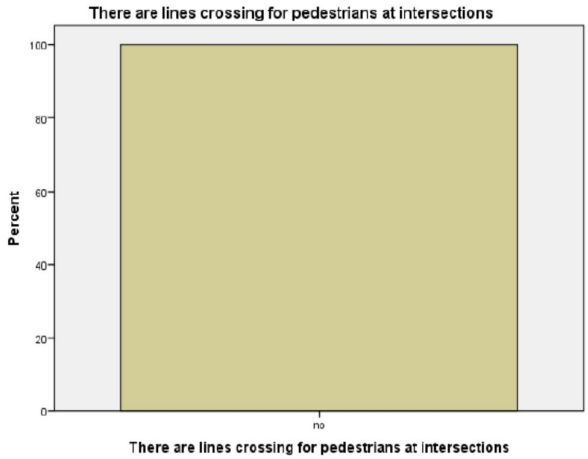
There are roundabout and it's well designed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	5	5.0	5.0	5.0
	no	95	95.0	95.0	100.0
	Total	100	100.0	100.0	



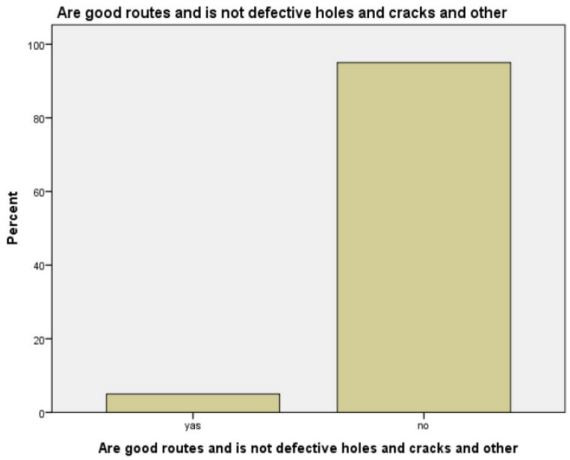
There are lines crossing for pedestrians at intersections

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	no	100	100.0	100.0	100.0



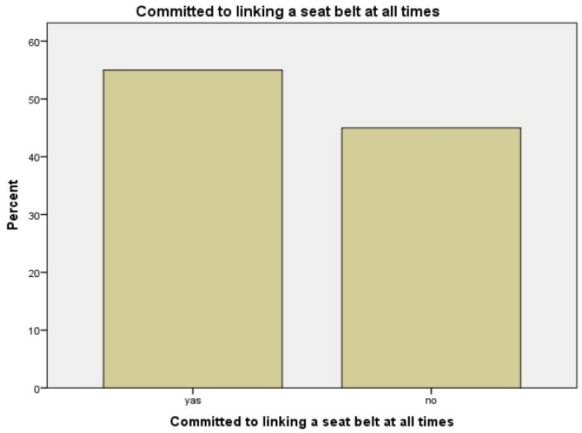
Are good routes and is not defective holes and cracks and other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	5	5.0	5.0	5.0
	no	95	95.0	95.0	100.0
	Total	100	100.0	100.0	



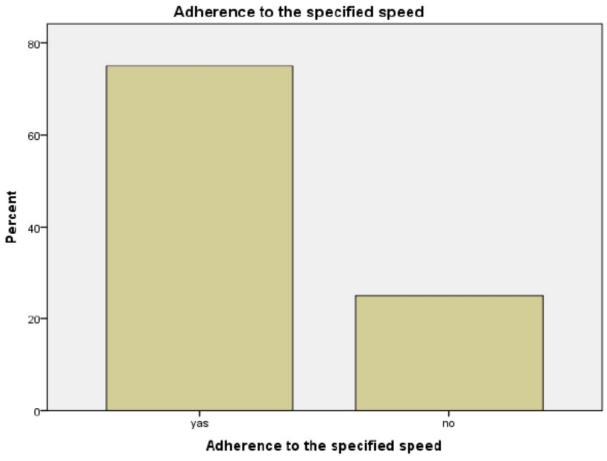
Committed to linking a seat belt at all times

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	55	55.0	55.0	55.0
	no	45	45.0	45.0	100.0
	Total	100	100.0	100.0	



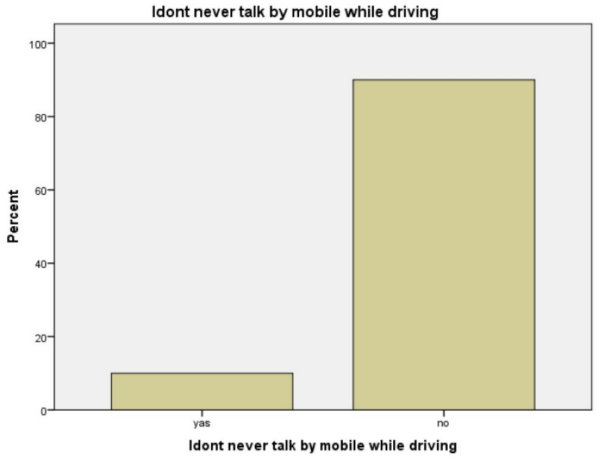
Adherence to the specified speed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	75	75.0	75.0	75.0
	no	25	25.0	25.0	100.0
	Total	100	100.0	100.0	



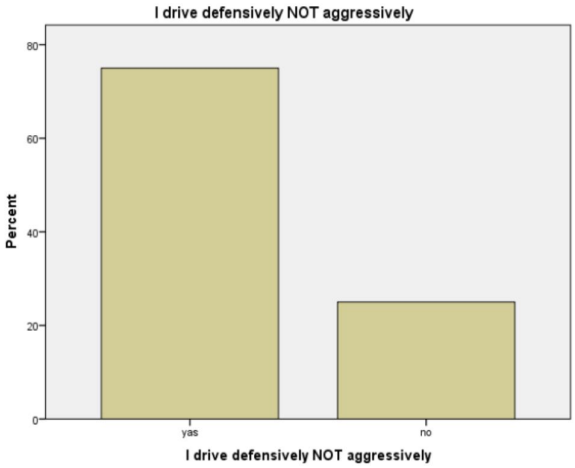
Idont never talk by mobile while driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	10	10.0	10.0	10.0
	no	90	90.0	90.0	100.0
	Total	100	100.0	100.0	



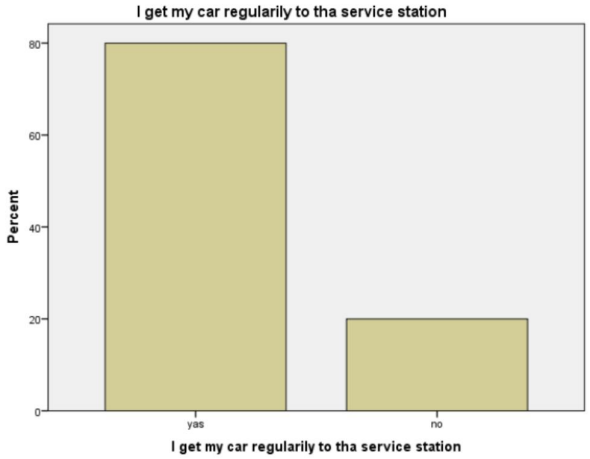
I drive defensively NOT aggressively

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	75	75.0	75.0	75.0
	no	25	25.0	25.0	100.0
	Total	100	100.0	100.0	



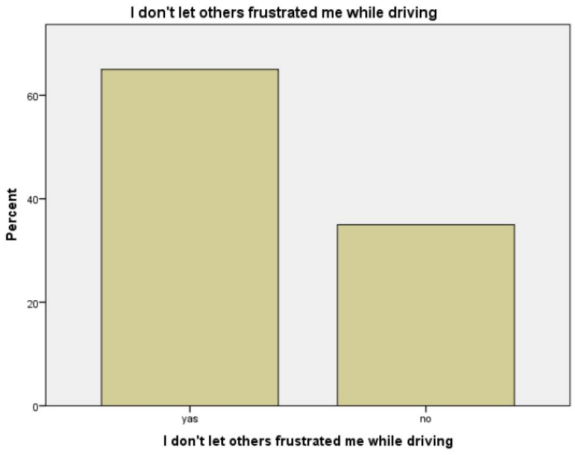
I get my car regularily to tha service station

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	80	80.0	80.0	80.0
	no	20	20.0	20.0	100.0
	Total	100	100.0	100.0	



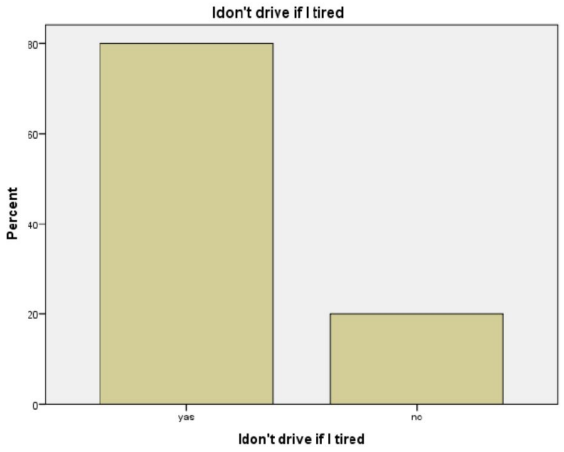
I don't let others frustrated me while driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	65	65.0	65.0	65.0
	no	35	35.0	35.0	100.0
	Total	100	100.0	100.0	



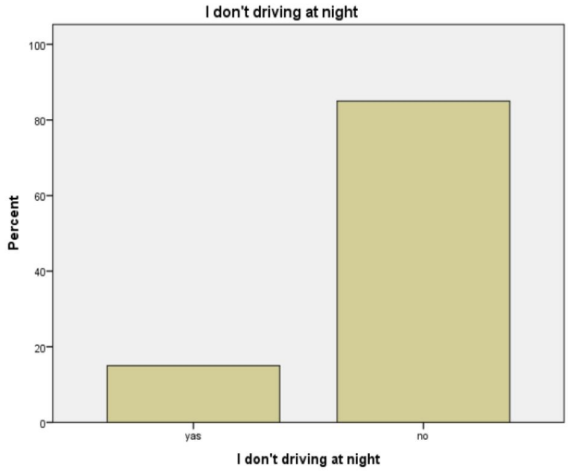
Idon't drive if I tired

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	80	80.0	80.0	80.0
	no	20	20.0	20.0	100.0
	Total	100	100.0	100.0	



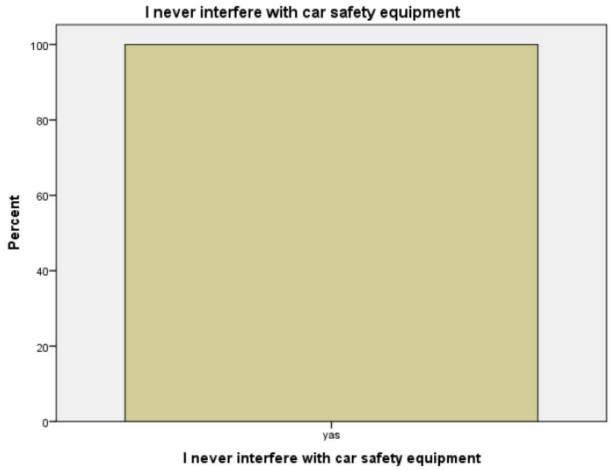
I don't driving at night

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	15	15.0	15.0	15.0
	no	85	85.0	85.0	100.0
	Total	100	100.0	100.0	



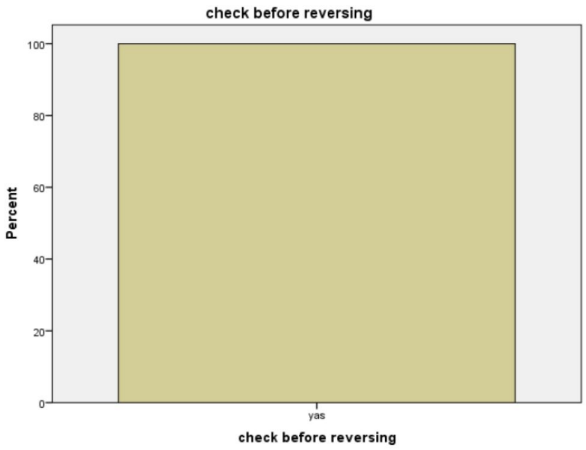
I never interfere with car safety equipment

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yas	100	100.0	100.0	100.0



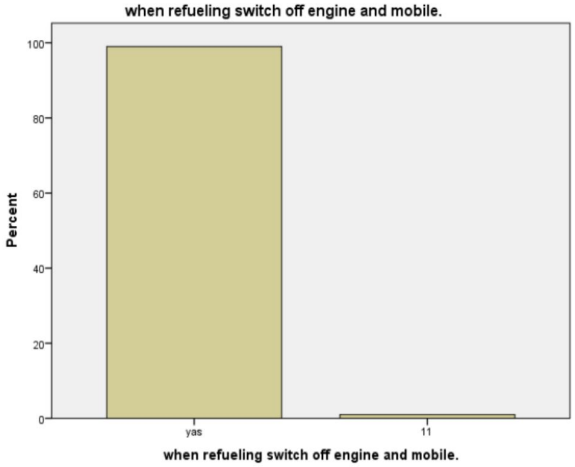
check before reversing

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yas	100	100.0	100.0	100.0



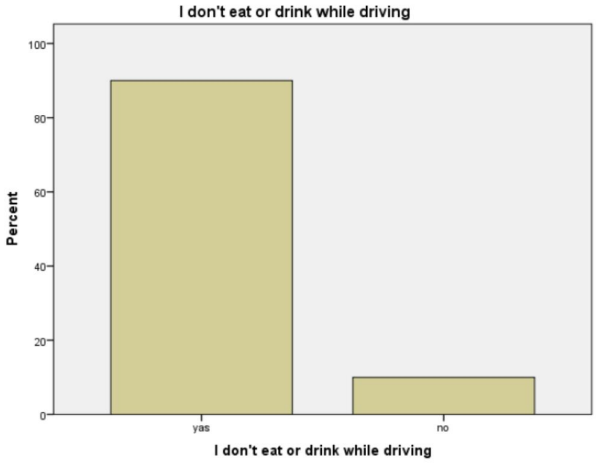
when refueling switch off engine and mobile.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	99	99.0	99.0	99.0
	11	1	1.0	1.0	100.0
	Total	100	100.0	100.0	



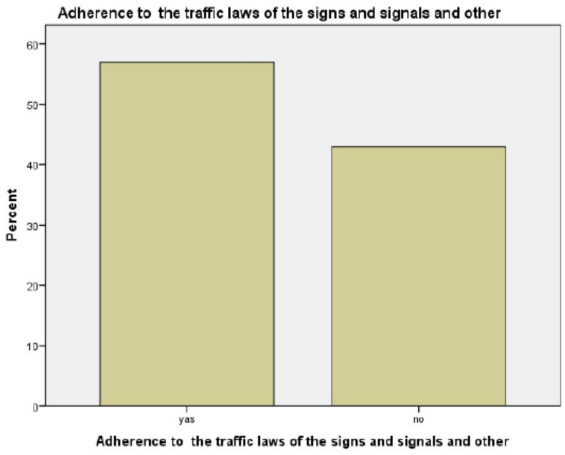
I don't eat or drink while driving

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	90	90.0	90.0	90.0
	no	10	10.0	10.0	100.0
	Total	100	100.0	100.0	



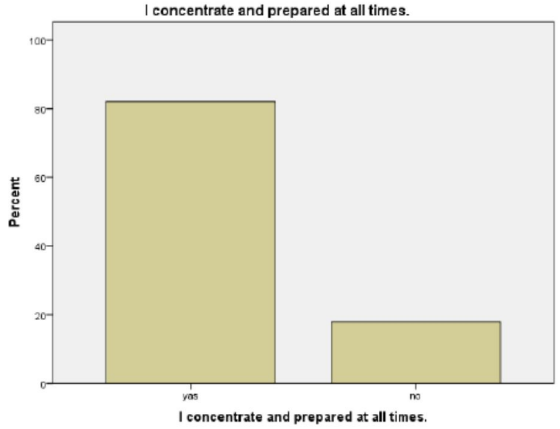
Adherence to the traffic laws of the signs and signals and other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	57	57.0	57.0	57.0
	no	43	43.0	43.0	100.0
	Total	100	100.0	100.0	



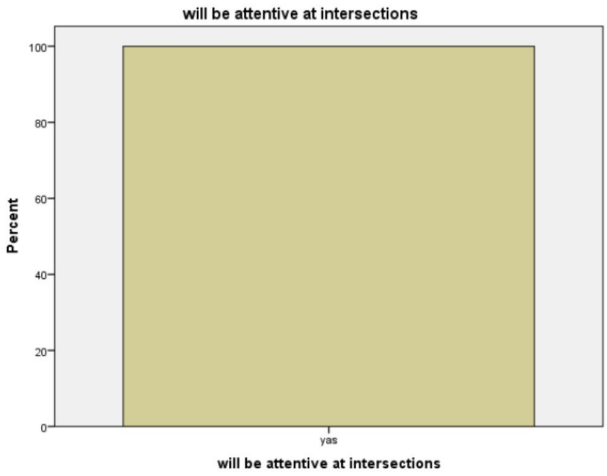
I concentrate and prepared at all times.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	82	82.0	82.0	82.0
	no	18	18.0	18.0	100.0
	Total	100	100.0	100.0	



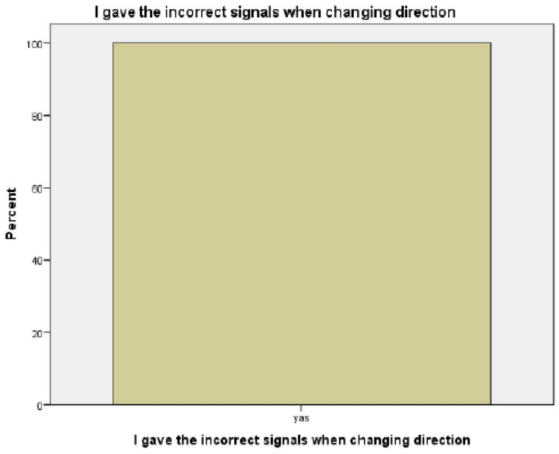
will be attentive at intersections

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yas	100	100.0	100.0	100.0



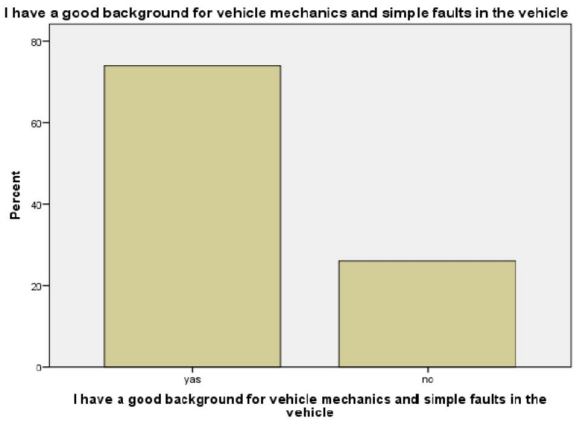
I gave the incorrect signals when changing direction

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yas	100	100.0	100.0	100.0



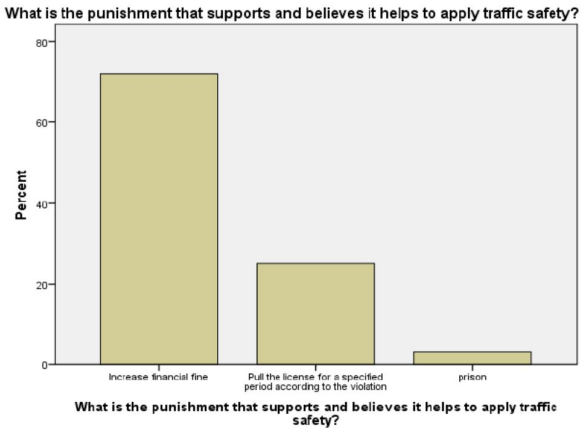
I have a good background for vehicle mechanics and simple faults in the vehicle

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	74	74.0	74.0	74.0
	no	26	26.0	26.0	100.0
	Total	100	100.0	100.0	



What is the punishment that supports and believes it helps to apply traffic safety?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Increase financial fine	72	72.0	72.0	72.0
	Pull the license for a specified period according to the violation	25	25.0	25.0	97.0
	prison	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

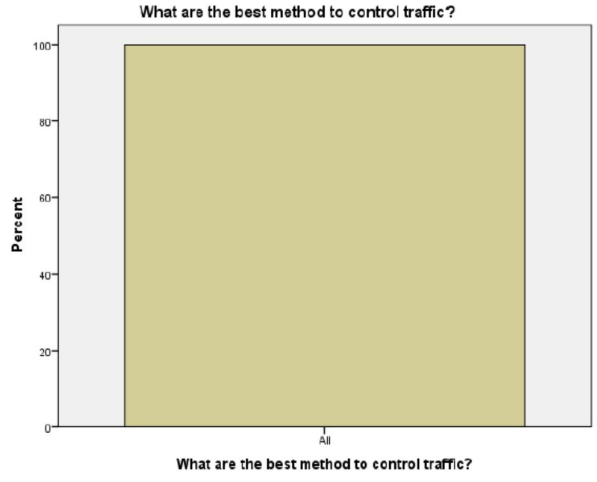


who is responsible for the application of traffic safety?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	All	100	100.0	100.0	100.0

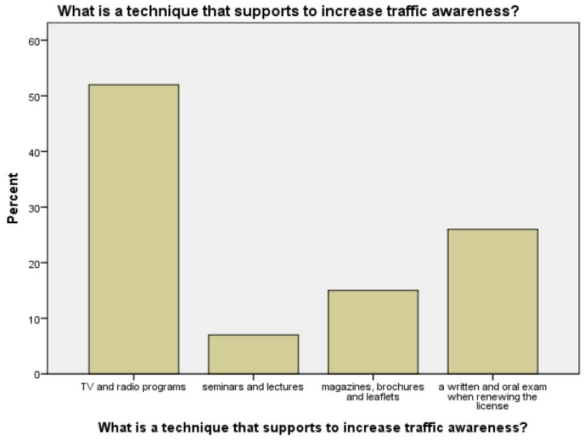
What are the best method to control traffic?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	All	100	100.0	100.0	100.0



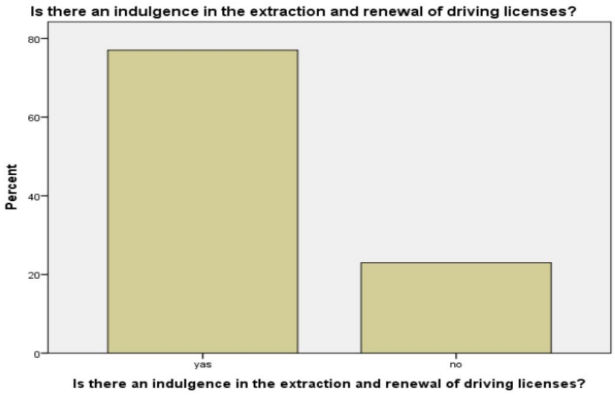
What is a technique that supports to increase traffic awareness?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	TV and radio programs	52	52.0	52.0	52.0
	seminars and lectures	7	7.0	7.0	59.0
	magazines, brochures and leaflets	15	15.0	15.0	74.0
	a written and oral exam when renewing the license	26	26.0	26.0	100.0
	Total	100	100.0	100.0	



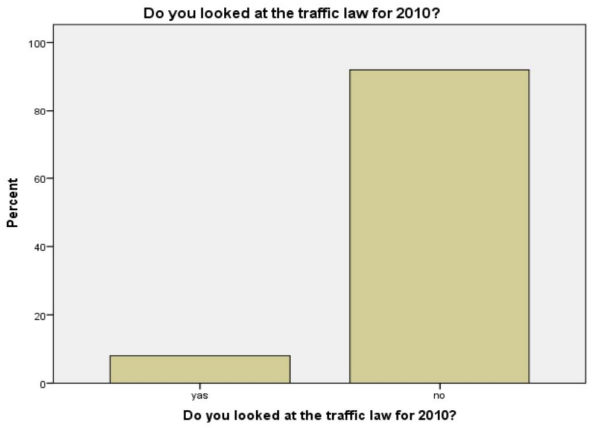
Is there an indulgence in the extraction and renewal of driving licenses?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	77	77.0	77.0	77.0
	no	23	23.0	23.0	100.0
	Total	100	100.0	100.0	



Do you looked at the traffic law for 2010?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	8	8.0	8.0	8.0
	no	92	92.0	92.0	100.0
	Total	100	100.0	100.0	



Do you agree that the retirement age for the age pension is the withdrawal of driving license

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	yas	98	98.0	98.0	98.0
	no	2	2.0	2.0	100.0
	Total	100	100.0	100.0	

Are you interested in traffic safety on the roads:

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid yas	100	100.0	100.0	100.0

		sex	age	Marital Status	Educational level	Do you own a car?	Do you have availed driver's license?	Have you ever been exposed to a traffic accident?	Driving too fast	Driving under the influence of alcohol and drugs	Driving with fatigue or drowsiness or disease	Driving during the rain and strong winds	Driving dangerously
N	Valid	100	100	100	100	100	100	100	100	100	100	100	100
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		1.09	2.97	1.43	4.03	1.36	1.07	1.58	1.11	1.00	1.00	1.10	1.00
Median		1.00	3.00	1.00	4.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00
Mode		1	3	1	4	1	1	2	1	1	1	1	1
Std. Deviation		.288	.822	.498	.521	.482	.256	.496	.314	.000	.000	.302	.000
Variance		.083	.676	.248	.272	.233	.066	.246	.099	.000	.000	.091	.000
Skewness		2.909	.835	.287	.042	.592	3.422	-.329	2.531			2.707	
Std. Error of Skewness		.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
Range		1	3	1	2	1	1	1	1	0	0	1	0
Minimum		1	2	1	3	1	1	1	1	1	1	1	1
Maximum		2	5	2	5	2	2	2	2	1	1	2	1
Sum		109	297	143	403	136	107	158	111	100	100	110	100

Using hand phone while driving	Eating and drinking while driving	Using headphones or higher recorded voise	Lack of respect for traffic signals and traffic rules	Wrong overtaking	Narrow streets	Defects on the streets (for example, cracks and holes .... etc.)	Maintenance work on the street	There is no adequate lighting for night	There is no traffic signs at the intersections	There is no pedestrian crossing lines
100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0
1.36	1.59	1.18	1.05	1.12	1.25	1.55	1.37	1.81	1.20	1.40
1.00	1.00	1.00	1.00	1.00	1.00	1.50	1.00	2.00	1.00	1.00
1	1	1	1	1	1	1	1	2	1	1
.628	.668	.386	.219	.327	.435	.592	.544	.748	.402	.667
.394	.446	.149	.048	.107	.189	.351	.296	.559	.162	.444
1.547	.700	1.691	4.193	2.375	1.172	.546	1.113	.327	1.523	1.419
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
2	2	1	1	1	1	2	2	2	1	2
1	1	1	1	1	1	1	1	1	1	1
3	3	2	2	2	2	3	3	3	2	3
136	159	118	105	112	125	155	137	181	120	140

The lack of traffic culture of road users (drivers and pedestrians)	Log In some animals for the Right of Way	Seat belt	Brakes and the handbrake works well.	Tires (you take into account the size, type and year of production).	Lamps (in terms of clarity, color and lighting level).	Signals (right, left, huzer, long, short)	Mirrors (right, left, center)	Rain cleaners	Interior door locks	Internal indicators (for fuel, heat, oil, speedometer, etc. ....)	Head restraints
100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0
1.25	1.60	1.00	1.00	1.25	1.22	1.05	1.00	1.14	1.03	1.12	1.93
1.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00
1	2	1	1	1	1	1	1	1	1	1	2
.435	.492	.000	.000	.435	.416	.219	.000	.349	.171	.327	.256
.189	.242	.000	.000	.189	.173	.048	.000	.122	.029	.107	.066
1.172	-.414			1.172	1.373	4.193		2.107	5.595	2.375	-3.422
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
1	1	0	0	1	1	1	0	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1
2	2	1	1	2	2	2	1	2	2	2	2
125	160	100	100	125	122	105	100	114	103	112	193

Child seats	Airbags	Spare wheel	Hag and the key wheel	Fire extinguisher	First aid kit	Triangle reflector	hand lamp (Flashlight)	Fire-resistant mattresses	Door locking systems in the case of the coup	Width of roads inadequate (lane greater than 3.5 meters).	Number of traffic lanes is enough to traffic in coming and going.
100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0
1.98	1.95	1.00	1.00	1.15	1.94	1.88	1.97	2.00	2.00	1.80	1.90
2.00	2.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
2	2	1	1	1	2	2	2	2	2	2	2
.141	.219	.000	.000	.359	.239	.327	.171	.000	.000	.402	.302
.020	.048	.000	.000	.129	.057	.107	.029	.000	.000	.162	.091
-6.962	-4.193			1.990	-3.762	-2.375	-5.595			-1.523	-2.707
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
1	1	0	0	1	1	1	1	0	0	1	1
1	1	1	1	1	1	1	1	2	2	1	1
2	2	1	1	2	2	2	2	2	2	2	2
198	195	100	100	115	194	188	197	200	200	180	190

There are median to separate traffic from each other	There are side protection bars in sharp curves	Right of Way enough for future expansion	There adequate night lighting	There edges determine the width of the road (Curb)	There shoulder to stop cars in the event of malfunctions or for a ride and get off	There Slope longitudinal and transverse on the roads to divert rain from the road surface	There drain longitudinal rainwater	Traffic signs are available in all the streets	There are traffic lights at all intersections and it's well designed	There are roundabout and it's well designed
100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0
1.69	1.95	2.00	1.80	1.70	1.50	1.87	1.85	1.57	1.80	1.95
2.00	2.00	2.00	2.00	2.00	1.50	2.00	2.00	2.00	2.00	2.00
2	2	2	2	2	1[a]	2	2	2	2	2
.465	.219	.000	.402	.461	.503	.338	.359	.498	.402	.219
.216	.048	.000	.162	.212	.253	.114	.129	.248	.162	.048
-.834	-4.193		-1.523	-.886	.000	-2.234	-1.990	-.287	-1.523	-4.193
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
1	1	0	1	1	1	1	1	1	1	1
1	1	2	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2
169	195	200	180	170	150	187	185	157	180	195

There are lines crossing for pedestrians at intersections	Are good routes and is not defective holes and cracks and other	Committed to linking a seat belt at all times	Adherence to the specified speed	Idont never talk by mobile while driving	I drive defensively NOT aggressively	I get my car regularily to tha service station	I don't let others frustrated me while driving	Idon't drive if I tired	I don't driving at night	I never interfere with car safety equipment	check before reversing
100	100	100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0	0	0
2.00	1.95	1.45	1.25	1.90	1.25	1.20	1.35	1.20	1.85	1.00	1.00
2.00	2.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00
2	2	1	1	2	1	1	1	1	2	1	1
.000	.219	.500	.435	.302	.435	.402	.479	.402	.359	.000	.000
.000	.048	.250	.189	.091	.189	.162	.230	.162	.129	.000	.000
	-4.193	.204	1.172	-2.707	1.172	1.523	.639	1.523	-1.990		
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
0	1	1	1	1	1	1	1	1	1	0	0
2	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	1	1
200	195	145	125	190	125	120	135	120	185	100	100

when refueling switch off engine and mobile.	I don't eat or drink while driving	Adherence to the traffic laws of the signs and signals and other	I concentrate and prepared at all times.	will be attentive at intersections	I gave the incorrect signals when changing direction	I have a good background for vehicle mechanics and simple faults in the vehicle	What is the punishment that supports and believes it helps to apply traffic safety?	who is responsible for the application of traffic safety?	What are the best method to control traffic?
100	100	100	100	100	100	100	100	100	100
0	0	0	0	0	0	0	0	0	0
1.10	1.10	1.43	1.18	1.00	1.00	1.26	1.31	4.00	4.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	4.00	4.00
1	1	1	1	1	1	1	1	4	4
1.000	.302	.498	.386	.000	.000	.441	.526	.000	.000
1.000	.091	.248	.149	.000	.000	.194	.277	.000	.000
10.000	2.707	.287	1.691			1.111	1.455		
.241	.241	.241	.241	.241	.241	.241	.241	.241	.241
10	1	1	1	0	0	1	2	0	0
1	1	1	1	1	1	1	1	4	4
11	2	2	2	1	1	2	3	4	4
110	110	143	118	100	100	126	131	400	400

What is a technique that supports to increase traffic awareness?	Is there an indulgence in the extraction and renewal of driving licenses?	Do you looked at the traffic law for 2010?	Do you agree that the retirement age for the age pension is the withdrawal of driving license	Are you interested in traffic safety on the roads:
100	100	100	100	100
0	0	0	0	0
2.15	1.23	1.92	1.02	1.00
1.00	1.00	2.00	1.00	1.00
1	1	2	1	1
1.306	.423	.273	.141	.000
1.705	.179	.074	.020	.000
.439	1.303	-3.144	6.962	
.241	.241	.241	.241	.241
3	1	1	1	0
1	1	1	1	1
4	2	2	2	1
215	123	192	102	100

Appendix B: National Strategy for Traffic Safety in Khartoum State

بسم الله الرحمن الرحيم

الإستراتيجية القومية المقترحة لتحسين مستوى السلامة المرورية (2017-2021)

الهدف الإستراتيجي

إن الهدف الرئيسي من الإستراتيجية القومية هو خفض عدد الوفيات والإصابات الناتجة عن الحوادث المرورية في السودان بصورة عامة و ولاية الخرطوم بشكل خاص بنسبة 50% عن ما هو عليه الآن وذلك بحلول عام 2021 م, ويجب أن يتم اتخاذ الإجراءات اللازمة من وضع خطط و برامج ، وآليات لنصل بها في النهاية إلى الهدف المحدد أو أفضل منه, على أن يتم في كل عام مقارنة عدد الوفيات والإصابات بسبب الحوادث المرورية ، لمعرفة مقدار التحسن الذي يطرأ على مستوى السلامة المرورية.

و تعتمد الإستراتيجية القومية المقترحة على خطتين:

الأولي/ خطة قصيرة المدي مكونة من أربعة مراحل هي:

1. التوعية والإرشاد.
2. الضبط المروري.
3. التحديد المكاني لمواقع الحوادث المرورية.
4. الإسعافات والتجهيزات الصحية.

والثانية/ خطة طويلة المدي تتكون من مرحلتين هما:

1. تطوير نظام النقل العام.
2. تطوير وتحديث شبكة الطرق

أولاً/ الخطة قصيرة المدي

وتحتوي هذه الخطة على نقاط مهمة وعاجلة ، تعمل على تحسين مستوى السلامة المرورية في ولاية الخرطوم والسودان بصورة عامة و تبدأ مع بداية سريان الخطة الإستراتيجية مباشرة و بشكل مكثف وتستمر طيلة فترة زمن الخطة الإستراتيجية (الخمس سنوات) وتشتمل هذه الخطة علي أربعة مراحل هي:

المرحلة الأولي/ التوعية	الجهة	2017	2018	2019	2020	2021
النشاط 1: التوسع في إدخال برامج السلامة المرورية في مناهج التعليم الإبتدائي والثانوي ، مع التركيز على مناهج الأطفال في دور الحضانة وفي المرحلة الابتدائية مما يكون له من مردود إيجابي في تأصيل مبادئ السلامة المرورية في نفوس النشء.	الإدارة العامة للمرور+ وزارة التربية والتعليم					
النشاط 2: إشراك الجهات المعنية بالسلامة المرورية في إعداد برامج توعوية لمستخدمي الطرق ،وتقديمها على مدار العام بوسائل الإعلام المقروءة والمسموعة والمرئية.	الإدارة العامة للمرور+ وزارة الإعلام					
النشاط 3: نشر مسابقات شعرية في الصحف والإذاعة والتلفاز بين القراء والمستمعين والمشاهدين عن السلامة المرورية. وأن يرصد لها جوائز قيمة تجذب المواطنين للتثقيف المروري والإطلاع على ما يكتب عن السلامة المرورية	الإدارة العامة للمرور+ وزارة الإعلام					
النشاط 4: مساهمة الجمعيات الأهلية والنوادي الرياضية في رفع مستوى الوعي المروري لدى منسوبي هذه الجهات عن طريق عقد الندوات والمؤتمرات واللقاءات التي تعرض كل جديد في مجال السلامة المرورية. وذلك في حضور الشخصيات التي يعرفها الجماهير مثل كتاب الصحف والفنانين ، وأبطال الرياضة وغيرهم.	الإدارة العامة للمرور+ وزارة الثقافة					
النشاط 5: حث الكتاب المعروفين على كتابة المقالات والقصص القصيرة التي تهدف إلى زيادة الوعي المروري لدى قراءهم.	وزارة الثقافة					
النشاط 6: إستحداث دورات إلزامية تأهيلية للسائقين الذين تتكرر منهم الحوادث المرورية.	الإدارة العامة للمرور					

المرحلة الثانية/ الضبط المروري	الجهة	2017	2018	2019	2020	2021
النشاط 1: الأخذ بأدوات الضبط المروري الحديثة مثل نظام النقاط السوداء ، والتي تمثل نوعاً من الردع الإضافي، حيث يكون التركيز فيه على السائق بذاته وسلوكياته.	الإدارة العامة للمرور					
النشاط 2: تعميم استخدام تقنيات المراقبة المرورية الحديثة مثل الرادارات والكاميرات على الطرق التي تكثر عليها الحوادث المرورية الخطيرة.	الإدارة العامة للمرور					
النشاط 3: تعديل الغرامات المالية المتعلقة بمخالفات السرعة القصوى على الطرق بحيث تتدرج وتزيد بمقدار التجاوز عن السرعة المحددة.	الإدارة العامة للمرور+ المجلس الوطني					
النشاط 4: تفعيل المواد القانونية الخاصة بالمخالفين لقواعد وأنظمة المرور وتطبيق هذه القوانين على الجميع بدون إستثناء.	الإدارة العامة للمرور					
النشاط 5: تكثيف الدوريات المرورية على الطرق السريعة.وتزويدها بالسيارات الحديثة وإدخال المراقبة الجوية لهذه الطرق بصورة مستمرة.	الإدارة العامة للمرور					
النشاط 6: التشديد على استخدام معدات السلامة المجهزة في المركبات (أحزمة الأمان ، طفاية الحريق، مقاعد خاصة بالأطفال ، .....الخ)	الإدارة العامة للمرور					

المرحلة الثالثة/ التحديد المكاني لمواقع الحوادث المرورية	الجهة	2017	2018	2019	2020	2021
النشاط 1: المتابعة اليومية لرصد الحوادث المرورية الخطيرة باستخدام خرائط النقاط (Accident Spot Maps) التي توضح مواقع الحوادث وشدتها ، والتي يمكن من خلالها تمييز المواقع التي تتكرر فيها الحوادث المرورية ونوع الإصابات باستخدام اللاصق الملون.	الإدارة العامة للمرور					
النشاط 2: الاستفادة من نظم المعمومات الجغرافية (GIS) في تحليل الحوادث المرورية وعلاقتيا المكانية.	الإدارة العامة للمرور					

المرحلة الرابعة/ الإسعافات والتجهيزات الصحية	الجهة	2017	2018	2019	2020	2021
النشاط 1: زيادة مراكز الإسعاف على الطرق السريعة بين المدن وتزويدها بالسيارات الحديثة المجهزة بمستلزمات الإسعافات الحديثة الخاصة بحوادث المرور.	وزارة الصحة					
النشاط 2: رفع كفاءة المسعفين في التعامل مع حالات المصابين في الحوادث المرورية في الوطن العربي ، خاصة الإصابات البليغة ، وزيادة أعداد كوادر المسعفين المدربين على أحدث الطرق والوسائل التي تعمل على إنقاذ المصابين في الحوادث المرورية وتقديم المساعدة المناسبة في مكان الحادث.	وزارة الصحة					
النشاط 3: تجهيز المستشفيات بكل جديد وحديث لإسعاف المتضررين من الحوادث المرورية.	وزارة الصحة					
النشاط 4: تزويد المستشفيات بالأطباء المتخصصين في مباشرة إصابات الحوادث المرورية.	وزارة الصحة					

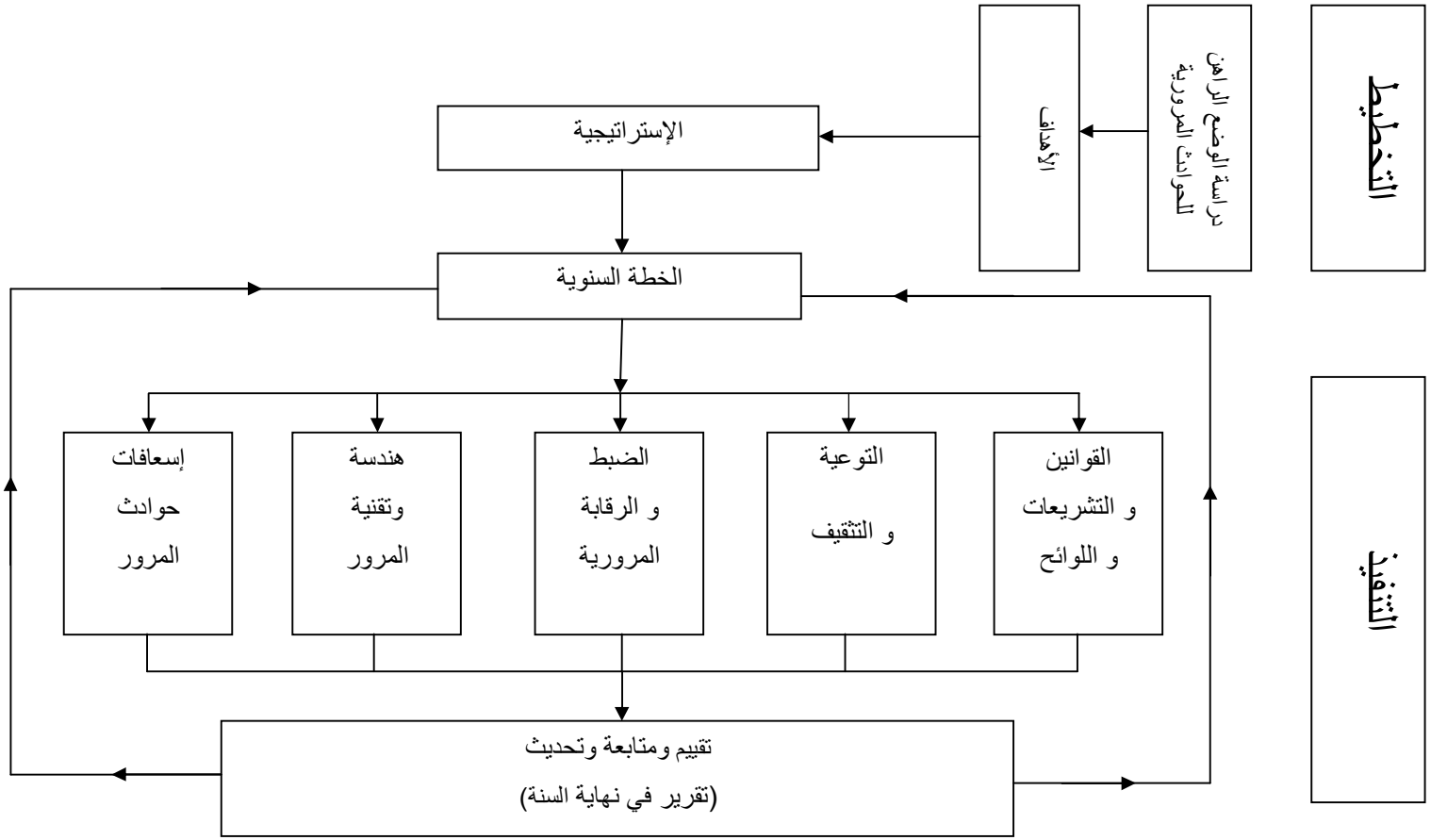
ثانياً/ الخطة بعيدة المدي

تضم هذه الخطة مرحلتين هما تطوير النقل العام وتطوير شبكة الطرق, وكلا المرحلتين تعملان على تحسين مستوى السلامة المرورية علي المدي الطويل ونسبة لأن هذه المراحل تحتاج لمبالغ مالية كبيرة فيجب أن تمرحل علي مدي الخمس سنوات وقد تحتاج لأكثر من هذه الفترة ويمكن تخصيص نظام النقل العام أو نسبة منه لصالح القطاع الخاص لكي تتحقق هذه المراحل في أقصر فترة ممكنة :

المرحلة الأولي/ تطوير النقل العام	الجهة	2017	2018	2019	2020	2021
النشاط 1: دعم النقل العام بالبصات ذات السعات الكبيرة خاصة داخل ولاية الخرطوم والمدن الكبيرة الأخري، وذلك لتقليل الاعتماد على النقل الخاص في أضيق الحدود	وزارة النقل والطرق والجسور					
النشاط 2: منع وسائل النقل العام القديمة من العمل على خطوط النقل الجماعي بين المدن.	الإدارة العامة للمرور					
النشاط 3: الاهتمام بالنقل المدرسي في جميع المراحل التعليمية ، وذلك للمحافظة على التلاميذ والبعد بهم عن التعرض لخطر الحوادث المرورية.	وزارة التربية والتعليم					
النشاط 4: إدخال شبكات النقل الحديثة في ولاية الخرطوم ، مثل مترو الأنفاق ، النقل النهري والسكك الحديدية.	وزارة النقل والطرق والجسور					
النشاط 5: إضافة شبكات حديثة للمواصلات بين المدن ، مثل القطارات الكهربائية السريعة وخطوط السكة الحديد الحديثة.	وزارة النقل والطرق والجسور					

المرحلة الثانية/ تطوير شبكة الطرق	الجهة	2017	2018	2019	2020	2021
النشاط 1: إعادة إنشاء الطرق التي تنخفض عليها مستويات السلامة المرورية بشكل كبير ويصعب تحسين مستوى هذه الشبكة في صورتها الحالية.	وزارة النقل والطرق والجسور					
النشاط 2: توسعة شبكة الطرق الحالية ، بإنشاء وصلات جديدة بأفضل المواصفات الفنية، لتسهيل الحركة المرورية وتخفيف الضغط على شبكة الطرق الحالية.	وزارة النقل والطرق والجسور					
النشاط 3: تحسين الطرق وصيانتها بصفة دورية وتزويدها بمستلزمات السلامة.	وزارة النقل والطرق والجسور					

مخطط مقترح لمراحل إستراتيجية السلامة المرورية في ولاية الخرطوم.



الإجراءات التنفيذية لتحقيق أهداف الخطة:

السياسة والتنظيم: (وزارة الداخلية – الإدارة العامة للمرور)

1.إنشاء هيئة متخصصة تكون مسئولة عن رسم السياسات ووضع خطط للسلامة المرورية في الأردن ومتابعة تنفيذها

التشريعات والرقابة المرورية: (وزارة الداخلية – الإدارة العامة للمرور)

1. تعديل التشريعات للوصول إلى المعايير العالمية الدولية.

2.وضع خطة سنوية للرقابة المرورية تأخذ بعين الاعتبار أهم المخالفات التي تسبب الحوادث وأوقات وأماكن وقوع هذه الحوادث اعتمادًا على تحليل دقيق للحوادث ونتائجها وخاصة:

- تجاوز السرعة المحددة.
- عدم إعطاء الأولوية للمشاة.
- السير في الاتجاه المعاكس .
- التركيز في الرقابة على فئة السواقين من (18 –25) عاماً
- زيادة الرقابة على إستخدام حزام الأمان.
- تركيز الرقابة على الصلاحية الفنية للمركبات خاصة الإطارات والأدوية.

3. استخدام وسائل وأجهزة الرقابة الآلية خاصة على مخالفات السرعة وتجاوز الإشارة الضوئية وإيجاز التشريع المناسب لها.

4. تشديد العقوبات على المخالفات التي تؤدي إلى وقوع الحوادث المرورية والتسبب في الوفيات.

الأبحاث وتحليل الحوادث المرورية: (وزارة الداخلية – الإدارة العامة للمرور + الجامعات السودانية)

1.تطوير أسلوب جمع المعلومات عن الحوادث المرورية.

2.إيجاد نظام لتحليل الحوادث المرورية وتحديد المواقع الخطرة.

3.تشجيع ودعم الأبحاث المتعلقة بالمرور من خلال الجامعات والمعاهد المختلفة.

تدريب وفحص السائقين : (وزارة الداخلية – الإدارة العامة للمرور)

1. تطوير أسلوب الفحص النظري والعملي.

2. التركيز أثناء الفحص على الراغبين في الحصول على رخص لقيادة الباصات وسيارات الشحن الكبيرة.

المواصفات وفحص المركبات: (وزارة الداخلية – الإدارة العامة للمرور + مؤسسة المواصفات والمقاييس)

1.تطبيق المواصفات القياسية على المركبات المستوردة.

2. الاهتمام والتركيز على سيارات الشحن الكبيرة والباصات العمومية خلال الفحص الدوري.

3.ضرورة استخدام التاكوغراف للرقابة على السرعة وعدد ساعات القيادة لسواقي الشاحنات والباصات.

الإجراءات الهندسية: (وزارة النقل والطرق والجسور + وزارة التخطيط العمراني+ ولاية الخرطوم وزارة البنية التحتية)

1. معالجة المواقع التي يزيد معدل وقوع الحوادث بها عن (5) حوادث سنوياً.
2. تنفيذ الحلول الفورية قليلة التكلفة للتقاطعات خاصة التقاطعات على شكل(+) ، وتأثيثها بالشواخص والضوابط المرورية اللازمة وتغيير شكل التقاطع إن أمكن.
3. توفير الظروف والمتطلبات على الطرق الخارجية لمنع حدوث الوفيات والإصابات البليغة جراء وقوع حوادث الصدم بالأجسام الثابتة مثل إعادة توزيع الأعمدة في منتصف وجوانب الطريق والاهتمام بإضاءة الطرق.
4. الاهتمام بموضوع سلامة المشاة وخاصة توفير الأرصفة، وممرات المشاة الآمنة ووسائل تخفيض السرعة والتهدئة المرورية وخاصة في المناطق السكنية والمأهولة.
5. الاهتمام بموضوع التنظيم والتخطيط العمراني واستعمالات الأراضي.

التوعية والتعليم المروري:(وزارة التربية والتعليم، وزارة الداخلية – الإدارة العامة للمرور ،وزارة الإعلام– الإذاعة والتلفزيون– الصحف, وزارة الثقافة)

1. التركيز على حملات التوعية على المواضيع التالية:
   - سلامة المشاة.
   - استخدام حزام الأمان.
   - سلامة الأطفال.
   - التعريف بالتشريعات المرورية.
2. إعداد برنامج توعية مرورية للأمهات خاصة وللأسرة للعناية بأطفالهم تحت سن عشر سنوات عن الحوادث المرورية بشكل عام وعن حوادث الدهس بشكل خاص.
3. توجيه برامج التوعية المرورية للسائقين وللفئة العمرية من (18–25) سنة
4. إعداد مناهج توعية مرورية لكل مرحلة من المراحل الدراسية وتدريب الطلاب على التعامل مع الطريق والمركبة.

الإسعافات والتجهيزات الصحية: (وزارة الصحة)

1. اتخاذ الإجراءات اللازمة لتحقيق أقصر وقت وصول وبأسرع وسيلة لتقديم الإسعافات الفورية للمصابين بحوادث الطرق.
2. زيادة أعداد مراكز الإسعاف والإنقاذ وخاصة على الطرق الخارجية.
3. ضرورة إخلاء موقع الحادث بالسرعة الممكنة.

Appendix C: Directions public transportation and a number of bus trips and the number of passengers per day

اولاً:الرحلات الى مركز الخرطوم :

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
الخرطوم جنوب				
السوق المحلي	271	8	2168	54200
السوق المركزي	273	10	2730	68250
المعمورة	109	14	1526	38150
المجاهدين	37	12	444	11100
العزوزاب	27	9	243	6075
جبرة	174	12	2088	52200
اللاماب	35	8	3080	77000
العشرة	30	8	240	6000
سوبا الحلة	54	14	756	18900
الكلاكلة	120	10	1200	30000
جبل اولياء	100	6	600	15000
مايو	150	10	1500	37500
سوبا الاراضي	17	8	136	3400
الديوم الغربية	41	12	492	12300
الاجمالي	1483	141	17203	430075
الخرطوم شرق				
الجريف غرب	102	10	1020	25500
الفردوس	49	13	637	15925
المنشية	59	1	767	19175
امتداد ناصر	16	12	192	4800
البراري	90	8	720	18000
الطائف	4	16	64	1600
اركويت	4	16	64	1600

الاجمالي	324	88	3464	86600
بحري الوسطى				
الشعبية	85	10	850	21250
المزاد	60	10	600	15000
عمر المختار	45	12	540	13500
الكدرو	100	10	1000	25000
الاجمالي	290	42	2990	74750

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
بحري شرق				
الحاج يوسف	53	4	212	5300
الردمية	53	5	265	6625
سوبا شرق	43	3	129	3225
المايقوما	29	5	145	3625
شارع واحد	41	6	246	6150
الوحدة	70	5	350	8750
ام ضوبان	45	4	160	4000
سوبا	15	4	60	1500
العيلفون	45	4	180	4500
الاجمالي	389	40	1747	43675
ام درمان				
شعبي امدرمان	50	12	5600	140000
الشهداء	70	14	980	24500
امبدة	119	3	357	8925

ليبيا	110	3	330	8250
ابوسعد	70	16	1120	28000
صالحة	60	12	720	18000
المربعات	70	14	980	24500
الثورات	200	10	2000	50000
استاد الهلال	90	8	720	18000
انقولا	32	3	96	2400
البحيرة	25	3	75	1875
الاجمالي	896	98	12978	324450
الاجمالي الكلي	3337	409	38382	959550

ثانياً: الرحلات الي مركز الخرطوم بحري (المحطة الوسطى):

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
بحري				
الحاج يوسف	30	6	180	4500
شارع واحد	48	6	288	7200
الردمية	54	5	270	6750
الحلفايا	50	10	500	12500
ام القرى	60	10	600	15000
الدروشاب	30	8	240	6000
الجيلي	60	10	600	15000
الاجمالي	332	55	2678	66950
امدرمان				
الشهداء	60	12	720	18000
الاجمالي الكلي	392	67	3398	84950

ثالثاً: الرحلات الي مركز امدرمان (السوق الشعبي – استاد الهلال):

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
امدرمان				
ابوزيد	135	6	810	20250
ابوزيد(من استاد الهلال)	14	4	56	1400
شارع مدني	20	6	120	3000
شارع العاشرة	91	6	546	13650
شارع 11	25	6	150	3750
الشقلة	90	12	1080	27000
حمد النيل	40	12	480	12000
الجميعاب	74	6	444	11100
الامتداد	100	10	1000	25000
29	60	10	600	15000
الاجمالي	649	78	5286	132150
الخرطوم جنوب				
اللفة	80	6	480	12000
الميناء البري	30	8	240	57600
الاجمالي	110	14	720	69600
الاجمالي الكلي	759	92	6006	201750

الجدول التالي يوضح ملخص الرحلات وعدد الركاب في اليوم لمراكز الخرطوم و الخرطوم بحري و امدرمان

1- مركز الخرطوم

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
الخرطوم جنوب	1438	141	17203	430075
الخرطوم شرق	324	88	3464	86600
بحري الوسطى	290	42	2990	74750
بحري شرق	389	40	1747	43675
ام درمان	896	98	12978	324450
الاجمالي	3337	409	38382	959550

2- مركز الخرطوم بحري (المحطة الوسطى)

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
بحري	332	55	2678	66950
امدرمان	60	12	720	18000
الاجمالي	392	67	3398	84950

3-مركز امدرمان (السوق الشعبي – استاد الهلال)

الخطوط	عدد الحافلات الكبيرة (25 راكب)	عدد الرحلات التي تقوم بها الحافلة في اليوم	اجمالي عدد الحافلات الكبيرة	عدد الركاب المرحل في اليوم
بحري	649	78	5286	132150
امدرمان	110	14	720	69600
الاجمالي	759	92	6006	201750

Appendix C: Sudan profile

SUDAN

Population: 37 964 306 • Income group: Middle • Gross national income per capita: US$ 1 550

INSTITUTIONAL FRAMEWORK

Lead agency	Council Coordination for Road Safety
Funded in national budget	No
National road safety strategy	Yes
Funding to implement strategy	Partially funded
Fatality reduction target	20% (2011–2016)

SAFER ROADS AND MOBILITY

Formal audits required for new road construction projects	Yes
Regular inspections of existing road infrastructure	Yes
Policies to promote walking or cycling	Subnational
Policies to encourage investment in public transport	Subnational
Policies to separate road users and protect VRUs	Subnational

SAFER VEHICLES

Total registered vehicles for 2013	320 974
Cars and 4-wheeled light vehicles	—
Motorized 2- and 3-wheelers	14 247
Heavy trucks	40 590
Buses	23 423
Other	242 714
Vehicle standards applied[a]	
Frontal impact standard	No
Electronic stability control	No
Pedestrian protection	No

[a] UNECE WP29.

POST-CRASH CARE

Emergency room injury surveillance system	No
Emergency access telephone numbers	777777
Permanently disabled due to road traffic crash	—

DATA

Reported road traffic fatalities (2013)	2 349[b] (67% M, 17%F)
WHO estimated road traffic fatalities	9 221 (95%CI 7 746–10 697)
WHO estimated rate per 100 000 population	24.3
Estimated GDP lost due to road traffic crashes	—

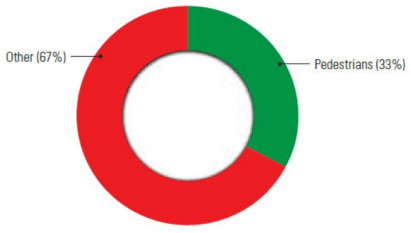
[b] Annual Report for Road Traffic Crashes (data from 2013). Defined as unlimited time period following crash.

SAFER ROAD USERS

National speed limit law	Yes
Max urban speed limit	50 km/h
Max rural speed limit	90 km/h
Max motorway speed limit	No
Local authorities can modify limits	Yes
Enforcement	0 1 2 3 4 5 (6) 7 8 9 10
National drink–driving law	Yes[c,d]
BAC limit – general population	—
BAC limit – young or novice drivers	—
Random breath testing carried out	Yes
Enforcement	0 1 2 3 4 5 (6) 7 8 9 10
% road traffic deaths involving alcohol	—
National motorcycle helmet law	Yes
Applies to drivers and passengers	Yes
Law requires helmet to be fastened	No
Law refers to helmet standard	No
Enforcement	0 1 2 3 4 (5) 6 7 8 9 10
Helmet wearing rate	—
National seat-belt law	Yes
Applies to front and rear seat occupants	No
Enforcement	0 1 2 3 4 5 6 7 (8) 9 10
Seat-belt wearing rate	—
National child restraint law	No
Restrictions on children sitting in front seat	Yes
Child restraint law based on	—
Enforcement	—
% children using child restraints	—
National law on mobile phone use while driving	Yes
Law prohibits hand-held mobile phone use	Yes
Law also applies to hands-free phones	Yes
National drug-driving law	Yes

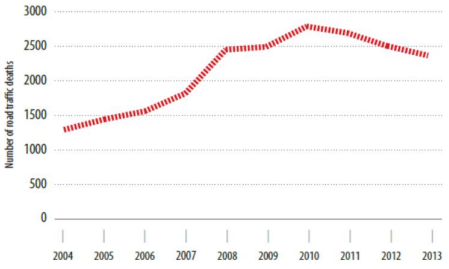
[c] Not based on BAC.
[d] Alcohol consumption legally prohibited.

DEATHS BY ROAD USER CATEGORY



Source: Annual Report for Road Traffic Crashes (data from 2013).

TRENDS IN REPORTED ROAD TRAFFIC DEATHS



Source: Annual Report for Road Traffic Crashes (data from 2013).

Legislative review conducted by WHO. Vehicle safety data from UNECE WP29. Other data collected by questionnaire and cleared by Ministry of Health.