

Sustainable solution to bad driving behaviour, driver road rage, and the incidence of road accidents in Pretoria-Mabopane Ipeleng, Gauteng Province (South Africa)

Phumzile P. Dlamini¹, Adewale A. Olutola², Nkhangweni J. Malange³

^{1,2,3} Department of Safety & Security Management, Faculty of Humanities,
Tshwane University of Technology, Pretoria, South Africa.

Corresponding author: olutolaAA@tut.ac.za

© Authour(s)

OIDA International Journal of Sustainable Development, Ontario International Development Agency, Canada.

ISSN 1923-6654 (print) ISSN 1923-6662 (online) www.oidajsd.com

Also available at <http://www.ssrn.com/link/OIDA-Intl-Journal-Sustainable-Dev.html>

Abstract: Road accidents are caused by different factors, which include but not limited to drunk driving, speeding and weather. South Africa has an annual road death toll that is significantly higher than the world average. Therefore, there is a pressing need to understand the underlying cause of the problem. Moreso, the effectiveness of the interventions requires a multi-disciplinary approach, which includes enforcement, engineering, psychological and educational approaches. While the resources are limited, road safety interventions must not only address the sustainability of the outcomes but also the behaviour involved in vehicle crashes and how the driving behaviour can be improved.

The objectives of this paper among others comprise of, to identify the causes of bad driving behaviour in Ipeleng Traffic Department in the Tshwane area of Gauteng province. The objectives also include, to investigate the relationship between the causes of accidents and the driver's behaviour, to investigate human behaviour behind the wheel and how it relates to the environment; to explain the role and impact played by the law enforcement agencies; and to analyse if the taxi drivers are educated enough about the importance of road safety.

Quantitative research design was adopted for this study, using simple sampling. Respondents included three categories, namely traffic officers (29.09%), taxi passengers (46.30%) and taxi drivers (23.90%). A univariate descriptive analysis was performed on all the original variables, displaying frequencies and percentages. Fischer's exact tests for ordinal data was used. This was conducted to test for significant group differences. Significance level was set at $p < 0.05$. **Factor analysis:** Factor analysis is used to reduce measurable and observable variables to fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality. In this study, factor analysis was conducted to generate latent variables for the main variables. The p-value was set at $p < 0.05$. Thus, we can say all these analyses were conducted using STATA version 14 statistical software. According to the findings, most of the study's respondents either agreed or strongly agreed that speeding, drinking and driving, lack of patience, use of mobile phones while driving, bad weather, hastiness and heavy traffic are causes of road accidents. Findings revealed that 49% of respondents strongly agree that the use of mobile phones while driving causes road accidents. While drivers' behaviour included speeding, drinking and driving and mobile phone use while driving. Exploration suggested that vehicle or road accident and drivers' behaviour relationship did associate because when the driver drink and drive that is highly likely to cause or contribute to road accidents. More than half of the study respondents agreed that strict law enforcement is the solution to bad driving behaviour. 59.1% strongly agreed that arresting corrupt traffic officials and reporting corruption such as taking bribes will assist in reducing road accidents.

Keywords: driver behaviour; road accidents; speeding driving, road rage, law enforcement.

Introduction

Worldwide about 1.2 million people are killed and 20 to 50 million more are injured or disabled annually due to road traffic crashes (Road Traffic Management Corporation, 2004). In South Africa about ninety percent (90%) of accidents could be blamed on human errors. Only 3 to 5% is blamed on the road environment (Arrive Alive, 2011:12). Yearly, the lives of approximately 1.3 million people are cut short because of the road crashes. Millions of road users suffer non-fatal injuries, with many experiencing disabilities because of third injury. Road traffic injuries are the leading cause of death for children and young adults aged 5-29 year (WHO, 2021). According to a report issued by the Department of Transport (2020:1), about 73% of households in South Africans do not own a motor vehicle, which mandated them to use public transport such as taxis and buses. Most taxi and bus drivers are not educated about the importance of road safety. In the month of April to August 2020 an estimated 5, 500 people were killed while commuting. (Arrive Alive,2020). According to Road Traffic Management Corporation [RTMC] (2016:1), it is important to understand the difference between good and bad driver behaviours. This study focuses mainly on bad driver behaviours.

Problem statement

According to Road Traffic Management Corporation (RTMC), 2016:1), South Africa has experienced the highest incidents of road accidents in the world. Most accidents are avoidable and are caused by drivers' misbehaviours and errors. In South Africa 90% of accidents can be blamed on human error (Steyn, 2013:89). Only limited percentage of road clashes can be blamed on the road environment (Taumang, Bello & Olutola, 2023)

According to the National Highway Traffic Safety Administration (NHTSA) (2019:1), traffic related injuries are increasing problem throughout the world, affecting both industrial and non-industrialised countries (Sonja, 2013:111). The challenges in addressing road safety in South Africa are primarily those of human behaviour negligence such as lack of knowledge of rules of the road and unwillingness to abide by those rules, inadequate enforcement and lack of follow up of fines and ineffectiveness in punishment of offenders.

Many people in South Africa rely on public transport. A report issued by Department of Transport, (2003:15) a lot of people are using the taxis as a source of transportation. Minibuses and taxis play a vital role in the public sector transport. Gloria (2006:10) stated that about 10%of females aged between 30 and 40 are also joining the taxis industry, driving passengers to their destinations. The job of driving helps them put food on the table and provide for their families (Arrive Alive, 2021).

Literature Review

Road Traffic Management Corporation of South Africa (RTMC, 2016:35), defines traffic as a delay that involves transportation or movement, in a designated location. Traffic congestion is the situation where there is an additional vehicle into a traffic flow which increases the journey times of others (Berkowitz, 2001:10). On any of such occasion, almost everyone will eventually cross paths with reckless drivers misbehaviour. Road users' misbehaviour could range from texting and talking, applying makeup while driving or crossing the road. Many drivers have developed dangerous habits that tend to jeopardise the lives of other road users. According to the Global Road Safety Report, driver misbehaviour can cause nearly 20% of traffic accidents and more than 90% of light vehicle accidents are due to driver distraction (Zhuo, Zhao, Xu, Zhao, Yao, & Li, 2023).

Some bad driving behaviours include driving and drinking, peer pressure and anger (Arrive Alive, 2017:16). Every year more than 1.24 million traffic related deaths are registered globally with the highest fatality rate in middle and low countries. Minibus taxis represent the most dominant mode of public transport (Arrive Alive, 2017: 17). Furthermore, research by RTMC (2005:6) stated that without intensive action, traffic-related injuries and deaths are expected to double by 2030.

Being a taxi driver is a demanding job; waking up early and go to sleep late. NHTSA, (2016), mentioned that some of the taxi drives even drink alcohol to help them focus while driving. Minibus taxis are involved in road traffic related accidents more than any other types of vehicles in South Africa (Barrett & Walters, 2008:98). The Automobile Association of South Africa (AASA) (2011:18) indicated that minibuses and taxis are responsible for an estimated 70,000 road traffic accidents per year. Without looking at the percentages, almost every day two or three people die in an accident, which involves a taxi. Drunk driving directly contributes to death statistics (World Health Organisation, 2021:1). Taxi drivers have the habit of not abiding by or following road signs; for example, most of them often ignore stopping at the stop sign. This bad driving behaviour also affects the pedestrians because some of them get killed while the drivers are speeding and focusing on making more money (Odufuwa, Salisu & Omoniyi, 2019:199-226). The

question is whether the law enforcement and government are doing enough to deal with bad driving behaviour. According to Hayes & Hua (2021:17), bad driving behaviour is also influenced by age. Old drivers are likely to drive carefully when they are driving while young drivers are more likely to speed, drive through red lights, make illegal turns, using alcohol or drugs. Young drivers do not have necessary driving experience and often display a lack of mature judgment (Arrive Alive, 2019). Traffic accident is one of the main causes of death and injuries between the ages of 18-35 (Arnett & Offer 1997:29-57).

The South African Departments of Transport and Education have emphasized the need for a long-term road safety strategy should include road safety education. The Ministry of Education announced at the start of 2006 that primary-school pupils will also study road safety in schools as part of the school curriculum. The Department of Transport confirmed that they have embarked on extensive educational programs, which have reached 90% of radio listeners and 80% of television viewers, (Arrive Alive, 2006). Children and young people have a high involvement in road crashes, so they must learn to use the road safely. Receiving road safety education as part of their normal school curriculum is recognized as being one of the most effective ways of providing youngsters with road safety knowledge (Arrive Alive, 2006). Road safety education develops knowledge, skills, attitudes and even more importantly - values that enable pedestrians, cyclists, motor cyclists, drivers, and passengers to use the road safely. The Road Traffic Management Corporation has been tasked with providing road safety education (Arrive Alive,2006). In the past road safety education in schools was sporadic, non-continuous or even non-existent.

There were many learners who went through schooling without ever being exposed to road safety education. Development of new resources using computers and other related equipment has now encouraged the use of new technology as part of the learning experience. The internet can play an important part in creating awareness of road safety and in making available educational materials (Alonso, Esteban, Useche & Colomer, 2018:18). According to Arrive Alive (2006), research have shown that learners show a limited knowledge regarding the following:

- the side of the road and for or against traffic and as to where (on the pavement or on the road) a cyclist should ride
- the importance of wearing seat belts
- why it is important to use a pedestrian footbridge if provided and not cross at any section of the road

Research Method – Quantitative Techniques

To satisfy the objectives of this paper, quantitative approach was adopted. The purpose of quantitative research is to attain greater knowledge and understanding of the social world. This descriptive study was to establish relation between variables of driver behaviour and road accidents.

Deductive approach

A quantitative research approach most often uses a deductive approach in which researchers start with a hypothesis and then collects data, which can be used to determine whether empirical evidence support the hypothesis. Quantitative analysis requires numeric information in the form of variables, (Wolceshym, 2018:52).

Data Analysis

Rengarasu and Hagiwara, (2005:79) stated that data analysis will ensure that results are more accurate, as it is very difficult to add personal bias to number obtained when the correct data gathering procedures have been followed. Analysing data helps to avoid personal bias and confirmation bias in the case of analysis means that the data will be much more accurate. Data in this study were analysed through SPSS instruments (Wegman ,2008:108).

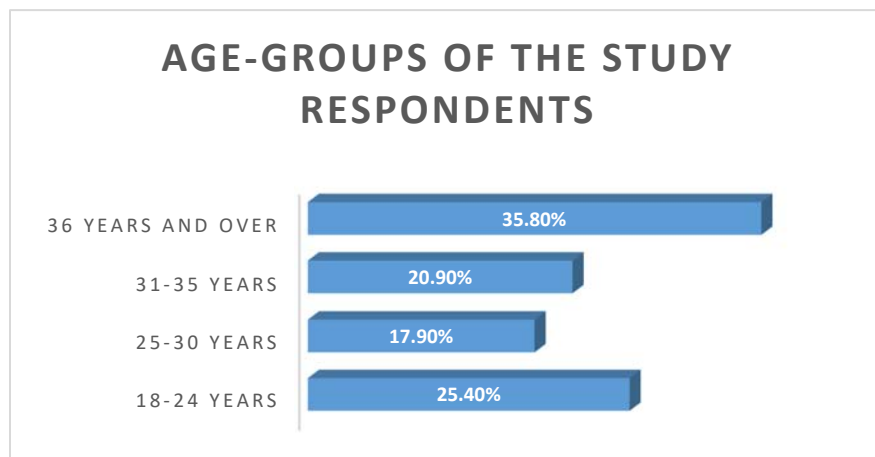
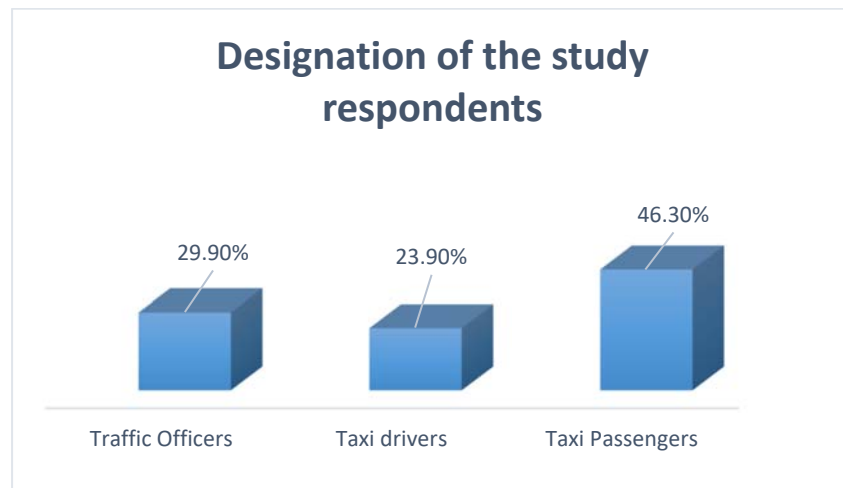
Descriptive statistics

Table 1. Socio-demographic information of the study respondents

Characteristic	% (n)
Designation	
Traffic Officer	29.9 (20)
Taxi Driver	23.9 (16)
Taxi Passenger	46.3 (31)
Age	

18-24	25.4 (17)
25-30	17.9 (12)
31-35	20.9 (14)
36 +	35.8 (24)
Gender	
Male	68.3 (43)
Female	31.8 (20)
Years working as a traffic official	
1-3 years	5.3 (10)
4-6 years	31.6 (6)
7-9 years	5.3 (1)
10+ years	57.9 (11)

In **Table 1** above, most of the study respondents were male (68.3%; n=43) and most of the traffic officers who participated in the study had been working as traffic officials 10 years (57.9%) or above.



In the Figure 2 above, age-groups of the study respondents. Most of the study respondents were 36 years and above, followed by those between 18 and 24 years (Figure: 2 and Table: 1).

Table 2: Causes of road accidents according to the study respondents.

Item	Strongly disagree %(n)	Disagree %(n)	Strongly Agree %(n)	Agree %(n)	Don't know %(n)
Speeding	4.5 (3)	1.5 (1)	56.7 (38)	34.3 (23)	3.0 (2)
Traffic officers to enforce the traffic laws without corruption	3.0 (2)	0 (0)	59.7 (40)	32.84 (22)	4.5 (3)
Drinking and driving	3.1(2)	3.1(2)	69.2(45)	23.1(15)	1.5(1)
Avoided if drivers are not distracted when driving	1.5 (1)	3.1(2)	49.2 (32)	41.5(27)	4.6(3)
Lack of patience	0(0)	3.0(2)	47.0(31)	45.5(30)	4.6(3)
Using mobile phone while driving	0(0)	0(0)	73.1(49)	20.9(14)	6.0(4)
Traffic rules are not enforced strictly	22.4(15)	6.0(4)	43.3(29)	26.9(18)	1.5(1)
Bad weather especially rain	1.5(1)	6.0(4)	43.3(29)	46.3(31)	3.0(2)
Hastiness	0(0)	3.0(2)	32.8(22)	52.2(35)	11.9(8)
Heavy traffic	0(0)	7.8(5)	31.3(21)	58.2(39)	3.0(2)
Drivers do not listen	25.4(17)	13.4(9)	19.4(13)	37.3(25)	4.5(3)
Passengers encourage drivers to increase speed	28.4(19)	16.4(11)	17.9(12)	29.9(20)	7.5(5)
Anger of drivers	6.0(4)	3.0(2)	25.4(17)	52.2(35)	13.4(9)
Depression and sadness of drivers	6.1(4)	7.6(5)	22.7(15)	56.1(37)	7.6(5)
Anxiety of drivers	6.0(4)	3.0(2)	25.4(17)	60.0(40)	6.0(4)
Failure to use the correct or appropriate lane for driving	3.1(2)	1.5(1)	36.9(24)	52.3(34)	6.2(4)

Table: 2 above indicates that most of the study respondents either agreed or strongly agreed that speeding, drinking and driving, lack of patience, use of mobile phones while driving, bad weather, hastiness, heavy traffic and all the items in the table are causes of road accidents.

Table 3: Road safety education

Item	Strongly disagree %(n)	Disagree %(n)	Strongly Agree %(n)	Agree %(n)	Don't know %(n)
Taxi drivers are not educated enough	7.5(5)	13.4(9)	50.8(34)	22.4(15)	6.0(4)
Taxi driver doesn't wear the seatbelt unless he/she sees the traffic roadblock	9.1(6)	10.6(7)	45.5(30)	28.8(19)	6.1(4)
The law is not strict	19.4(13)	14.9(10)	23.9(16)	38.8(26)	3.0(2)
The taxi on the roads are not roadworthy	13.4(9)	14.9(10)	28.4(19)	34.3(23)	9.0(6)
The community are involved in ensuring road safety	29.9(20)	19.4(13)	19.4(13)	23.9(16)	7.5(5)

In the **Table 3 above**, more than half of the study respondents strongly agreed that taxi drivers were not educated enough about the importance of road safety (50.8%; n=34). Many respondents (45.5%; n=30) strongly agreed that taxi drivers do not wear the seatbelt unless they see the traffic roadblock, however, only 9.1% (n=6) strongly disagreed. Only 38.8% (n=26) agreed that the law was not strict enough to prevent road accidents in Ipeleng traffic area but 19.9% (n=13) strongly disagreed. More than half of the respondents strongly agreed and agreed that the taxis

on the roads were not roadworthy and not safe for passengers (62.7%; n=42). Some of the respondents strongly disagreed that the community were involved in ensuring road safety (29.9%; n=20) while few respondents either strongly agreed (19.4%) or agreed (23.9%).

Table 4: Consequences of not following the rules of the road

Item	Strongly disagree %(n)	Disagree %(n)	Strongly Agree %(n)	Agree %(n)	Don't know %(n)
Suspended or revoked driver's license	1.5(1)	7.5(5)	17.9(12)	59.7(40)	13.4(9)
Jail time	1.5(1)	4.5(3)	22.4(15)	56.7(38)	14.9(10)
Permanent criminal record	3.0(2)	4.5(3)	26.9(18)	49.3(33)	16.4(11)
Cost of fines and medical expenses	3.0(2)	1.5(1)	21.2(14)	62.1(41)	12.1(8)
Mandatory court appearance	1.5(1)	4.6(3)	25.8(17)	51.5(34)	16.7(11)
Destroys families, through death of family heads	1.5(1)	1.5(1)	71.6(48)	20.9(14)	4.5(3)
Grave negative consequences are more than negatives	0(0)	0(0)	35.8(24)	49.3(33)	14.9(10)
Death on the roads	0(0)	1.5(1)	79.1(53)	14.9(10)	4.5(3)
High insurance rates	0(0)	1.5(1)	28.4(19)	50.8(34)	19.4(13)
Blame game	0(0)	1.5(1)	49.3(33)	43.3(29)	6.0(4)
Disabilities	1.5(1)	0(0)	80.6(54)	13.4(9)	4.5(3)

In **Table 4 above**, most of the study respondents either agreed or strongly agreed that suspension revocation of driver's license, jail time, permanent criminal record, facing cost of fines and medical expenses, mandatory court appearance, destruction of families through death of family heads and all the items listed in the table were consequences of not following the rules of the road.

Table 5 Roles of traffic officer in helping to reduce road accidents

Item	Strongly disagree %(n)	Disagree %(n)	Strongly Agree %(n)	Agree %(n)	Don't know %(n)
Strict law enforcement	0(0)	0(0)	33.3(22)	59.1(39)	7.6(5)
Arrest corrupt traffic officials	1(1.5)	6.1(4)	25.8(17)	59.1(39)	7.6(5)
Report corrupt officials	3.0(2)	6.1(4)	25.8(17)	59.1(39)	6.1(4)
Report bad road to department of transport for road maintenance	0(0)	3.0(2)	33.3(22)	60.6(40)	3.0(2)

In the **Table 5 above**, more than half of the study respondents agreed that strict law enforcement (59.1%; n=39), arresting corrupt traffic officials (59.1%; n=39), reporting corrupt officials (59.1%; n=39) and reporting bad roads to the Department of Transport for road maintenance (60.6%; n=40) were the roles of traffic officers in helping to reduce road accidents.

Table 6: Relationship between causes of road accidents and driver's behaviour

Item	Strongly disagree %(n)	Disagree %(n)	Strongly Agree %(n)	Agree %(n)	Don't know %(n)
Good behaviour	1.5(1)	0(0)	68.2(45)	24.2(16)	6.1(4)
Drunk driving	50.0(33)	28.8(19)	12.1(8)	4.6(3)	4.6(3)
Not maintain the vehicle	3.1(2)	7.7(5)	52.3(34)	32.3(21)	4.6(3)
Fasten seat belt after seeing traffic officials	31.8(21)	16.7(11)	24.2(16)	21.2(14)	6.1(4)
Using phone while driving	1.5(1)	6.2(4)	63.1(41)	21.5(14)	7.7(5)
Lack of attention	1.5(1)	3.0(2)	50.0(33)	37.9(25)	7.6(5)
Devil causes accident	39.4(26)	18.2(12)	9.1(6)	21.2(14)	12.1(8)

In **Table 6 above**, most of the study respondents strongly agreed that good behaviour on the road by drivers can reduce or eliminate road accidents (68.2%; n=45), not maintaining the vehicle regularly can cause road accidents (52.3%; n=34), use of phones while driving can cause accidents on the road (63.1%; n=41) and lack of attention and concentration on the road when driving can cause accidents (50.0%; n=33). However, half of the respondents strongly disagreed that drunk driving cannot cause accidents on the road (50.0%; n=33) while more than a third of the respondents strongly disagreed that they only fasten their seatbelts when they see traffic officials (31.8%; n=21) and that it is the devil that causes accident on the roads and not bad driving behaviour (39.4%; n=26).

Summary of the findings

According to the opinions of the respondents and the findings of this research:

- Theme 1: Bad driving behaviour in Gauteng province is a major problem in South Africa.
- Theme 2: Road safety education is very important in helping to reduce the cause of road accidents.
- Theme 3: Education of all road users and traffic officials will help them understand the different between good and bad driving behaviour.

The assessment was conducted through a questionnaire technique and findings revealed that the response to bad driving behaviour has not been effective, mainly because more road accidents were caused by human error rather than environment or vehicle factor.

Discussion and Conclusion

With respect to the distribution of the respondents in this survey, the following analogies can be drawn from this research:

- Most of the respondents were males.
- Most of the respondents were taxi passengers.
- Most of the respondents were 36 years and above.
- Most of the respondents who were traffic officers had spent more than 10 years working as police officials.

With respect to the causes of road accidents, according to the study respondents, the following analogies can be drawn from this study:

- Most of the respondents strongly agreed that speeding was a cause of road accidents.
- More than half of the study respondents strongly agreed that traffic officers needed to enforce traffic laws without corruption.
- Most of the study respondents strongly agreed that drinking and driving contributed majorly to road accidents in the Ipeleng traffic area.
- Almost half of the respondents strongly agreed that road accidents would be avoided if drivers were not distracted when driving.

- Almost half of the respondents strongly agreed that lack of patience while driving in the heavy traffic caused accidents.
- Most of the respondents strongly agreed that using mobile phones while driving was a factor causing road accidents.
- More than a quarter of the study respondents agreed that traffic rules were not enforced strictly.
- More than half of the study respondents agreed that hastiness contributed to road accidents in the Ipeleng traffic area.
- More than half of the study respondents agreed that heavy traffic contributed to accidents in the Ipeleng traffic area.
- More than a third of the respondents agreed that even when passengers complained about speed, drivers did not listen to them.
- A third of the study respondents agreed that passengers sometimes encourage drivers to increase speed.
- More than half of the respondents agreed that one of the causes of road accidents in Ipeleng traffic area is anger of drivers.
- More than half of the respondents agreed that one of the causes of road accident in Ipeleng traffic area is depression and sadness of drivers.
- Most of the respondents agreed that one of the causes of road accidents in Ipeleng traffic area was anxiety of drivers.
- More than half of the respondents agreed that failure to use the correct or appropriate lane for driving caused road accidents.

With respect to road safety education, according to the study respondents, the following analogies can be drawn from this study:

- More than half of the study respondents strongly agreed that taxi drivers are not educated enough about the importance of road safety.
- Almost half of the respondents strongly agreed that taxi drivers did not wear the seatbelt unless he/she saw the traffic roadblock.
- More than a third of the respondents agreed that the law was not strict enough to prevent road accidents in Ipeleng traffic area.
- More than a third of the respondents agreed that the taxis on the roads were not roadworthy and not safe for passengers.
- The number of respondents who strongly disagreed that the community were involved in ensuring road safety were more than those who said otherwise.

With respect to the consequences of not following the rules of the road, according to the study respondents, the following analogies can be drawn from this study:

- Very few of the respondents strongly disagreed that suspended or revoked driver's licence was a consequence of not following the rules of the road while more than half agreed.
- More than half of the respondents agreed that facing jail time might be a consequence.
- Almost half of the study respondents agreed that bad driving behaviour could result in permanent criminal record.
- Most of the respondents agreed that drivers might face high speeding cost of fines and medical expenses.
- More than half of the respondents agreed that a mandatory court appearance could be a consequence.

- Most of the study respondents strongly agreed that not obeying the rules of the road destroyed families, through death of family heads.
- Almost half of the respondents agreed and almost a quarter of the respondents strongly agreed that the negative consequences of not following traffic rules were more than the positives.
- Most of the respondents strongly agreed that not obeying traffic rules could result in causing death on the road.
- More than half of the study respondents agreed that bad driving behaviour led to high insurance rates.
- Almost half of the respondents strongly agreed and more than a quarter agreed that bad driving behaviour led to blame-game.
- Most of the respondents strongly agreed that not obeying the traffic rules could cause disabilities or death to people.

With respect to the role of traffic officers in helping to reduce road accidents, according to the study respondents, the following analogies can be drawn from this study:

- More than half of the respondents agreed and a third strongly agreed that traffic officers' roles to reduce road accidents was through strict law enforcement.
- More than half of the respondents agreed that traffic officers' role to reduce road accidents was to arrest corrupt traffic officials.
- More than half of the respondents agreed that traffic officers' role to reduce road accidents was to report corrupt traffic officials.
- Most of the respondents agreed that traffic officers' role to reduce road accidents was to report bad roads to the department of transport for road maintenance.

With respect to the relationship between causes of road accidents and driver's behaviour, according to the study participants, the following analogies can be drawn from this study:

- Most of the respondents strongly agreed that good behaviour on the road by drivers could reduce or eliminate road accidents.
- Half of the respondents strongly disagreed that drunk driving could not cause accident on the road.
- More than half of the respondents strongly agreed that not maintaining the vehicle regularly could cause road accident.
- A third of the respondents strongly disagreed that they only fastened their seatbelt when they saw the traffic officials while more than one-fifth of the participants strongly agreed.
- Most of the study respondents strongly agreed that using a phone while driving could cause accidents on the road.
- Half of the respondents strongly agreed and about a quarter of the respondents agreed that lack of attention and concentration on the road when driving could cause accidents.
- About a quarter of the respondents strongly disagreed that it was the devil that caused accident on the roads and not bad driving behaviour.

According to the results obtained from the analysis, the following analogies can be drawn from the study:

- No difference in the responses to "Taxi drivers are not educated enough" by designation, age or gender.
- Female respondents were more likely to strongly agree or agree with the statement "Taxi driver doesn't wear the seatbelt unless he/she sees the traffic roadblock" than men.
- Traffic officers were most likely to strongly agree or agree that the law was not strict, followed by the traffic drivers and the taxi passengers. However, there was no difference in the responses to the statement among the different age groups and genders.

- There was no difference in the responses to the statement “The taxis on the roads are not roadworthy” among the different designations, age groups and genders.
- There was no difference in the responses to the statement “The community are involved in ensuring road safety” among the different designations, age groups and genders.
- When both the government punishment and bodily harm (both from “Consequences of not following the rules of the road”) were compared among the different designations of the participants, gender and age group, there were no statistically significant difference in the responses.
- Taxi drivers were most likely to strongly agree/agree that the role of traffic officers in helping to reduce road accidents is to teach all road users about the importance of road safety
- Designation, age and gender of the participants were not associated with either behaviour or attitude (both from “relationship between causes of road accidents and driver’s behaviour”)

Recommendations and conclusions

Recommendations from this research are drawn from the objectives and the findings. Recommendations are important because they give clarity on what can be done in future to resolve the problem of bad driving behaviour, the recommendations are as follow:

1. Create no-distraction driving policy.

Along with other safety policies, creating a no-distraction policy is very important. The primary reason for this policy is to prohibit drivers from using mobile devices while driving. It includes making or receiving calls plus reading and responding to text messages, when driving a vehicle (Keshavdas, 2021:1)

2. Knowledge of rules of the road

Drivers must be aware of the rules of the road and rights of way, road signs, road marking and load restrictions. This awareness will also alert and remind the drivers who do not know how to drive at intersections, at roundabout and pass the mountains (Arrive Alive, 2022).

3. Train the drivers

The most effective way to manage driver behaviour safety is by educating them and making the driver aware of the importance of road safety. show the driver the realities of unsafe diving, over-speeding, distracted driving, and bad behaviour. Create a program where drivers will be encouraged to perform better and offer appropriate incentives to motivate the individual driver’s performance. These incentives can uplift better driving and compliance (Keshavdas, 2021:1)

4. Effectiveness of seatbelts

Seatbelts are one of the most effective road safety interventions, wearing a seatbelt reduces the risk of ejection from a vehicle and suffering serious or fatal injury by 40-65% and their use is extremely cost effective to society. Effective use of seatbelts should be encouraged among drivers and passages to avoid road accidents, (World Health Organization, 2013).

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respects to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for this research authorship, and/or publication of this article

Ethics

Ethical standards were upheld in line with TUT stipulated ethical guidelines

Acknowledgement: This research was supported by friends and members of the family.

References

- [1] Alonsa,F, Esteban,C, Useche,S and Colomer, N.2018. Effect of Road Safety Education on Road Risky Behaviors of Spanish Children and Adolescents: Findings from a National Study. Int J Environ Res Public Health. Doi: 10.3390/ijerph15122828. Available (online) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6313808/>. (Accessed 23/07/2022).
- [2] Alvesson, M., & Skoldberg, K. (2009). Reflexive methodology: New vistas for qualitative research (2nd ed.). Thousand Oaks, CA: Sage.
- [3] Arnett, J.J., and Offer, D, 1997. Reckless driving in adolescence: state and trait factors, Accident Analysis and Prevention, no. 29, pp. 57-63.
- [4] Arrive Alive, 2018. *Drive Sober*. (Online). Available from: <http://arrivealive.co.za/> Experience the evidence (Accessed: 15/08/2019)
- [5] Arrive Alive, 2022. Education and Road Safety (Online) Available from: <http://arrivealive.co.za> (Accessed: 12/12/202)
- [6] Automobile Association of South Africa ,AASA, 2011. Department of Roads and Transport- Tow Truck Report. (Available online) https://utasa.co.za/index_htm_files/21%20-%20DEPARTMENT%20OF%20ROADS%20AND%20TRANSPORT%20TOW%20TRUCK%20REPORT.pdf. (ACCESSED 05/03/2021)
- [7] Aveyard, H., Hanlon, B., and Larget B, 2011. *Samples and Populations*, University of Wisconsin-Madison. Cameroon
- [8] Babbie, E., and Mouton, J.2001. *The practice of social research*. 8th ed. USA: Oxford University Press.
- [9] Baron, R. A., and Richardson, D.R. 1994. Human Aggression. New York: Plenum Press
- [10] Berkowitz L.2001. Affect, Aggression and antisocial behaviour. *Handbook of Affective Science*, ed. New York/ Oxford UK: Ox
- [10] Bromfield, N, Mohamed, M, 2017. Attitudes, Driving Behaviour, and Accident Involvement Among Young Male Drivers in Saudi Arabia. Available from : <https://www.sciencedirect.com/science/article/abs/pii/S1369847816302492?via%3Dihub>. (Accessed 01/10/2021)
- [11] Crowell, E,L, 2021. The ABC Model of Attitudes: Affect, Behaviour & Cognition. Study.com. (Available online) <https://study.com/academy/lesson/the-abc-model-of-attitudes-affect-behavior-cognition.html>. (Accessed 16/07/2021).
- [12] Department of Transport. South Africa , Cost of crashes in South Africa. Research and development report. Tshwane: Road Traffic Management Corporation; 2016. Available from: <http://www.rtmc.co.za/images/media/Cost%20of%20Crashes%20in%20South%20Africa%20-%20RTMC%20-%20September%202016.pdf> Links. (Accessed: 28/05/2020).
- [13] De Vos A.S., Strydom,H., Fouche, C.B. and Delpont, C.S.L.2011. *Research at grassroots for the social sciences and human service professions*. Pretoria: Van Schaik Publishers
- [14] Chang, C.M and Yeh, C.H ,2007. Why riders perform risky riding behaviour in Jakarta: THE EFFECTS OF HAZARDOUS SITUATION, *Gender and risk perception*.
- [15] Creswell, J.W, 2013. Research Design, Qualitative, Quantitative and mixed Methods Approaches, 3rd. SAGE
- [16] Furusa, S.S, and Mahlangu,G, 2016. A conceptual Model for Highway Speed and Enforcement in Zimbabwe, *Business Journal of Systems Integration*. Doi.10.20470/jsi.v7i4.269. (Available online) <https://www.semanticscholar.org/paper/A-conceptual-Model-for-Highway-Speed-Monitoring-and-Furusa-Mahlangu/170c607a073ef2529a34b6be5b2f701c1faab978>. (Accessed 04/07/2022).
- [17] Global Road Safety Partnership: Activities: GRSP. 2010. South Africa. Retrieved 09 07, 2010, from Global Road Safety Partnership web site: Available from www.grsproadsafety.com. (Accessed 11/12/2020)
- [18] Guetterman,T.C.2015. Description of Sampling Practices Within Five Approaches to Qualitative Research in Education and the Health Sciences. (Available Online) <https://www.qualitative-research.net/index.php/fqs/article/view/2290>. (Accessed 14/01/2019)
- [19] Hayes, A , L, I, T and Renfro, B, 2021. The unintended consequences of self driving cars. Available from: <https://www.investopedia.com/articles/investing/090215/unintended-consequences-selfdriving-cars.asp>. (Accessed 12/02/2021).

- [20] Hirasawa, M., Rengarasu, T and HAGIWARA, T. 2005. *Speed choice in relation to speed limit and influence from other drivers*, 5th ed. Oxford Publishers
- [21] Keshavdas, M,2021. 10 Awesome Ways To Improve Driver Behaviour & Safety. (Available online) <https://fleetroot.com/blog/10-awesome-ways-to-improve-driver-behavior-safety/>. (Accessed 26/07/2022).
- [22] Krishna, B.G.2002, Improving bus transport constraints and potential in Bangalore, in urban transport of growing cities high capacity bus systems, ed. W TIWARI, MACMILAN, INDIA.
- [23] McMillan , J.H & Schumacher, S, 2010. Research in Eduaction: Evidence-Based Inquiry, 7th ed. Virginia Commonwealth University. (Available online) [hccttps://www.pearson.com/us/higher-education/program/Mc-Millan-Research-in-Education-Evidence-Based-Inquiry-7th-Edition/PGM153294.html](https://www.pearson.com/us/higher-education/program/Mc-Millan-Research-in-Education-Evidence-Based-Inquiry-7th-Edition/PGM153294.html). (Accessed 15/03/2019).
- [24] National Highway Traffic Safety Amination (NHTSA), 2012. Seatbelts- saving thousands of lives around the world everyday. Available (Online) <http://seatbelts/> [Accessed: 15/04/2021]
- [25] Neumann, K and Abell, N.G, 2014. Qunatitaive Research Designs and Approaches. Available Online. https://www.researchgate.net/publication/266323766_Quantitative_Research_Designs_and_Approaches (Accessed: 2/02/2021)
- [26] Odufuwa, B.O., Salisu,U.,Omoniyi, S.2019. Driving Behaviour of Taxi Drivers towards Sustainable Public Road Transport in Ogun, State, Nigeria. [online] [semanticscholar.org/paper/Driving-Behaviour-of-Taxi-Drivers-towards-Public-in-Odufuwa-Salisu/a92deb54a5692a172294d60c2128a4c3e83853c3](https://www.semanticscholar.org/paper/Driving-Behaviour-of-Taxi-Drivers-towards-Public-in-Odufuwa-Salisu/a92deb54a5692a172294d60c2128a4c3e83853c3). pdf (Accessed 10/12/2020)
- [27] Ribbens, H and Everitt, P. 2008, *Impact an adequate road environment on the safety of non-motorized road users*, Medical Research council-University of South Africa
- [28] Road Traffic Collision (RTC), 2014. (Available online) <https://www.ddfire.gov.uk/road-traffic-collision-rtc>. (Accessed 15/06/2019)
- [29] Road Traffic Infringement Agency, RTIA, 2020, Annual Report,2020, *meeting the moment*. (Available Online) <https://www.rti.org/2020-annual-report>. (Accessed: 12/03/2019)
- [30] Samuels,P, 2020. A Really Simple Guide to Quantitative Data Analysis. *Statistics teaching resources*. Birmingham City University. (online) Available from: https://www.researchgate.net/publication/340838762_A_Really_Simple_Guide_to_Quantitative_Data_Analysis. (Accessed: 31/06/2020)
- [31] Small, M and Runji, J, 2014. Managing Road Safety in Africa, *A Framework for National Lead Agencies*.SSATP, Africa Transport Policy Program. (Available online) <https://www.ssatp.org/sites/ssatp/files/publications/SSATPWP101-Road-Safety-Framework.pdf>. (Accessed: 30/12/2019).
- [32] Sonja, E.2013. what Motivate Drivers to Disobey Traffic Regulations and How can we change this behaviour. 6th ed. Swedish Road and Transport Research Institute, VTI. 6th Road Safety on Four Continents Conference. (Available online) <http://vti.diva-portal.org/smash/get/diva2:759176/FULLTEXT01.pdf>. (Accessed: 19/01/2021)
- [33] Steyn, G.M, 2013. Fostering Teachers Professional Development Through Collaboration in Professional Learning Communities. *Teacher Empowerment Toward Professional Development and Practices*. (online) Available from: https://www.researchgate.net/publication/316356662_Fostering_Teachers'_Professional_Development_Through_Collaboration_in_Professional_Learning_Communities. (Accessed: 15/07/2020)
- [34] Taumang, E.M., Bello, P.O. & Olutola, A.A. 2022. An exploratory study of a law enforcement model for vehicle speed in Tshwane Metropolitan Municipality, South Africa. *International Journal of Research in Business and Social Science* 11(6) (2022) 572-583. ISSN: 2147-4478. Available online at www.ssbfnct.com. Journal homepage: <https://www.ssbfnct.com/ojs/index.php/ijrbs>
- [35] Transport and ICT Department, 2013, Road Safety in Africa, Available from: <http://www.road> safety in Africa [Accessed 10/09 2019]
- [36] Transport International Kenny United National Economic Commission for Europe Information Unit, UNECE. 2018. Road Safety: Cameroon must redouble its efforts and strengthen coordination. Press Releases. (Available online) <https://unece.org/press/road-safety-cameroon-must-redouble-its-efforts-and-strengthen-coordination>. (Accessed: 10/10/2021).
- [37] Walters, J.A, Hansen, E.C and Johns D.P. 2008. A mixed methods study to compare models 2008. Thorax

- [38] Walliman N, 2011. Research Methods the Basic. Oxford Brookes University, London, New York,
- [39] Wegman, F, Aarts, L and Bax, C.2008. *Advancing sustainable safety*: National road safety outlook for 2005-2020. Leidschendam, the Netherlands: Institute for Road Safety Research.
- [40] Western Sydney University Library, 2016. Literature review purpose. (Available online) https://www.westernsydney.edu.au/_data/assets/pdf_file/0006/1254786/Literature_review_purpose.pdf. (Accessed 18/10/2021)
- [41] Wolcshym, Y, 2018. Evaluating Inductive vs Deductive Research in Management Studies: Implications Emerald Insight, Available from: <http://www.research> approach [Accessed 11/11/2021]
- [42] World Health Organization, (WHO), Global status report on alcohol and health. (Available online) <https://apps.who.int/iris/handle/10665/44292>. (Accessed 10/05/2019)
- [43] World Health Organization, WHO, Strengthening Road Safety Legislation: A practice and resource manual for countries. (Available online) <https://www.arrivealive.co.za/documents/Strengthening%20Road%20Safety%20Legislation%20A%20practice%20and%20resource%20manual%20for%20countries.pdf>. (Accessed 26/07/2022).
- [44] World Health Organization, WHO, 2013. Effectiveness of seatbelts. (Available online) <https://seatbelts.who.int/iris/handle/106565/424492> (Accessed 11/05/2021)
- [45] Zhuo, S. Zhao, Z., Xu, X., Zhao, Y., Yao, Y., Peng, R. & Li, H. (2023) Driver State Monitoring System Based on YOLOv5 and Dlib. In: You, P., Li, H., Chen, Z. (eds) Proceedings of International Conference on Image, Vision and Intelligent Systems 2022 (ICIVIS 2022). ICIVIS 2022. Lecture Notes in Electrical Engineering, vol 1019. Springer, Singapore. https://doi.org/10.1007/978-981-99-0923-0_71

