The Road Transport and Safety Agency

Department of Research and Statistics

# Seatbelt and Motor Cycle Helmet Use in Zambia: A Baseline Study

Research Report

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## Executive Summary

Road traffic injuries and fatalities are a serious concern the world over. Seatbelts and motor cycle helmets play a critical role in minimising the severity of a traffic injury and reducing the chances of a fatality. Studies show that the use of seatbelts reduces the probability of a fatality in a road accident by 40–50% for drivers and front seat passengers and by about 25% for passengers in rear seats. The use of helmets can lead to a 69% reduction in the risk of head injuries and a 42% reduction in the risk of a fatality

This baseline study was conducted to establish the prevalence of seatbelt use in six towns in Zambia. Seatbelt usage was further categorised by gender, location, vehicle occupancy, type of vehicle and traffic flow. The study was observational and the data was collected from various locations throughout each town. A total of 10,028 vehicles were observed in seven main towns in Zambia. The data was analysed using descriptive techniques and the chi-square test of independence was used to establish association between variables.

The study revealed that Seatbelt adherence stands at 49.88% among drivers, 37.35% among front passengers and 6.6% among rear passengers. Adherence rates among women drivers stands at 71.25% while the adherence rates among men is 45.68%. Lusaka city has the highest driver seatbelt adherence rates (59%) followed by Livingstone (57%) and Ndola (47%). Choma town recorded the lowest adherence rates (30%). 37% of commercial vehicle drivers use seatbelts while 53% of drivers in private vehicles were observed to use seatbelts.

Furthermore, seatbelt adherence is higher in low-density areas and shopping malls than in the Central Business District (CBD) and in high density residential areas. People are more likely to wear a seat belt in fast moving traffic than in slow moving traffic. The data also reveals that probability of the front and rear passengers are more likely to wear a seatbelt if the driver is also wearing a seatbelt.

Motorcycle helmet usage stands at 93% for drivers and 87% passengers. Lusaka had the highest helmet usage rates and the lowest rates were observed in Kitwe.

It is recommended that road safety education and enforcement campaigns be intensified in order to increase seatbelt use in Chipata and Choma which recorded the lowest seatbelt usage rates in the country. These campaigns should be targeted mainly towards men and commercial vehicles.

# 1.0 Introduction

Road traffic crashes are a major public health concern and a leading cause of death and injury around the world. The World Health Organization estimates that approximately 1.35 million people are killed each year in road crashes worldwide, with up to 50 million more injured. Over 95% of these deaths and injuries occur in the low and middle-income countries of the world where pedestrians, motorcyclists, cyclists and passengers are especially vulnerable[i]. In 2018, Zambia recorded a total of 30,168 Road traffic crashes and 1,818 people lost their lives and another 14,005 people were injured[ii].

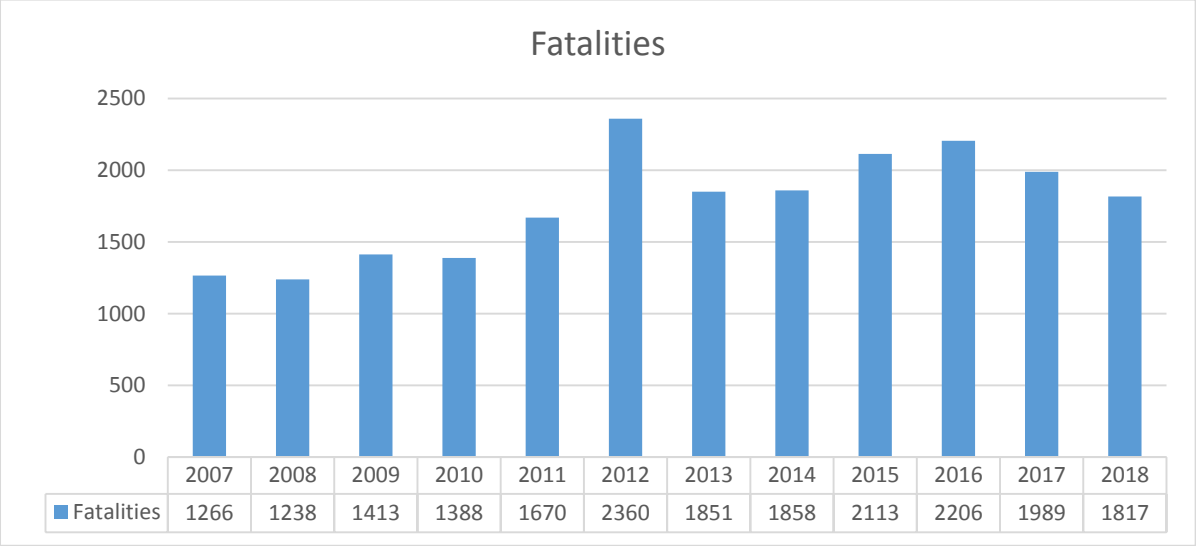


*Figure 1: Road Traffic Accident Fatalities in Zambia from 2007 to 2018*

Seat-belts and motor cycle helmets are extremely effective at saving the lives of car occupants in the event of a crash. Failure to use a seat-belt is a major risk factor for road traffic injuries and deaths among vehicle occupants. An occupant's chance of survival increases significantly when appropriately restrained. A review of research on the effectiveness of seat-belts found that their use reduces the probability of being killed by 40–50% for drivers and front seat passengers and by about 25% for passengers in rear seats[iii]. The impact on serious injuries is almost as great, while the effect on slight injuries is smaller at 20–30%. More detailed analyses indicate that seat-belts are most effective in frontal impacts and in run-off-the-road crashes, where the probability of being ejected is high if seat-belts are not worn[iv].

Motorcyclists are less protected against road accidents than the users of some other vehicles because they have the safety helmet as the most effective means of protection, while car occupants, for example, are protected by safety belts, airbags and even by the body structure of the car[1]. Lui et al states that motorcycle helmets reduce the risk of head injury by 72% and are also likely to reduce the risk of death, although the effectiveness may be modified by speed[2].

[1] F.A.O. Fernandes, R.J. Alves de Sousa (2013), Motorcycle helmets—A state of the art review

[2] Lui B I R, Norton R, Blows S. et al Helmets for preventing injury in motorcycle riders. The Cochrane Library. Chichester, UK: Wiley, 2004

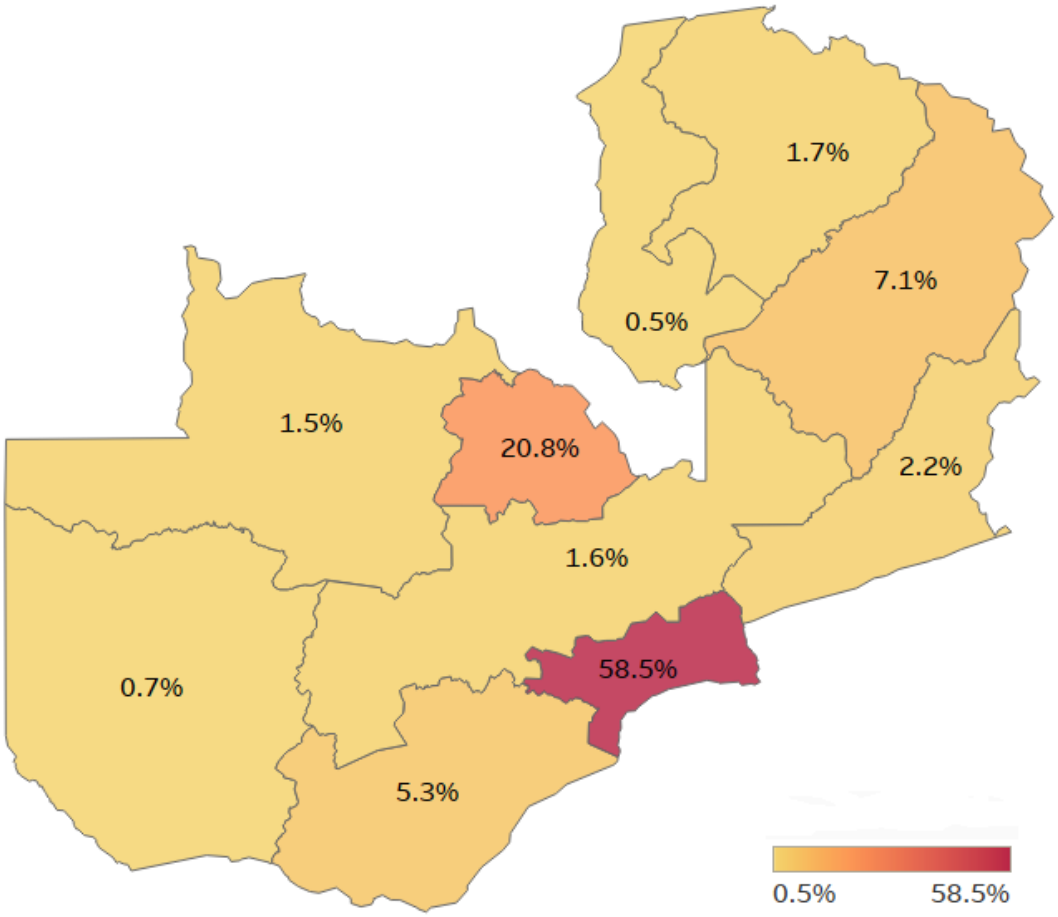


*Figure 2: Zambia Motor Vehicle Population by Province*

The Road Traffic Act No 11 of 2002 stipulates the mandatory use of seat-belts by all motorists traveling in a vehicle in Zambia. Also, all vehicles must be fitted with seatbelts and a person shall not import into the country a motor vehicle that has not been fitted with a seat belt. The Act further makes it compulsory for protective helmets to be worn by persons riding on motor cycles, or in side-cars attached to motor cycles and also prescribes the shape, construction and quality of the helmets[v]. The global status report on road safety report states that mandatory seat belt and helmet use legislation is a cost effective means of reducing road traffic deaths and injuries and is highly effective in promoting seat-belt use (WHO, 2018).

Adherence to seat-belt use varies greatly between countries, governed to a large extent by the type of laws that require seat-belts to be fitted in vehicles and cars, and the laws requiring them to be worn. Compliance levels are also dependent on the degree to which these laws are enforced. In many low-income countries there is no requirement for belts to be fitted or used, and rates of use are therefore correspondingly low. In addition, there may be cultural norms that negatively influence seat-belt wearing rates, particularly among young adult car occupants.

According to ( (MacLeod, et al., 2010) MacLeod, et al., (2010) head injuries are the leading cause of death among motorcyclists. The use of motorcycle helmets is an

important means of preventing traffic deaths. Studies show that the use of helmets can lead to a 69% reduction in the risk of head injuries and a 42% reduction in the risk of a fatality. (WHO, 2018).

This study seeks to collect baseline data on the use of seatbelts while driving which can serve as a basis for the design of a more effective road safety education campaign. The data collected will provide stakeholders with a clear understanding of the current situation in relation to the prevalence of seat-belt use in the country. It will also provide useful baseline figures against which the effectiveness of future actions can be monitored and evaluated.

## 2.0 Objectives

To establish the seatbelt adherence rates for drivers in Zambia broken down by gender, vehicle occupancy, town and location.

## 3.0 Methodology

The study design will be mainly an observational survey. The survey will be concentrated in selected towns of Lusaka, Central, Southern and Copperbelt Provinces. The study will be designed to cover a range of road types and locations. Road types will be selected in such a way that all road types are represented so that as far as possible correlation may be made between urban and rural roads, motorways and unclassified roads, built-up areas and non-built-up areas, and so on. A team consisting of 5 observers was trained and subsequently deployed at each sampling point to ensure a consistent approach to data collection. Seat belt use rates were measured only in the daytime due to security reasons but observation times were spread out throughout the day.

Sites were chosen for the ease with which they allow the survey staff to observe and record the use of seat-belts by vehicle occupants. For example, sites where traffic lights are installed allow survey staff time to view vehicle occupants clearly.

This helps to ensure that results can be generalized to represent different vehicles and different journeys. This need to observe the car occupants is a limiting factor in carrying out surveys on high-speed roads such as motorways.

Five sampling stations per town will be selected to represent the typical community. At each sampling station, every third car will be observed to check for compliance with seat belt use as they park. If the third car user refuses to be interviewed, then the immediate next car occupant will be approached.

A total of 10,028 vehicles were sampled sampled in seven towns. Data will be analysed using Microsoft Excel and Statistical Package for Social Sciences Software (SPSS).

# 4.0 Results

## 4.1 Town

*Table 1: Number of vehicles observed by town*

| Row Labels | Count of Town | % |
|---|---|---|
| Chipata | 693 | 7% |
| Choma | 1060 | 11% |
| Kabwe | 835 | 8% |
| Kitwe | 1096 | 11% |
| Livingstone | 1663 | 17% |
| Lusaka | 3074 | 31% |
| Ndola | 1607 | 16% |
| Grand Total | 10028 | 100% |

The data collected shows that 31% (3074) of the observations were in Lusaka, 17% were in Livingstone, 16% in Ndola, 12% in Kitwe, 11% in Choma, 9% in Kabwe and 7% in Chipata town.

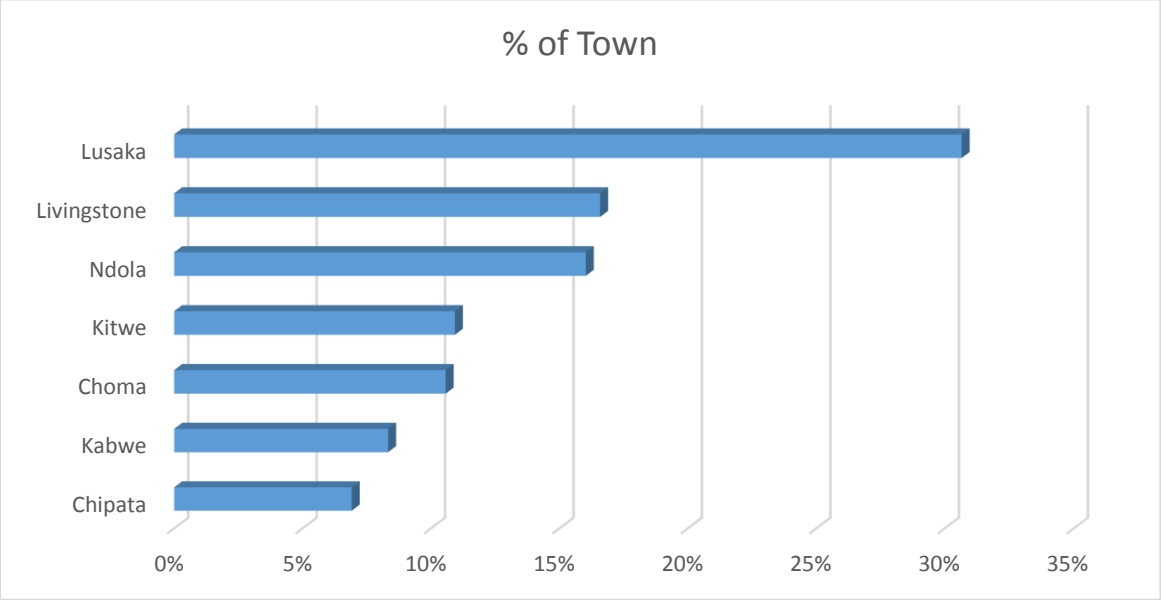


*Figure 3: Number of observations per town*

## 4.2 Location of observation

*Table 2: Location of Observations*

| Row Labels | Count of Location | % of Location |
|---|---|---|
| CBD | 5214 | 52% |
| High density Area | 1746 | 17% |
| Low Density Area | 1840 | 18% |
| Shopping Mall | 1288 | 13% |
| Grand Total | 10088 | 100% |

Locations were picked and classified in the CBD, High- and Low-density areas and shopping malls. The majority of the observations were conducted in areas in and around the CBD's in all the seven towns.

## 4.3 Description of Traffic Flow

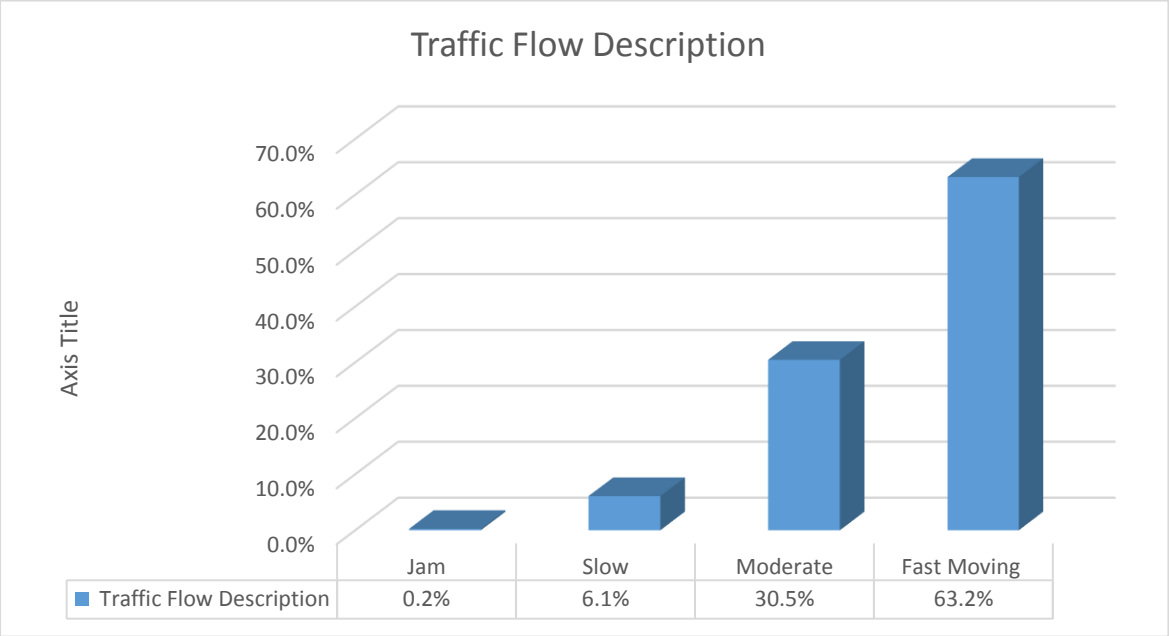


*Figure 4: Description of Traffic Flow*

The traffic flow was described as traffic Jam, slow, moderate and fast-moving traffic. Figure 3 above shows that the majority of the observations were conducted in fast moving traffic.

## 4.4 Type of Motor Vehicle

*Table 3: Type of Vehicle*

| Row Labels | Type of Vehicle | % |
|---|---|---|
| Motor Cycle | 230 | 2% |
| Commercial/ PSV | 2466 | 26% |
| Private | 6652 | 71% |
| Grand Total | 9348 | 100% |

The study observed motor cycles, commercial and private motor vehicles. 71% of the vehicles were private motor vehicles, 26% were commercial and 2% were motor cycles.

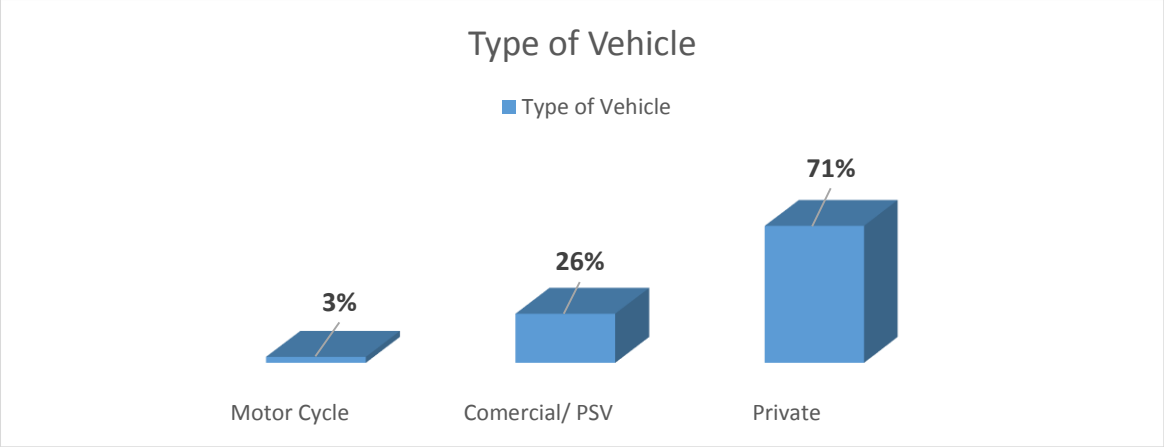


*Figure 5: Seatbelt use by type of motor vehicle*

Table 4 below shows that among the commercial vehicles observed, 45% were passenger buses, 34% were goods vehicles and 22% were taxis.

*Table 4: Classification of Commercial Vehicle*

| Row Labels | Count of Type of Commercial Vehicle | % Type of Commercial Vehicle |
|---|---|---|
| Goods | 867 | 34% |
| Passenger Bus | 1141 | 45% |
| Passenger Taxi | 551 | 22% |
| Grand Total | 2559 | 100% |

## 4.5 Gender of the driver

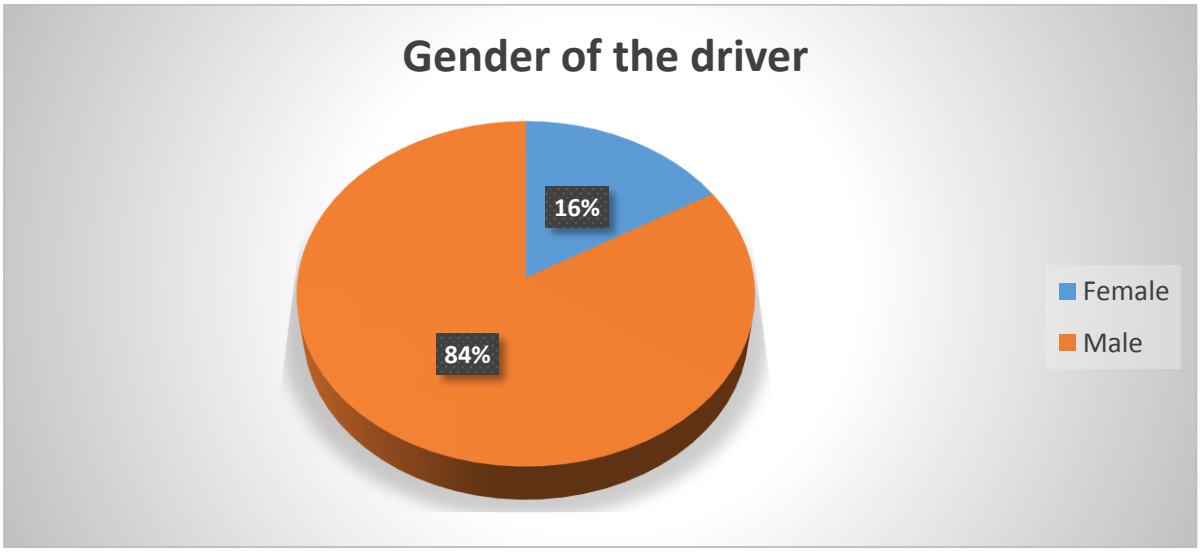


*Figure 6: Sex of the Driver*

Figure 4 above shows that 84% of the drivers observed were male and 16% were female.

## 4.6 Seatbelt adherence

*Table 5: Seatbelt adherence among drivers, front and rear passengers*

| Row Labels | Driver | | Front Passenger | | Rear Passengers | |
|---|---|---|---|---|---|---|
| | *Count* | *%* | *Count* | *%* | *Count* | *%* |
| No | 4568 | 50.12% | 3432 | 62.65% | 2745 | 93.40% |
| Yes | 4547 | 49.88% | 2046 | 37.35% | 194 | 6.60% |
| Grand Total | 9115 | 100.00% | 5478 | 100% | 2939 | 100% |

Table 5 shows that seatbelts usage rates are at 49.88% among drivers, 37.35% among front passengers and 6.60% among rear passengers.

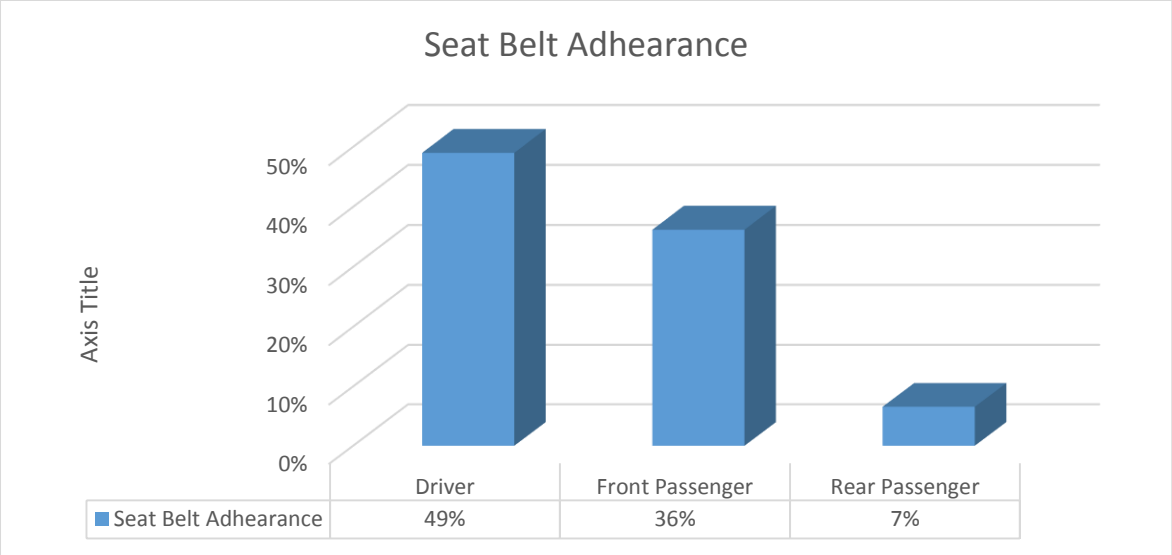


*Figure 7: Seatbelt adherence among drivers, front and rear passengers*

## 4.61 Seatbelt adherence by Gender

*Table 6: Seatbelt adherence by Gender of the driver*

| | Driver wearing a seatbelt | | | | |
|---|---|---|---|---|---|
| Gender | Yes | | No | | Grand Total |
| | Count | % | Count | % | |
| Female | 1133 | 71% | 461 | 29% | 1594 |
| Male | 3626 | 45% | 4483 | 55% | 8109 |

Table 6 and figure 7 show that the seat belt usage among females is 71% and 45% among males.

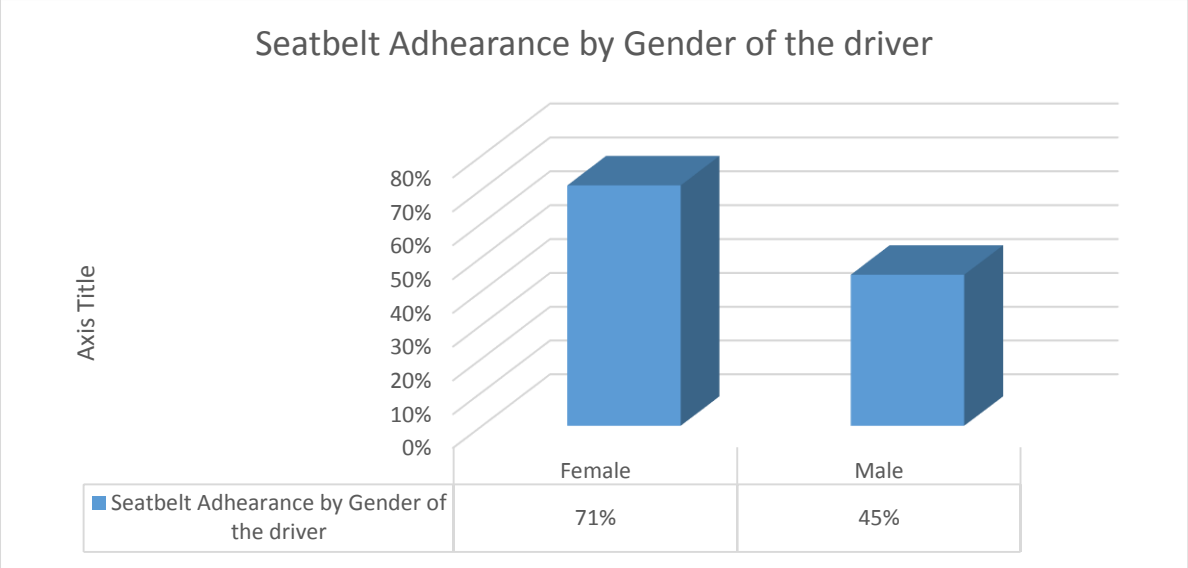


*Figure 8: Percentage of males and females wearing seatbelts*

### 4.6.2 Seat Belt adherence by town

*Table 7: Seatbelt adherence by town*

| Town | Driver | Front Passenger | Rear Passenger |
|---|---|---|---|
| Lusaka | 59% | 43% | 11% |
| Livingstone | 57% | 42% | 5% |
| Ndola | 47% | 34% | 5% |
| Kitwe | 46% | 32% | 4% |
| Kabwe | 38% | 37% | 6% |
| Chipata | 35% | 18% | 6% |
| Choma | 30% | 23% | 3% |

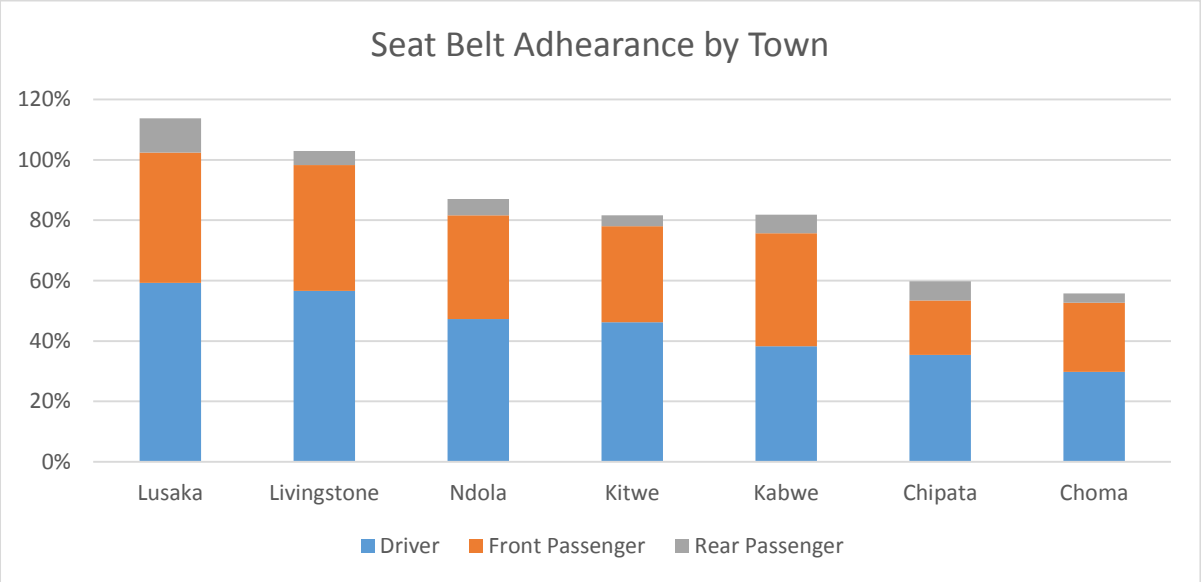


*Figure 9:Seatbelt adherence by town among the driver, the front and rear passengers*

Lusaka City has the highest seatbelt adherence rates followed by Livingstone and Ndola. Choma town has the lowest seatbelt adherence rates.

### 4.6.3 Seat belt adherence by location

*Table 8: Seatbelt adherence by location*

| Location | Driver | Front Passengers | Rear Passengers |
|---|---|---|---|
| CBD | 46% | 32% | 6% |
| High density area | 45% | 33% | 3% |
| Low density area | 52% | 38% | 10% |
| Shopping malls | 64% | 52% | 13% |

Results show that seatbelt usage rates among the various vehicle occupants differs according to location. Vehicles observed in shopping malls had the highest adherence rates followed by Low density areas, the CBD and high-density areas had the lowest usage rates.

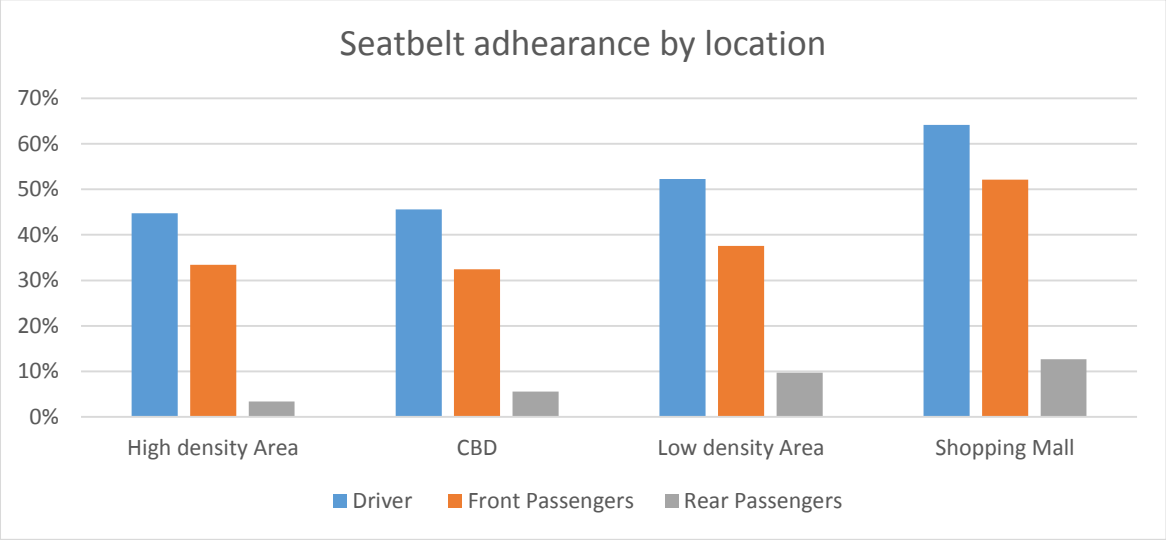


*Figure 10: Seatbelt adherence by location among the driver, the front and the rear passengers*

### 4.6.4 Seatbelt Adherence by type of motor Vehicle

*Table 9: Seat belt adherence rates by type of motor vehicle*

| Type of Motor Vehicle | No | Yes |
|---|---|---|
| Goods | 83% | 16.9% |
| Passenger Bus | 90% | 9.7% |
| Passenger Taxi | 90% | 10.3% |
| Private | 47% | 53.3% |

Table 9 above shows that seatbelt usage is low among drivers of commercial vehicles (37%). Passenger bus drivers have the lowest usage rates of 9.7%. Taxi drivers account for 10.3% and goods vehicle drivers compliance rates are at 16.9%

### 4.6.5 Associations between the driver and passengers wearing a seat belt

A Chi-Square test of independence was conducted to establish if there is significant association between the driver wearing a seatbelt and the front and rear passengers wearing seatbelts. Results of the Chi-Square test ($\chi^2 = 3.834166, df = 1, P = 0.05021792$) show that there is significant association between the driver wearing a seatbelt and both the front and rear passengers wearing seatbelts.

*Table 10: Driver wearing a seatbelt verses the front and rear passengers wearing seatbelts*

| Driver wearing a seatbelt | | Front Passenger wearing a seatbelt | Rear Passenger wearing a seatbelt | Total |
|---|---|---|---|---|
| | No | 470 (22.38%) | 36 (18%) | 498 |
| | Yes | 1630 (77.62%) | 164 (82%) | 1741 |
| | Total | 2045 | 194 | 2239 |

The contingency table above shows that the front and the rear passengers are more likely to wear a seatbelt if the driver is wearing a seatbelt.

## 4.7 Motor Cycle Helmet Use

*Table 11: Motor Cycle Helmet and Reflective gear use*

| | No | | Yes | | Grand Total |
|---|---|---|---|---|---|
| | Count | % | Count | % | |
| **Helmet - Driver** | 21 | 7% | 291 | 93% | 312 |
| **Helmet - Passenger** | 5 | 13% | 33 | 87% | 38 |
| **Reflective Gear - Driver** | 279 | 89% | 33 | 11% | 312 |
| **Reflective Gear - Passenger** | 38 | 100% | 0 | 0% | 38 |

A total of 312 motor cycle riders were observed of which 38 had passengers. Motor cycle helmet use is at 93% among motor cycle riders and 87% of motor cycle passengers. 11% of motorcycle riders wore reflective gear while riding.

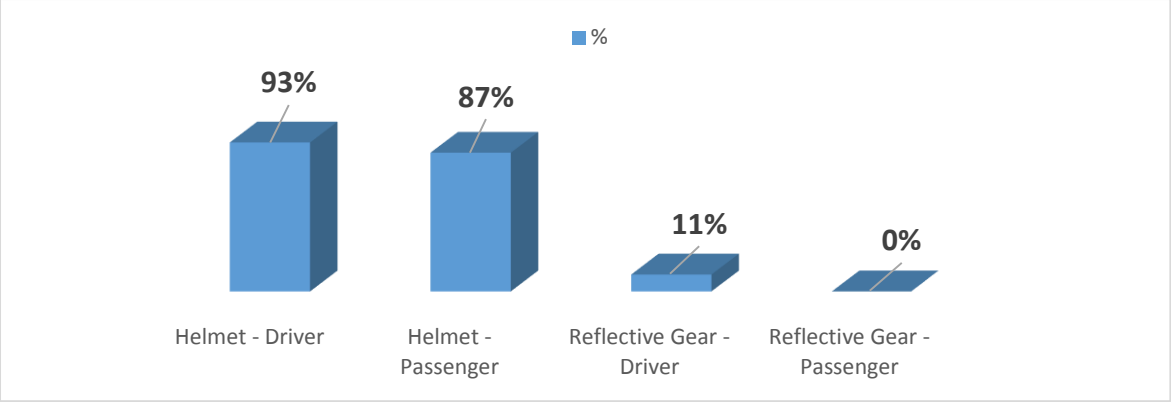


*Figure 11: Driver and Passenger Helmet and Reflective gear compliance rates*

Table 12 below shows that Lusaka City had the motor cycle helmet usage rates for both the rider and the passengers while Kitwe had the lowest helmet usage rates.

*Table 12: Motor Cycle Helmet use by town*

| Row Labels | Driver | Passenger |
|---|---|---|
| Chipata | 91% | 86% |
| Choma | 89% | 75% |
| Kabwe | 90% | 80% |
| Kitwe | 73% | 50% |
| Livingstone | 95% | 100% |
| Lusaka | 98% | 100% |
| Ndola | 89% | - |

## 5.0 Discussion

The main aim of the study was to collect baseline data on the usage of seat belt and motor cycle helmets while driving/riding to serve as a basis for the design of future road safety campaigns. The percentage of seatbelt usage among drivers is at 50%. Seatbelt usage among front and rear passengers stands at 37% and 7% respectively. The percentage of motorcycle helmet usage is at 93% among drivers and 87% among motorcycle passengers.

The 50% seatbelt adherence rates observed in Zambia is quite low when compared to other countries such as 80% in Nigeria (Ismaila & Akanbi, 2010), 81% in South Africa (Olukoga & Noah, 2005), 89.7% in the United States (NHTSA, 2018), 97% in Australia and 98% in the UK.

Various reasons have been suggested for non usage of seat belt by drivers despite the obvious advantages derivable from its use. Some of the reasons advanced include; discomfort, seatbelts belts wrinkle and dirten my clothes, frequent stops was stated by some commercial vehicle drivers. There are also some situational reasons such as not believing the effectiveness of seat belt, underestimating the danger and not having a habit.

## 6.0 Conclusion and Recommendations

Results of the study show that the seatbelt usage among drivers is currently around 50%. Motor Cycle helmet compliance rates stand at 93% for drivers and 87% for passengers. Just as it is the case for other risk factors, increasing seat-belt and helmet usage requires a multi sectoral approach which goes beyond the setting a appropriate legislation. Measures include the combined education and enforcement and the provision of seat-belt reminders in the vehicle which is the case in most newly manufactured vehicles. Good helmet design and ensuring their correct use have also proved to be highly important.

The study recommends the following:

1. There is need to put in place awareness programs which encourage the use of seatbelts especially in Kabwe and Choma where adherence is low.
2. Seat belt usage rates among front and rear passengers must be encouraged and more education and enforcement activities should be particularly targeted at front and rear passengers.
3. Usage rates among commercial vehicle drivers is very low. It was observed that only 9% of bus drivers use seatbelts and so there is need to target more road safety activities at this category of drivers.
4. Motor Cycle Helmet usage is lowest in Kitwe for both drivers and passengers and so awareness campaigns need to conducted in Kitwe.
5. High density areas need particular focus as the seat belt usage rates are much lower in these areas.
6. There is also a need to do a lot of sensitisation on the use of seatbelts among front and rear passengers as well.
7. Seatbelt campaigns need to be designed to appeal to men as compliance rates among men are lower than rates among women.

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[i] World Health Organisation, Global Status Report on Road Safety 2015.
[ii] 2018 Road Traffic Accident Report. RTSA
[iii] Elvik R, Vaa T, eds. *The handbook of road safety measures.* Elsevier, 2004.
[iv] Evans L. Safety belt effectiveness: the influence of crash severity and selective recruitment. *Accident Analysis and Prevention*, 1996, 28:423–433.
[v] Road Traffic Act No.11 of 2002, Section 258 - Seat Belt and Child Seats Regulations.