

**UNDERSTANDING AND COMPLIANCE TO ROAD TRAFFIC SIGNS AMONG
COMMUTER MINIBUS DRIVERS IN MAKINDYE DIVISION, KAMPALA.**

BY

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20/U/11398/PS

**A RESEARCH DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF BACHELOR OF
ENVIRONMENTAL HEALTH SCIENCE OF MAKERERE UNIVERSITY KAMPALA**

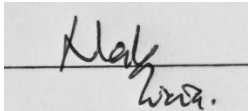
JUNE 2023

DECLARATION

I, Nakaggwa Patricia, hereby declare that this research dissertation is original and never has it been submitted to any university or institution for any award or any other qualification.

I therefore submit it for the award of the Degree of Bachelor of Environmental Health Science of Makerere University Kampala.

AUTHOR

A rectangular box containing a handwritten signature in black ink. The signature appears to be 'Nakaggwa Patricia' written in a cursive style, with a horizontal line drawn across the middle of the signature.

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Date: 11/10/2023

SUPERVISOR APPROVAL

This dissertation was developed by this student.

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A handwritten signature in black ink on a light-colored background. The signature is cursive and appears to read 'F. Oporia'. There are some horizontal lines drawn through the signature, possibly indicating a stamp or a correction.

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DEDICATION

I dedicate my work to my beloved brother Kanya Timothy for his endless support, guidance, and unmatched efforts to see me excel throughout my entire academic journey.

ACKNOWLEDGEMENT

First, I thank God Almighty who has brought me this far, watched over me and has enabled me to overcome the challenges throughout the course.

Secondly, all the thanks go to my supervisor Mr. Frederick Oporia for his tireless efforts and guidance which have enabled me to produce this work. I am grateful for continuous support and time spared to make this work come out as a success.

Special thanks go to the leaders at the different stages who welcomed me as I carried out my data collection.

Furthermore, I thank go to my lovely mother Nakitiibwa Beatrice Nalongo, my brothers Ssegujja Patrick and Kato Deogratus for their continuous support to see me become who I am today.

Finally, thanks to all my classmates AbenyTabisa, Wanyama Emmanuel, SenkubugeShafik, Alupo Mercy Bridget, Kyobutungi Sandra, Kigen Samali who in one way or the other have contributed to my academic success.

DEFINITION OF TERMS

Commuter minibus (taxi): This is a public service minibus vehicle with a capacity of 14 passengers.

Commuter minibus (taxi) driver: A person who drives passengers in a 14-seater commuter minibus, in Uganda commonly referred to as taxi.

Road safety risk factors: These include driving beyond the speed limit, distracted driving, drinking, and driving, not using the seat belt, and driving a vehicle in dangerous mechanical condition.

Road traffic crashes: This refers to a happening that causes injuries or death of an individual or damage of property that occurs in an area intended for public transport.

Road traffic signs: These are symbols, letters, numbers, or a combination of all that convey information, instructions, or warnings to a driver. For this case, the traffic signs include the zebra crossing sign, humps ahead sign among others.

ACRONYMS

BAC	Blood Alcohol Concentration
GDP	Gross Domestic Productivity
KCCA	Kampala Capital City Authority
KMA	Kampala Metropolitan Area
LMICs	Low and middle-income countries
MoWT	Ministry of Works and Transport
RTCs	Road Traffic Crashes
SDGs	Sustainable Development Goals
UBOS	Uganda Bureau of Statistics
UPF	Uganda Police Force
WHO	World Health Organisation

ABSTRACT

Introduction: Globally, road traffic crashes cause over 1.35 million deaths and leaving over 50 million people with disabilities every year. The most vulnerable road users are pedestrians, motor cyclists, and pedal cyclists. Many governments, Uganda inclusive, have put road traffic signs to regulate road user behavior among others. However, it is not known if commuter minibus drivers who are the major perpetrators of road crashes understand and comply with these signs.

The objective of this study is to assess the understanding and compliance to the road traffic signs among commuter minibus (taxi) driver in Makindye division, Kampala.

Methodology: This study will be conducted in Makindye division using a cross-sectional study design to interview 384 commuter minibus (taxi) drivers. The drivers will be sampled from their different stages in Makindye division using simple random sampling techniques. Data will be analysed using STATA version 13.0 and results reported using frequencies and figures.

Results: Generally, the understanding of the road traffic signs by the commuter minibus (taxi) drivers was low with majority understanding only what 5 signs mean of the 21 signs that is speed hump 98.2% (376/383), traffic lights 97.7% (374/383), pedestrian crossing 96.1% (368/383), bend to the right 77.3% (296/383) and children crossing 71.8% (275/383). Commuter minibus (taxi) drivers comply to these road traffic signs that is pedestrian crossing, children crossing, speed hump and traffic lights. Faded road traffic signs 52.7% (202/383) were found to be the major barrier hindering compliance with road traffic signs. Reflective material of the road traffic sign 60.6% (232/383), presence of traffic officers 57.4% (220/383), color of the road traffic sign 59.0% (226/383) and its size 53.3% (204/383) were found to motivate the drivers to comply with the road traffic signs.

Conclusion: The commuter minibus (taxi) drivers barely understood the meaning and complied to the road traffic signs.

CHAPTER ONE

1 INTRODUCTION AND BACKGROUND

1.1 Introduction

Road traffic crashes are a serious global problem causing mortality and injuries however these can be prevented (WHO 2018). Globally amongst all age groups, road traffic crashes are the eighth leading cause of death exceeding diseases like tuberculosis, HIV/AIDS, and diarrheal diseases (WHO 2018). However, World Health Organisation (WHO) predicts that by 2030, road traffic crashes will be the fifth leading cause of death globally (WHO 2009). Annually, more than 1.35 million people die on roads worldwide leaving about 50 million people with injuries (WHO 2018). Of these, low and middle-income countries contribute over 90% of the fatalities on the world's roads (WHO 2009). Having an average fatality rate of 27.5 deaths per 100,000 population, low-income countries have a high fatality rate of road traffic crashes, which is 3 times higher than that in high-income countries with a fatality rate of 8.3 deaths per 100,000 population (WHO 2018). Amongst the many measures that have been put in place to curb these deaths are road traffic signs that convey important information to all road users.

Over the years, road traffic signs are the most used traffic control devices (Makinde and Opeyemi 2012). Road traffic signs convey information in words or symbols (Al-Madani and Al-Janahi 2002). These road traffic signs are divided into three categories warning signs that notify the road user of danger and its nature, regulatory further sub-divided into special regulation, prohibitory and mandatory signs, and informative signs which include direction signs among others (Castro and Horberry 2004). With these signs in place, road users have enough information to maintain order, to be warned and directed while on the road (Makinde and Opeyemi 2012). Road traffic signs are tools aimed at promoting traffic safety by providing important information in a short time to support safe driving however for this to be successful, these signs must be understood by the drivers (Kirmizioglu and Tuydes-Yaman 2012). Therefore, if the driver does not understand the information pertaining safe driving behavior encoded in the sign, then the road traffic sign has not served its intended purpose. However, an effectiveness road traffic signs should be able to make the road users pay close attention, convey a simple and clear meaning, command road user respect and fulfil their need and give enough time for a proper response(Al-Madani and Al-Janahi 2002).

Traffic signs play a big role in achieving road safety (Ezeibe, Ilo et al. 2019). For instance, in Hungary, road traffic signs were used to eliminate the three spots on the highway with high fatal rates (Ezeibe, Ilo et al. 2019). Because of road traffic signs, there was a 41% decrease in road

traffic injuries in the United Kingdom (Berhard, Evdorides et al. 2006). Also developing countries such as Mexico and Columbia use road traffic signs to reduce road traffic crashes (Rodríguez, Fernández et al. 2003). In Nigeria a study showed that lack of effective road traffic signs at sharp bends and road intersections is the major cause of road traffic crashes (Ezeibe, Ilo et al. 2019). Similarly in Mumbai, road traffic crashes are majorly caused by poor traffic signs and lack of warnings (Ezeibe, Ilo et al. 2019). Researchers have in the past few decades been interested in the relationship between road traffic signs, congestion, and occurrence of road traffic crashes (Makinde and Opeyemi 2012). A study in Nigeria, Akure city showed that the major cause of road traffic injuries in this city is related to the general perception that drivers in this city have a low level of understanding of road traffic signs (Makinde and Opeyemi 2012).

In developed countries various studies have been conducted on the understanding of road traffic signs (Al-Madani and Al-Janahi 2002, Kirmizioglu and Tuydes-Yaman 2012). This can be related to the fact that traffic professionals and engineers consider successful road signage to be that can be comprehended by road users (Ng and Chan 2008). Understanding of road traffic signs can be affected by several factors which may be design factors, individual factors including driver physical characteristics and environmental conditions. For the road traffic signs to be understood, they should comply with the ergonomic design principles though the UN conventional designs vary among countries (Shinar, Dewar et al. 2003). These ergonomic principles are familiarity of the driver with the road traffic sign depending on their experience, compatibility relating to the driver perception of the sign and standardization which relates to the color and shape of the signs being consistent across all similar signs (Ben-Bassat, Shinar et al. 2019). Driver personal characteristics such as education level, monthly income and nationality affect understanding of road traffic signs this is because they are associated with the understanding capacity of the drivers (Al-Madani and AlJanahi 2002).

Despite the importance of road traffic signs in promoting road safety, they are neglected in most developing countries. Therefore, governments have a strategy of strengthening legislation by adopting and enforcing road traffic regulations as a way of changing road user behavior to promote road safety though various countries still lack legislation (WHO 2018). Some of the risk behaviors include driving under the influence of alcohol, driving beyond the speed limit, being distracted by the phone while driving, reckless driving, and unlicensed drivers. These risk behaviors affect identification and recognition of road traffic sign and hence failure to process and understand what

the road signs mean. For instance, a driver under the influence of alcohol can be a victim of excessive speeding (WHO 2017). This could be due to failure of the impaired driver to identify the road traffic signs for example, the regulatory signs for example speed limit signs. For compliance to traffic safety information such as that warning drivers about the above-mentioned risk factors, countries have come up with different measures such as the use of the auditory warning system and treated pavement to draw the driver's attention on the road hence complying with the road safety signs. However, this being expensive it cannot be afforded in developing countries (Kang and Momtaz 2018).

Developing countries have instead managed some of these risk behaviors and promote compliance to the road traffic signs using the different road traffic regulations dependent on the country. For example, the blood alcohol concentration (BAC) limit not exceeding 0.05g/dl for the entire driving population and not exceeding 0.2g/dl for young and beginner drivers because beyond these levels there is rapid impairment of the driving behavior that puts the passengers at risk (WHO 2018). This also affects the driver's ability to identify and interpret the road traffic signs. Even though random breath testing is done, it is not on a routine basis in some countries therefore drivers still practice it but also there is limited data about the problem and its extent (WHO 2018). Regulatory traffic signs such as those for speed limit are guided by the national speed limit laws. These include speed limits not exceeding 50km/h in urban areas and not exceeding 30km/h in areas having many activities of pedestrian as well as residential areas and local authorities that can adjust speed limits (WHO 2018). Enforcement strategies put in place are both manual the most used and automated that is use of cameras and mobile fitted devices though these are expensive thus not used in low-income countries (Wali, Ahmed et al. 2017).

1.2 Background

The African region experiences 26.6 deaths per 100,000 population due to road traffic crashes (Organization 2015). Most countries rely on road transport as the most used transport mode since it is cheap and readily available compared to others even though roads constructed do not cater for all road users and ensure their safety (WHO 2015). In sub-Saharan Africa, road traffic crashes are the seventh leading cause of death amongst males with Central Western and Eastern regions having the highest death rates due to road traffic crashes globally (Facility 2014). On average, Uganda compared to the rest of East Africa has the highest number of people lost to road traffic crashes in a day that is 10 people per day causing it to loss approximately USD 1.2 billion to road crashes (UN 2018).

World Health Organisation (WHO) ranks Uganda number 6 in terms of road traffic crashes (WHO 2020). Uganda experience road traffic crashes that contribute to 28.9 deaths per 100,000 population, which is higher that of the African region and global average that is 24.1 deaths per 100,000 population and 18.0 deaths per 100,000 population respectively (Balikuddembe, Ardalan et al. 2017). According to Uganda Police Force, in 2020 and 2021 there was 42% increases in the number of road traffic crashes from 12,249 to 17,443 respectively (UPF 2021). Kampala Metropolitan Area (KMA) has the highest number of registered vehicles as compared to the other areas and the highest number of road crashes (KCCA 2021). For example, in 2016, 50% of the road crashes occurred in Kampala with 22% of these fatal of the road traffic injures nationally therefore a road safety strategy aimed at halving the number road crashes and deaths in Kampala by 2030 (UN 2018).

Commuter minibuses also known as taxis are one of the most used public transport mode in Kampala city a 14seater public service minibus vehicle and so far, Kampala Capital City Authority has registered 12,184 taxis attached to particular routes (KCCA 2021). In 2015, 82.6% of the residents in Kampala used minibus taxi to travel to their different residential areas with in the five divisions of Kampala (Ndibatya and Booyesen 2021). Most of the vehicles (90%) including the taxis imported from since the country cannot manufacturing its own and these are often already used vehicles with less vehicle inspection since the country has four inspection centres that are not often used.

Uganda roads lack facilities for road users that are non- motorized and a licensing system with poor driving standards that explains the high contribution of drivers towards road traffic crashes

(UN 2018). The Traffic and Road safety Act with the traffic regulations enforced by Uganda police through operations undertaken to manage driver speed, breath testing, check if the drivers are licensed, seatbelt use amongst others and in order to ensure compliance and promotion of safe driving behavior, operations such as the 2016 operation Fika Salama have been put in place (UN 2018). Uganda police during enforcement it ensures that the drivers use the seat belts, the blood alcohol concentration (BAC) limit for all drivers does not exceed 0.08g/dl and the speed limit in urban areas does not exceed 50km/h (KCCA 2021). However, despite all these efforts, compliance of the drivers with the existing regulations aimed reducing the risk behaviors that affect the compliance with the road traffic signs, has still not been achieved.

According to the Uganda police annual crime report 2021, 336,722 traffic violators were arrested due to failure to comply with the existing road traffic regulations 17% for careless driving, 16% having vehicles in dangerous mechanical conditions, 19,636 for not wearing seat belts, 19,653 for having invalid driving licenses (UPF 2021). Despite the presence of a road sign to let the drivers know the existence of zebra crossing, a study found out that pedestrians are at a high risk of being injured as they cross the road from a zebra crossing (Oporia, Tumwesigye et al. 2020). It is from this that we need to know if the drivers understand the road traffic signs and their compliance with these signs.

CHAPTER TWO

2 LITERATURE REVIEW

2.1 Introduction

According to the WHO Global status report 2018, road traffic injuries are the 8th leading cause of death globally amongst all age groups ahead of diarrheal diseases, HIV/AIDS, and tuberculosis but it is also estimated that by 2030 road traffic injuries will be the 5th leading cause of death globally (WHO 2018). Every year approximately 1.35 million people die due to road traffic injuries and amongst these the death due to road traffic injuries are 3 times higher in low and middle-income countries as compared to high-income countries with the highest in Africa and South-East Asia having 26.6/100,000 and 20.7/100,000 deaths respectively (WHO 2018). Road traffic injuries are the leading cause of death amongst the young adults and children of age 15- 29 years (WHO 2018). The most affected road users who contribute to more than half of the road traffic deaths include the pedestrians, motorcyclists and cyclists with Africa having the highest number of pedestrians and cyclists who die that is 44% (WHO 2018). This is because they are exposed, less protected, and not favored by the road designs in various countries.

The United Nations General Assembly in relation to the sustainable development agenda of 2030 adopted the Sustainable Development Goals (SDGs) (WHO 2018). For purposes of promoting global road safety, SDG target 3.6 aiming at halving the number of deaths and injuries due to road traffic crashes and SDG 11.2 aiming at providing access to safe, affordable, accessible, and sustainable transport systems for all road users by expanding public transport focusing on those in vulnerable situations by 2030 were focused on (WHO 2018). According to the WHO Global Status Report 2018, high-income countries have best practices laws as compared to low and middle-income countries (WHO 2018). The report shows that 46 countries have speed limit laws for example existence of national speed laws, speed limit not exceeding 50km/h in urban areas and not exceeding 30km/h in residential areas or areas with a lot of pedestrian activities (WHO 2018). Drink-driving laws in 45 countries presence of a national drink-driving laws, a blood alcohol concentration of not exceeding 0.05g/l and not exceeding 0.02g/l for young and beginner drivers (WHO 2018). These legislations were put in place to manage the risk factor behavior of drivers such as speeding, drinking, and driving, seatbelt usage and distracted driving though compliance is still low in many countries (WHO 2018). The above risk factors can affect the compliance with road traffic signs. This study therefore aims at exploring the understanding and compliance with road traffic signs by commuter minibus (taxi) drivers in Makindye division, Kampala.

2.2 Understanding of the road traffic signs by drivers.

Countries depend on their legislation to design the road traffic signs their shape, size, color and location (Berrio, Barrero et al. 2022). Foreexample, the Manual on Uniform Traffic Control Devices for streets and highways used in the United States looks at the traffic signs having a uniform design in terms of location, message, size, color, and shape which provides road users with the same message continuously and hence a need to understand the meaning (Huckaby, Brown et al. 2001). Furthermore, in Colombia and Mexico of Latin America traffic sign design comprises of the size, color and shape all combined with pictorial symbols and messages simple to understand (Transporte 2015). The Convention on Traffic Signs and Signals of Europe has in place standard size, shape and colors used in traffic sign designs (Europe 2008). However, authorities are not well versed with the extent to which the road users understand the traffic signs, the road users understand some traffic signs more than others and the designs of the traffic signs affects the ability of the road users to understand them (Berrio, Barrero et al. 2022).

Traffic signs are defined as road equipment in form of either letters, symbols, numbers, sentences, or a combination of the above used as warnings, prohibitions, orders or instructions for road users (Suhardi, Ishartomo et al. 2021). Traffic signs consist of warning signs, prohibitory signs, command signs and information signs (Suhardi, Ishartomo et al. 2021). Driver knowledge on the road traffic signs can contribute to their understanding of these signs (Abduljabbar, Jaleel et al. 2020). Traffic signs can be used as a tool to promote behavior change amongst divers (Meis and Kashima 2017). Traffic signs can be violated because of failure of humans to understand the meaning of these signs, the drivers are also not interested in the traffic signs thus not motivated to comprehend these signs but also there is weak supervision and enforcement (Winarso 2016). In addition to this, a study in Indonesia showed that there is ignorance of traffic signs and factors like rush moments, probability of getting stuck in traffic jam may influence the failure to recognize as well as internalization of the traffic signs to understand what they mean since they pay less attention (Suhardi, Ishartomo et al. 2021). More to that there is poor enforcement attributed to limited personnel this therefore not only provides few for the awareness sessions but also provides less motivation to drivers to understand what the traffic signs mean (Suhardi, Ishartomo et al. 2021).

High distracted driving among young adult drivers which causes shifted focus therefore causing failure to understand the traffic signs for example an observational study in England shows some of the causes of distractions that include mobile phone use, adjusting controls such as the radio,

talking with passengers as well as eating and drinking (Sullman 2012). Faded and blurred traffic signs can affect driver understanding of the traffic sign due to failure to know what the sign means (Suhardi, Ishartomo et al. 2021). Other factors such as time of the day affect the driver's ability to recognize and understand the traffic sign since visibility is limited to the retro-reflective material on the road sign that also depends on the color of headlights of the vehicle and the illumination angle that are associated with the vehicle (Saleh and Fleyeh 2021).

A study in Nigeria showed that despite the existence of traffic signs on the roads though their effectiveness is not felt, and it also shows that the young and elderly drivers find it difficult understand these signs (Adedeji, Hassan et al. 2016). In Uganda particularly Kampala no studies have been done to show the understanding of traffic signs by commercial minibus (taxi) drivers this study therefore aims at showing the understanding of commercial minibus (taxi) drivers in Makindye division, Kampala.

2.3 Compliance to the road traffic signs by drivers.

Road traffic lights convey a visual language to the drivers (Johnson and Adebayo 2011). Compliance to these road traffic signs can be influenced or affected by several factors as shown in different studies. The integrated strategy to prevent road traffic deaths and injuries has enactment and enforcement of legislation as one of its important components (WHO 2018). According to the WHO Global Status report on Road Safety, high-income have better practice laws as compared to low and middle-income countries (WHO 2018). This report shows that 46 countries have speed laws, 45 countries have drink-driving laws, and 105 countries have seat belt laws aligning with best practices (WHO 2018). The existence of legislation can be a starting point to promoting compliance since it backs up the existing road traffic signs and therefore this helps in enforcement of the to ensure compliance with the respective traffic signs.

In order to suit best practices, 22 countries made improvements in their laws in regard to one or more risk factors that include speeding, drink- driving and seat belt use (WHO 2018). Speeding and drink driving can affect visibility of the road traffic signs and hence affect compliance to these signs therefore, having legislation to regulate these behaviors helps in promoting compliance to the road traffic signs. In 2015, Thailand amended its speed law from a speed limit not exceeding 80km/h in urban areas to the current best practice of not exceeding 50km/h in urban areas and 30km/h in residential or high pedestrian activity areas (WHO 2018). Similarly, Brazil in 1998 had a drink- driving law with a BAC level of 0.06g/dl but later in 2008 the government enacted a new

law called the Dry law that changed the BAC level from 0.06g/dl to 0.02g/dl and caused a decrease in road traffic injuries and deaths in the state of Sao Paulo (WHO 2018). The government of Brazil enacted the law furthermore in 2012 to enable the traffic officers to use evidence-based measures that include the use of videos and clinical signs to identify drink-driving offenders who have any measurable alcohol in their blood as well as twice an increase in fine by the offenders (WHO 2018). With the legislation present, drivers are informed of the legal speed limits through the signposts that is the road traffic signs for speed limit (WHO 2017). Therefore, the drivers can end up complying with the speed limit traffic signs since it is a law from the government.

In European Union, the different countries use enforcement as a way of promoting compliance. The countries have similar sanctions in place for the traffic offenders that include fixed fines, fines from court procedures that is for some specific cases but also those involving injury accidents, suspension of the driving license, restrictions on driving and imprisonment (Mäkinen, Zaidel et al. 2003). Other than fines and imprisonment various countries have resorted to adding more consequences for those who do not comply with the traffic legislation, and these are rehabilitation, suspension of the driving license, mandatory medical and psychological tests, requirement for re-licensing and remedial courses (Mäkinen, Zaidel et al. 2003). With fear of the different penalties, drivers will be forced to comply with the different measures in place the road traffic signs backed up by these traffic laws to avoid inconveniences. In addition to enforcement, education campaigns promote compliance since they raise awareness, which gives knowledge about the existing road traffic signs and their benefits (Al-Hajj, El Hechi et al. 2022). Knowledge creates a desire to act therefore having higher knowledge promotes high chances of being obedient. Public awareness through communication campaigns creates an understanding as to why risk behavior and attitude should be stopped thereby acting as a driving force for compliance (Faus, Alonso et al. 2021).

Some individual factors such as driver attitude hinder compliance in that they make the drivers ignore the outcomes in this case compliance depends on the consequences they perceive from their behavior for example drivers who speed expect a positive outcome out of it such as quickly reaching their destination (Forward 2009). Furthermore, drivers who consider themselves very skilled disregard the negative outcomes that may come from non-compliance (Forward 2013). The belief that drivers get that non-compliance will not cause any negative consequences because the drivers have not exposed to any of these consequences over the years that they did not comply with the road traffic signs therefore the drivers do not consider themselves vulnerable to the negative consequences of their non-compliance (Forward 2013).

Other factors affecting compliance to the road traffic sign include visibility mostly at nighttime, which is in turn affected by the driver's ability to read and process the information on the road traffic sign (Saleh and Fleyeh 2021). Visibility is directly affected by factors such as age, and driver skills (Saleh and Fleyeh 2021). The driver's ability to read and process the traffic sign information depends on factors such as the shape, size, design and message design factors of the traffic sign for example font type, letter height, text height enables the driver to read the road traffic sign (Bullough 2017). This in the end helps promote compliance with the road traffic signs. More to that retro-reflectivity of the road traffic signs thus easy to spot out during the night (Bullough 2017). Other factors affecting the driver's ability to read the traffic signs include the streetlight, ambient level of illumination and location of the signs (Bullough 2017). If the driver can read what the road traffic sign says and process the information, this may promote compliance of the drivers to what the traffic sign instructs them to do.

According to a survey carried out by the African Development Bank in 17 countries on Road safety in Africa, most countries have laws on traffic speed, seat belt use, drink- driving laws with specified blood alcohol concentration limits though implementation of these and enforcement are still limited (Bezabeh 2013). The African Development Bank has interventions on road safety in place these include sensitization, traffic sign provision and measures to curb speeding (Bezabeh 2013). Countries have road safety laws in place to control speeding, driving when drunk, and use of safety devices such as a seat belt (Bezabeh 2013). For example, 17 surveyed countries have either national or local regulations on traffic speed based on roads in urban or rural areas and vehicle type (Bezabeh 2013). 76% of the surveyed countries have a law that prohibit driving under the influence of alcohol and for a crash caused due to driving under the influence of alcohol resulting into death or injuries, a severe penalty is given in almost all the countries (Bezabeh 2013). A third of the country's carryout random breath tests and a few other carryout both the random tests and soberness checks to prevent drink driving and 95% of the surveyed countries have a law on mandatory seat belt use (Bezabeh 2013).

In addition, African countries, conducted road safety campaigns on a regular basis addressing issues such as driving beyond the speed limit, seat belt use and driving under the influence of alcohol (Bezabeh 2013). These campaigns create awareness on the effects of the risk behaviors and the different measures in place to curb these behaviors such as road traffic signs for example a study in Southern Nigeria shows that safety education increased the compliance to the road safety signs (Johnson and Adebayo 2011).

In Uganda, enforcement of the traffic laws is focused to improve road safety (UN 2018). This enforcement comprises of comprising of checks along the roadside and operations to manage speed (UN 2018). This therefore helps in promoting compliance with the different measure in place that promote road safety including the road traffic sign. However, enforcement is not effective due to staff shortage (40%) of traffic officers but also lack of enough logistics such as speed guns and patrol vehicles (UN 2018) which hinders compliance. In Kampala, for better enforcement a training plan and curriculum for capacity building of traffic officers (KCCA 2021).

CHAPTER THREE

3 PROBLEM STATEMENT, JUSTIFICATION, CONCEPTUAL FRAMEWORK AND

RESEARCH QUESTIONS.

3.1 Problem statement

In Uganda, Kampala Metropolitan Area has the highest of road crashes and the largest number of registered vehicles compared to other parts of the country (KCCA 2021). Commuter minibus (taxis) are the 2nd most used public transport mode in Kampala city (KCCA 2021). Commuter minibus drivers are known for reckless driving which contributes to over 76% of the road crashes that mostly affect pedestrians and motorcyclists compared to other road users (UPF 2021). In addition, they are associated with risk factors for failure to understand and comply with road traffic signs. These include speeding which increases the risk of crashing, and the impact of the crash is greater on the vulnerable road users such as motorcyclists and pedestrians. These crashes can result in either severe injuries or death, considering a principle that says any 1% mean speed increase, raises the risk of a fatal crash by 4% and risk of serious injury by 3% (FINCH, Kampfner et al. 1994). Also driving under the influence of alcohol increases the chances of crash occurrence as well as its severity since alcohol impairs the drivers causing about 5% - 35% of deaths on the road (WHO 2019).

Road traffic signs are one of the measures put in place to curb road traffic crashes and ensure safety for all road users. Therefore, there is a need for the commuter minibus (taxi) driver to understand as well as comply to these signs. It has been estimated that injuries from road crashes are associated with high socio-economic burden due to time lost when a person is hospitalized for either a short or a long period. Even though 30.1% of people in Uganda earn less than 1.77 USD per person in a day (UBOS 2019/2020), treating a severely injured boda-boda crash casualty costs approximately seven million Ugandan shillings (2800 USD) (Sebaggala, Matovu et al. 2017). However, treatment does not eliminate the chances of someone getting either temporary or permanent disability but also death. In addition, the anxiety that comes with the injury and death of a road traffic victim leaves and society with uncertainty of the future.

While Uganda Police continues to sensitize the public on road safety measures, enforcement of the road traffic regulations and the presence of road signs, the number of road traffic crashes continues to grow to new heights each year. What remains unknown is whether the drivers understand these road traffic signs and the extent of their compliance with the existing road traffic signs. This study

therefore seeks to explore the understanding and compliance to the road traffic signs among commuter minibus (taxi) drivers in Makindye division, Kampala.

3.2 Justification

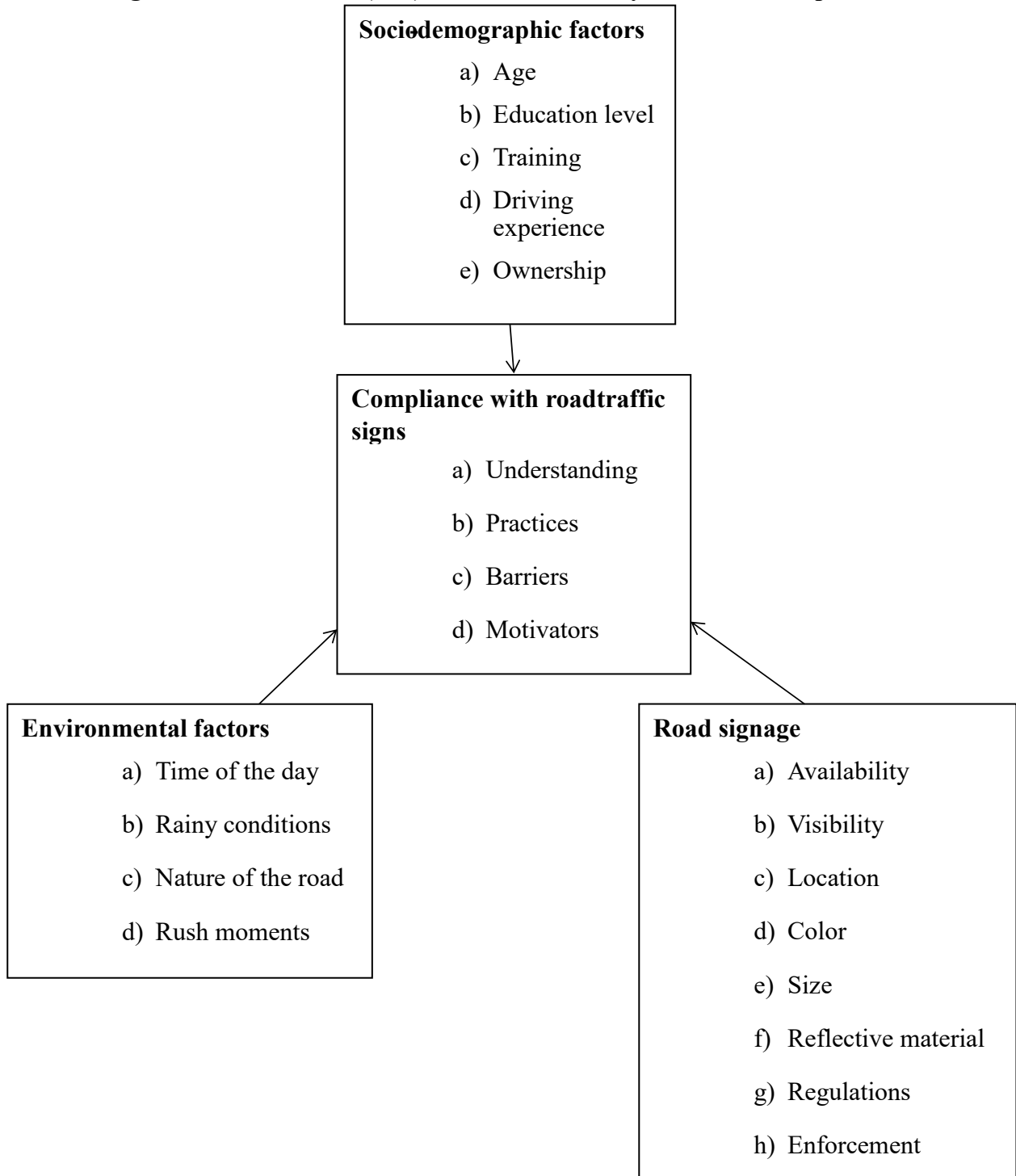
The number of road traffic crashes (RTCs) and deaths continue to rise every year in Uganda, making the Ugandan roads one of the most unsafe worldwide (WHO 2018). According to the Uganda Police Annual crime reports of 2020 to 2021, over 12,249 to 17,443 RTCs were reported, indicating a 42% increase with 3,757 of the crashes in 2021 being fatal (UPF 2021). In East Africa, Uganda loses the highest number of people to RTCs that is an average of 10 people per day (UN 2018). Of these 22% occurred in Kampala only and the surrounding areas. The most affected groups are the vulnerable road users such as the pedestrians, motorcyclists (commonly known as boda-boda) contributing to 33% and 34 % of the fatalities respectively (UPF 2021). Amongst the common perpetrators of these crashes and deaths are commuter 14-seater minibus (taxi) drivers who are the most common violators of road traffic regulations. Many of these drivers are known for driving on the road shoulders, pedestrian walkways, overtaking, speeding and many other kinds of reckless and careless driving which contribute to 76% of the road crashes (UPF 2021).

Road traffic signs help to curb road traffic crashes and ensure safety for all road users. Therefore, not knowing if the commuter minibus (taxi) drivers understand and comply to the road traffic signs contributes to a further violation of these signs thus increase in road traffic crashes, which result into death, trauma and disabilities among the pedestrians, motorcyclist as well as passengers in these vehicles. This study aims at knowing whether the commuter minibus (taxi) drivers understand and comply the road traffic signs, which informs if they know what these road signs mean and follow this with action or there is need for more sensitization and education campaigns to be done. It also identifies the barriers that hinder the compliance of commuter minibus (taxi) drivers with road traffic signs such that they can be addressed to promote compliance but also identify the motivators that promote compliance with these signs and support them in order to increase on the number commuter minibus (taxi) drivers that comply.

Uganda looking forward to attaining SDG 11.2 by 2030 that looks at improving road safety by expanding public transport. Therefore, identifying the gap in compliance by one of the most used public transport means will help guide the government, Ministry of Works, and Transport (MoWT), Uganda Police force, Kampala Capital City Authority, Uganda National roads Authority and other stakeholders to formulate and implement the necessary interventions in order to promote

road safety for all road users. SDG target 3.6 that aims at halving the number of global deaths and injuries from road traffic crashes (RTCs) therefore, this study will enable the relevant stakeholders to know how best road traffic signs can be used to achieve this target. If the study is not done it will not be known to what extent do commercial minibus (taxi) drivers understand and comply to the road traffic signs, what road traffic signs are understood more than others and the factors that affect compliance to these signs. The study will help cover the knowledge gap that will guide interventions such as enforcement, sensitization programs, restoration of the faded signs and what to change in the design of the traffic signs to ease and improve understanding by the commercial minibus (taxi) drivers. Therefore, if the study is not conducted it will not be known if these drivers understand and comply to the road traffic signs and what should be done where to promote compliance and ensure that these drivers understand resulting into reduction of road traffic crashes.

3.3 Conceptual framework of the factors that promote compliance with road traffic signs among commuter minibus (taxi) drivers in Makindye division, Kampala.



3.4 Narrative

Several factors directly influence the understanding of and compliance with the road traffic signs and these either motivate or act as barriers that hinder compliance with these signs. These factors include the existence of road traffic signs, environmental and social demographic factors.

Environmental factors such as nature of the road that is along a straight the road traffic signs can be easily identified but also murrum roads do not have road traffic signs. Weather conditions for example rainy conditions may affect the driver's visibility and failure to identify the road traffic signs thus affecting compliance but it may also hinder speeding since some roads get slippery after it rains. For time of the day, during day, chances are high of finding traffic officers who enforce compliance with the road traffic signs but also these signs are easily seen this therefore can motivate compliance of the commuter minibus (taxi) drivers other than in the night when there are few traffic officers on the road and visibility is limited to artificial lights. Rushing moments that include hours of the day when all people are rushing to work in the morning or in the evening when everyone is going back home create congestion along the road thus enough time to observe the surrounding features including the road traffic signs. These also come along with the need of commuter minibus (taxi) drivers to make more shifts hence failure to recognize or even limited time process and understand what the road traffic signs mean and hence not complying with these signs.

Existence of road traffic signs is the starting point to promoting compliance with these traffic signs. The existence of road traffic regulations against the risk factors such as drink driving, speeding and seat belt use that affect compliance with the road traffic signs hence help in promoting compliance with these signs. These road traffic regulations also inform some of the existing road traffic signs such as those related with speed limit which act as reminders and hence promoting compliance of the commuter minibus (taxi) drivers. Awareness about these traffic signs in addition to enforcement measures both manual and automated put in place also promote compliance. This also depend on how often people are made aware and how often is enforcement done.

Social demographic factor such as age hinder compliance since the young often drive beyond the speed limit and the old usually practice drink driving thus affecting compliance with the road traffic signs due to failure to process and understand these signs. Education level affects the ability of the commuter minibus (taxi) drivers to read, interpret, understand the road traffic signs and hence failure to comply. Driving experience promotes compliance since beginners are always conscious and obedient to avoid making mistakes as compared to those who have spent some good time driving and have been exposed to these road traffic signs.

3.5 Research questions

1. What do the commuter minibus (taxi) drivers in Makindye division, Kampala understand by the road traffic signs?
2. What are the practices of the commuter minibus (taxi) drivers in Makindye division, Kampala when they see the road traffic signs?
3. What are the motivators contributing to the compliance of commuter minibus (taxi) drivers in Makindye division, Kampala with the road traffic signs?
4. What are the barriers contributing to the compliance of commuter minibus (taxi) drivers in Makindye division, Kampala with the road traffic signs?

CHAPTER FOUR

4 OBJECTIVES OF THE STUDY

4.1 Broad objectives

To assess the understanding and compliance with road traffic signs among commuter minibus (taxi) drivers operating in Makindye division, Kampala to inform government efforts in improving road safety for all road user with attention paid to the road safety risk factors such as speeding and no seatbelt use.

4.2 Specific objectives

1. To assess the understanding of road traffic signs among commuter minibus (taxi) drivers operating in Makindye division, Kampala.
2. To assess the compliance with road traffic signs among commuter minibus (taxi) drivers operating in Makindye division, Kampala.
3. To determine the barriers and motivators of compliance with road traffic signs among commuter minibus (taxi) drivers operating in Makindye division, Kampala.

CHAPTER FIVE

5 METHODOLOGY

5.1 Study area

The study was conducted in Makindye Division, one of the five divisions in Kampala Capital City Authority (KCCA) in Uganda. Makindye Division is located in the Southeast of Kampala city, in the East, it is bordered by Murchison Bay which is a part of Lake Victoria (KCCA, 2017). The population within the division is 154,342 (UBOS, 2014). The division is made up of 21 parishes and 978 villages. Makindye division was selected for this study because according to the annual crime report 2021 by Uganda Police, it had the highest number of road crashes that is 2713 crashes as compared to the other areas of Kampala Metropolitan Area (UPF 2021).

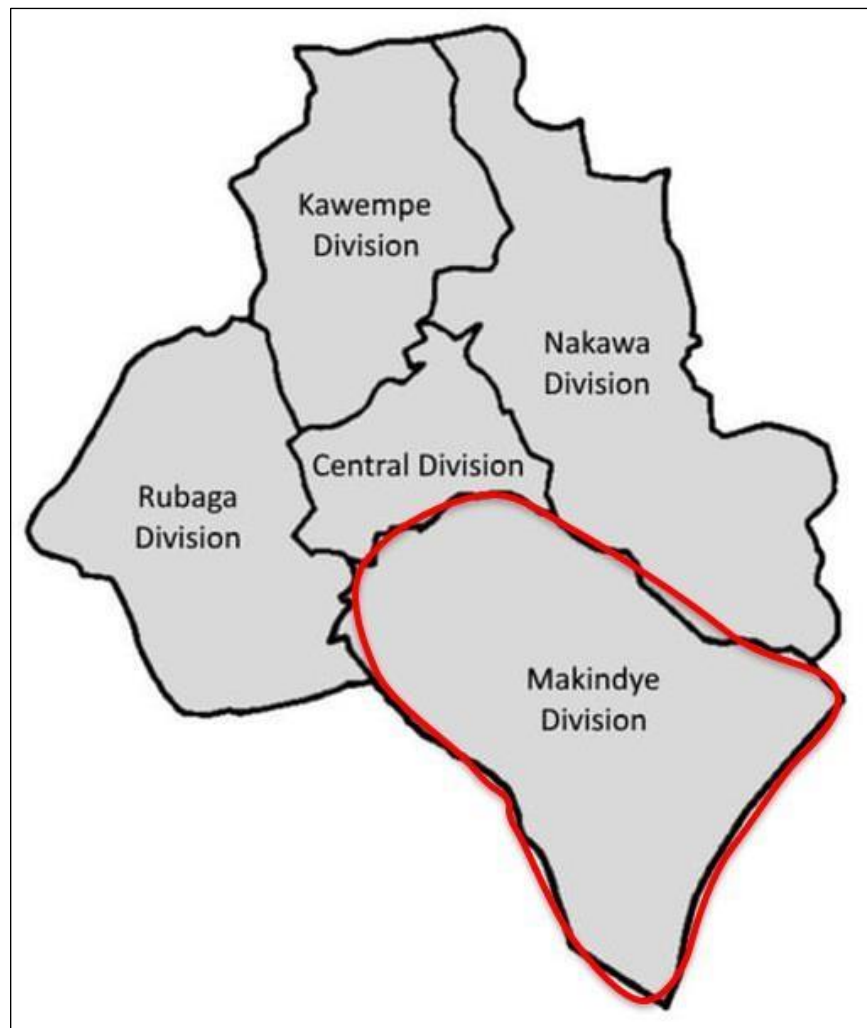


Figure 1: Map of Kampala showing Makindye Division

Study population

Commuter minibus (taxi) drivers who operate in Makindye division stages.

5.2 Study design

The study design was a descriptive cross-sectional study employing quantitative data collection methods.

5.3 Sample size

The sample size was determined using the Kish Leslie formula for cross sectional studies.

$$n = z^2 pq / d^2$$

Where, **n** is the required sample size **z** is the standard normal deviate at 95% confidence interval, taken as 1.96 **p** is the prevalence of commuter minibus (taxi) drivers who comply with the road traffic signs. For this study the prevalence will 50% since there are no previous studies **q** is the probability that the commuter minibus (taxi) drivers do not comply with the road traffic signs. (1-p) **d** is the maximum acceptable error for the study which is 5%

$$n = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2}$$

$$n = 384.16$$

Therefore, the study participants will be 385.

5.4 Sampling procedure

The stages at the taxi parks for the taxis that ply the routes of the different destinations in Makindye division were identified and the drivers were selected using simple random sampling until the sample size is achieved.

5.5 Study variables

5.5.1 Dependent variable

Compliance with the road traffic signs.

5.5.2 Independent variable

Social demographic factors such as age were measured in complete years, income level measured, driving experience measure by how long the taxi driver has spent driving and the highest education level was measured.

Environmental factors such as time of the day, rainy conditions, rush moments and nature of the road were also measured.

Road traffic signage the existence of the traffic signs on the road, their color, size, shape, reflective material, visibility, location, enforcement as well as their understanding by the commuter minibus (taxi) drivers and practices were measured.

5.6 Eligibility criteria

5.6.1 Inclusion criteria

Commuter minibus (taxi) drivers who had done this work for at least six months. This is because by this time, they may be knowing the traffic signs along the roads but also, they have been exposed to several factors that motivate or hinder their compliance with the road traffic signs.

5.6.2 Exclusion criteria

On average, the commuter minibus (taxi) driver makes 5 trips in a day depending on the time of the day which affects the availability of passengers, the number of commuter minibuses (taxis) that operate at that stage, distance to travel and traffic jam along the way. Commuter minibus (taxi) drivers who make less than 3 trips a day since reduces their exposure to the road traffic signs and other factors such as rush hours, enforcement that could motivate or hinder their compliance.

5.7 Quality control

5.7.1 Translation of the data collection tool

The researcher was to translate the questionnaire into Luganda a local language commonly used in this area and the translated words should still maintain their meaning. This help avoid a bias that may arise due to language barrier.

5.8 Pre-testing

The researcher pre-tested the questionnaire in Nakawa division which is close to Makindye division prior to data collection. This helped to identify any mistakes and correct them, to add questions that were left out when designing the questionnaire but also remove the irrelevant questions from the questionnaire.

5.9 Pre-visiting

The researcher visited where data is to be collected prior to the study to clearly locate and be well versed with where to find the study population.

5.10 Field data editing

The researcher checked the data collected in a day to find out if it is accurate, complete and consistence. This helped to identify any missing information and have it filled.

5.11 Data collection tools

A structured questionnaire was used to collect quantitative data on the understanding of road signs. The barriers and motivators contributing to the compliance of the commuter minibus (taxi) drivers as well as their practices when they see these signs were assessed quantitatively using a questionnaire.

5.12 Data collection procedure

Prior to data collection the researcher introduced herself to the eligible, sought for their consent and if they agree, the researcher then proceeded with data collection and those that did not agree, the researcher looked for the next eligible respondent.

Data was collected through a face-to-face interview using an online structured questionnaire. This was used to collect data on the understanding of the road traffic signs where selected road traffic signs that are most used in Kampala city and roads of Makindye Division were printed out and used to ask the study participantsto find out if they understand the meaning of these signs. In addition to this they were asked where the signs are often located to give a know more on their understanding. They were also asked their actions for each of the signs hence data on compliance obtained. More to this, the respondents were asked what motivates them to do what they do or what hinders them from doing what they are supposed to do, and this provided more data about compliance.

5.13 Data management and analysis

The collected data was edited and then checked for consistency. Analysis was done at univariate level of analysis using STATA version 13. At univariate analysis level, descriptive analysis was done. Proportions, measures of central tendency and measures of dispersion were obtained, and the results presented using graphs and tables.

5.14 Ethical considerations

Makerere University School of Public Health gives the researcher approval to proceed with the research. More to that, the researcher first sought for the consent of the participants before the interview that gives the participants a right to either accept or decline the research study. Letting the participants know that before the interview that no incentive was to be given to them such that

they do not expect any at the end. The questionnaire used during the interview did not have the participants name to ensure of confidentiality. The participants had full authority to withdraw from the interview at any point in time during, before or even at the end of the interview, questions from the participant are welcome.

5.15 Study limitation

Convincing the commuter minibus (taxi) drivers to participate in the study since they are always looking for passengers. The researcher overcame this by using the leaders to engage these drivers, making the interview short.

False information regarding the understanding of the traffic signs. This was overcome by testing them on the traffic signs they know and by probing.

5.16 Dissemination of results

The study finding will be presented to Makerere University School of Public Health for the partial fulfillment of the requirements to be awarded a Bachelor degree in Environmental Health Science. This research will also be availed for the various stakeholders to guide in policy making and coming up with interventions.

CHAPTER SIX

6 RESULTS

In this chapter, the results from the study are presented as per the objectives.

6.1 Social demographic characteristics of commuter minibus (taxi) drivers

This study achieved a response rate of 99.7% (383/384). All the respondents were male with a mean age of 34.9 years and a standard deviation of 7.0 years. They worked from the different stages in the taxi parks and most of them were married 53.8% (206/383), catholic 34.2% (131/383) with the majority having attained secondary education 58.0% (222/383). Most of the commuter minibus (taxi) drivers 47.8% (183/383) had a driving experience of 5 years and above, 75.5% (289/383) did not own the commuter minibus (taxi) and 80.0% (306/383) were not trained to operate the commuter minibus (taxi). The majority of the commuter minibus (taxi) drivers do not own the commuter minibus (taxi) they drive (Figure 1). The commuter minibus (taxi) drivers operate at different stages (Figure 2).

Table 1: Social demographic characteristics of commuter minibus (taxi) drivers

Variable	Frequency (n=383)	(%)
Age (Average = 34.9±7.0)		
20-24 years	6	(1.6)
25-29 years	97	(25.3)
30-34 year	109	(28.5)
35-39 years	63	(16.4)
40-44 years	62	(16.2)
45-49 years	34	(8.9)
50 years and above	12	(3.1)
Marital status		
Married/cohabiting	206	(53.8)
Single	177	(46.2)
Religion		
Catholic	131	(34.2)
Muslim	114	(29.8)
Protestant	107	(27.9)
SDA	31	(8.1)
Highest education level		
Primary	88	(23.0)
Secondary	222	(58.0)
Tertiary (including university)	73	(19.1)
Driving experience		
1-2 years	22	(5.7)
3-4 years	178	(46.5)
5 years and above	183	(47.8)
Source of training		
From a friend/relative	33	(8.6)
From driving school	44	(11.5)
Not trained	306	(80.0)

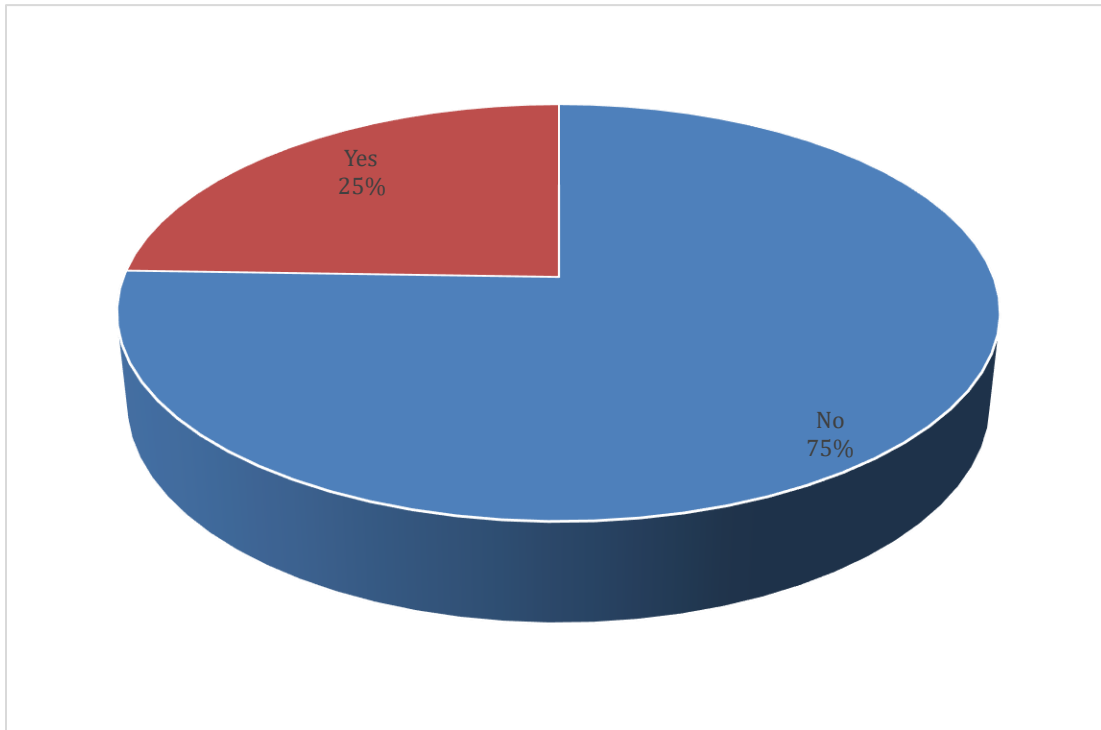


Figure 2: Ownership of the commuter minibus (taxi)

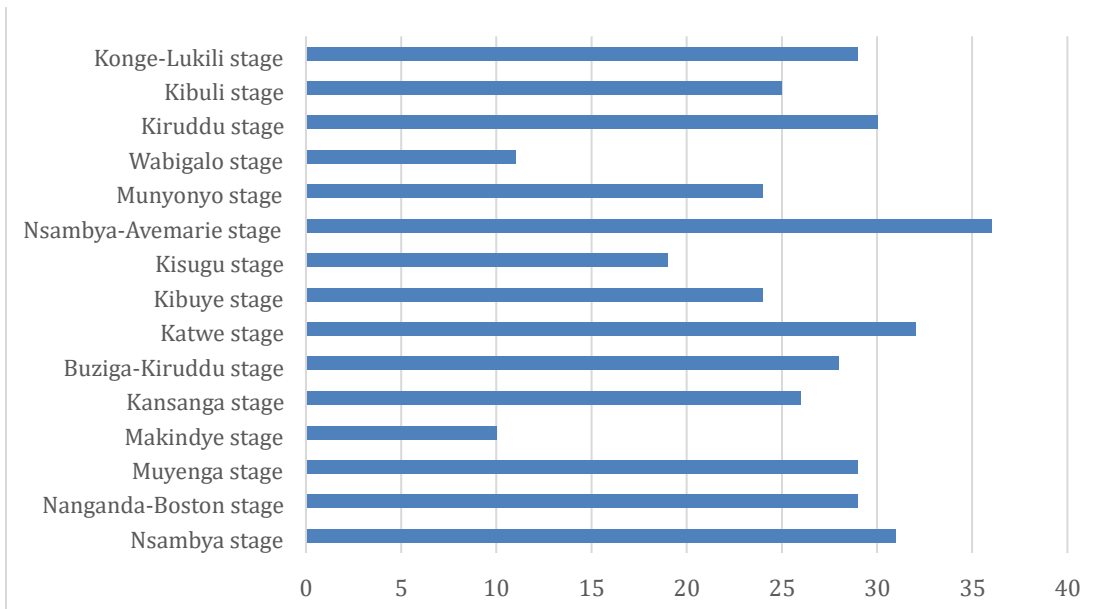


Figure 3: Stage names

6.2 Understanding of road traffic signs by commuter minibus (taxi) drivers.

Source of information on road traffic signs

The majority of the commuter minibus (taxi) drivers 53.3% (204/383) heard about road traffic signs from fellow commuter minibus drivers (Figure 3). Other commuter minibus (taxi) drivers heard about road traffic signs from traffic officers, from friends/relatives and from the driving school.

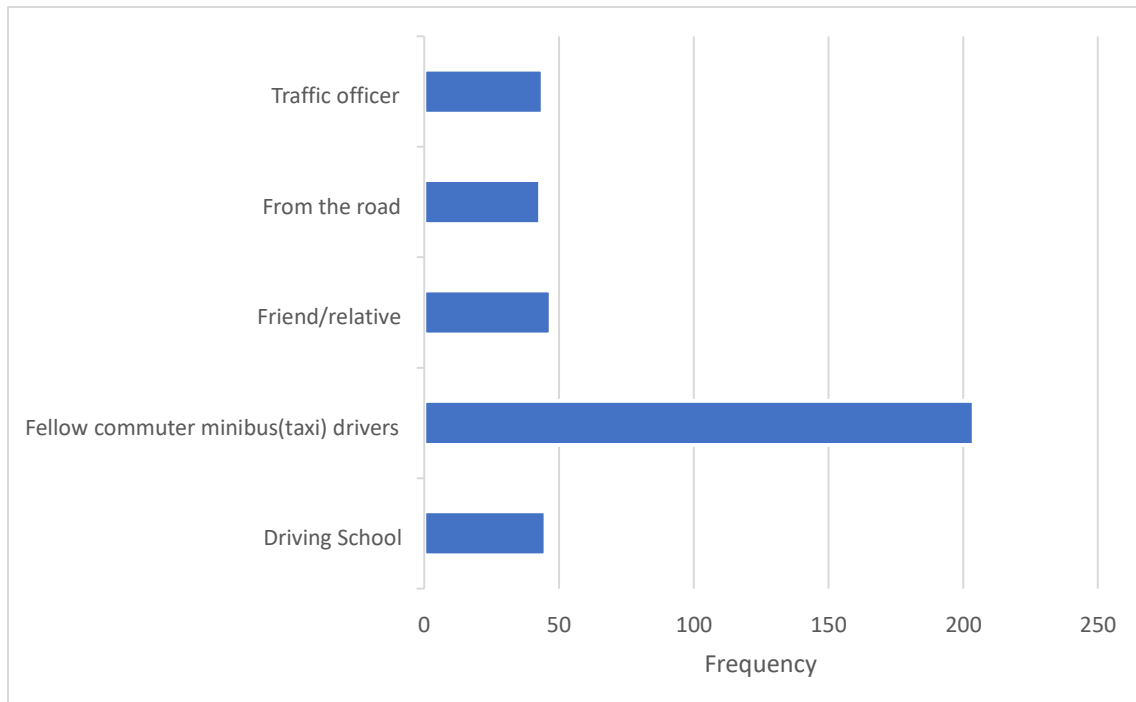


Figure 4: Source of information on road traffic signs

The majority of the commuter minibus (taxi) drivers 98.2% (376/383) understood what road traffic speed hump means. Most of the commuter minibus (taxi) drivers understood what the road traffic signs for traffic lights 97.7% (374/383), pedestrian crossing 96.1% (368/383), bend to the right 77.3% (296/383) and children crossing 71.8% (275/383) meant. Most of the commuter minibus (taxi) drivers 9.7% (37/383) did not understand what the road traffic sign for give way means, Table 2.

Table 2: Knowledge of road traffic signs by the commuter minibus (taxi) drivers

Variable		Frequency (n=383)	(%)
Pedestrian crossing	No	15	(3.9)
	Yes	368	(96.1)
Children crossing	No	108	(28.2)
	Yes	275	(71.8)
Speed hump	No	7	(1.8)
	Yes	376	(98.2)
Give way	No	346	(90.3)
	Yes	37	(9.6)
No U-turn	No	246	(64.2)
	Yes	137	(35.8)
No left turn	No	252	(65.8)
	Yes	131	(34.2)
Pass on either side	No	185	(48.3)
	Yes	198	(51.7)
Bend to the right	No	87	(22.7)
	Yes	296	(77.3)
Speed limited	No	212	(55.4)
	Yes	171	(44.7)
No entry	No	310	(80.9)
	Yes	73	(19.1)
No parking	No	298	(77.8)
	Yes	85	(22.2)
No overtaking	No	240	(62.7)
	Yes	143	(37.3)
One way	No	154	(40.2)
	Yes	229	(59.8)
Road work	No	151	(39.4)
	Yes	232	(60.6)
Round about	No	214	(55.9)
	Yes	169	(44.1)
Side road to the left	No	253	(66.1)

	Yes	130	(33.9)
Crossroads ahead	No	300	(78.3)
	Yes	83	(21.7)
T-intersection	No	310	(80.9)
	Yes	73	(19.1)
Traffic lights	No	9	(2.4)
	Yes	374	(97.7)
Seat belt use	No	305	(79.6)
	Yes	78	(20.4)
Hospital	No	269	(70.2)
	Yes	114	(29.8)

6.3 Compliance of the commuter minibus (taxi) drivers with the road traffic signs.

The majority of the commuter minibus (taxi) drivers through their practices, they comply to these road traffic signs that is to say pedestrian crossing by stopping to let the pedestrians cross the road 74.2% (284/383), children crossing by stopping to let the children cross 69.5% (266/383), speed hump by slowing down 99.7% (382/383) and traffic lights by taking caution to see what the traffic lights instruct me to do 97.1% (372/383) respectively. Road traffic signs for no U-turn, no left turn, no entry, no parking and no overtaking had most commuter minibus (taxi) drivers' carryout practices opposite to what the road traffic sign means that is to say make a U-turn 59.8% (229/383), turn to the left 60.3% (231/383), driving along the road where the road traffic sign is 59.3% (227/383), parking where the road traffic sign is 70.2% (269/383), overtaking 55.1% (211/383) respectively. Most of the commuter minibus (taxi) drivers 90.9% (348/383) ignore the give way road traffic sign. Furthermore, the majority of the commuter minibus (taxi) drivers ignored the road traffic signs for hospital 74.2% (284/383), T-intersection 80.4% (308/383), crossroads ahead 78.1% (299/383), sideroad to the left 85.4% (327/383) and round about 56.4% (216/383).

Table 3: Practices of the commuter minibus (taxi) drivers when they see the road traffic signs.

Variable	Frequency (n=383) (%)
Pass on either side	
Drive on either side	196 (51.2)
Do not drive here	66 (17.2)
Ignore the road traffic sign and continue driving	121 (31.6)
Bend to the right	
Slow down	11 (2.9)
Slow down, drive in the direction of the arrow	72 (18.8)
Drive in the direction of the arrow	219 (57.2)
Ignore the road traffic sign and continue driving	81 (21.2)
Speed limited	
Drive at a speed of 50km/h or less	165 (43.1)
Drive at a speed above 50km/h	204 (53.3)
Ignore the road traffic sign and continue driving	14 (3.7)
One way	
Drive in the direction of this road traffic sign	251 (65.5)
Drive in the direction opposite to that of the road traffic sign	25 (6.5)
Ignore the road traffic sign and continue driving	107 (27.9)
Road work	
Slow down	45 (11.8)
Slow down, take caution while driving	146 (38.1)
Ignore the road traffic sign and continue driving	161 (42.0)
Take caution while driving	31 (8.09)

**Multiple choice questions*

The majority of the commuter minibus (taxi) drivers 52.7% (202/383) agreed that faded road traffic signs hinder their compliance. Most of the commuter minibus (taxi) driver disagreed that rain conditions 46.7% (179/383), the location of the road traffic signs 65.0% (249/383), nature of the road 69.7% (267/383), time of the day 50.9% (193/383) and rush moments 38.1% (146/383) hinder their compliance with the road traffic signs. In addition to this, more than half of the commuter minibus (taxi) drivers 54.1% (207/383) disagreed that they could not read. The majority of the commuter minibus (taxi) drivers 61.6% (236/383) disagreed that they have eyesight problems and 61.1% (234/383) disagreed that they do not know what road traffic signs are.

Table 4: Barriers to compliance to road traffic signs by commuter minibus (taxi) drivers

Variable		Frequency (n=383)	%
The road traffic signs are faded	Agree	202	(52.7)
	Disagree	110	(28.7)
	Strongly Agree	36	(9.4)
	Strongly disagree	35	(9.1)
Rainy conditions	Agree	121	(31.5)
	Disagree	179	(46.7)
	Strongly Agree	10	(2.6)
	Strongly disagree	73	(19.1)
The road traffic signs are obstructed	Agree	170	(44.4)
	Disagree	142	(37.1)
	Strongly Agree	27	(7.05)
	Strongly disagree	44	(11.5)
The location of the road traffic signs	Agree	66	(17.2)
	Disagree	249	(65.0)
	Strongly Agree	12	(3.1)
	Strongly disagree	56	(14.6)
Nature of the road	Agree	58	(15.1)
	Disagree	267	(69.7)
	Strongly Agree	4	(1.04)
	Strongly disagree	54	(14.1)
Time of the day	Agree	32	(8.4)
	Disagree	193	(50.4)
	Strongly Agree	14	(3.7)
	Strongly disagree	144	(37.6)
Rush moments	Agree	128	(33.4)
	Disagree	146	(38.1)
	Strongly Agree	45	(11.8)

Most of the commuter minibus (taxi) drivers strongly agreed that the reflective material of the road traffic signs 60.6% (232/383) and the presence of traffic officers 57.4% (220/383) motivate them to comply with the road traffic signs. Over half of the commuter minibus (taxi) drivers agreed that the color of the road traffic sign 59.1% (226/383), its size 53.3% (204/383) and their availability 59.5% (228) motivates them to comply with the road traffic signs. The same number of commuter minibus (taxi) drivers 49.1% (188/383) agreed that exposure to the road traffic signs and driving experience motivates their compliance with the road traffic signs.

Table 5: Motivators of compliance to road traffic signs by the commuter minibus (taxi) drivers

Variable		Frequency (n=383)	%
Reflective material of the road traffic signs	Agree	151	(39.5)
	Strongly Agree	232	(60.6)
Color of the headlights	Agree	226	(59.0)
	Disagree	3	(0.8)
	Strongly Agree	154	(40.2)
Presence of traffic officers	Agree	163	(42.6)
	Strongly Agree	220	(57.4)
The color of the road traffic sign	Agree	226	(59.1)
	Strongly Agree	157	(41.0)
The size of the road traffic signs	Agree	204	(53.3)
	Disagree	54	(14.1)
	Strongly Agree	125	(32.6)
How often the driver is exposed to the road traffic signs	Agree	188	(49.1)
	Disagree	84	(21.9)
	Strongly Agree	84	(21.9)
	Strongly disagree	27	(7.05)
Driving experience	Agree	188	(49.1)
	Disagree	102	(26.6)
	Strongly Agree	64	(16.7)
	Strongly disagree	29	(7.6)

CHAPTER SEVEN

7 DISCUSSION

7.1 Social demographic characteristics of commuter minibus (taxi) drivers

This study assessed the understanding and compliance to road traffic signs among commuter minibus (taxi) drivers in Makindye division in Kampala city. The results show that all the respondents were male. This was not surprising because another study found that the taxi driver business is male dominated (Spooner, Mwanika et al. 2020). This dominance is not only because of the dangers of this occupation that are life threatening due to working till late in the night but also the strong cultural background of Uganda that specifies work done by males and females. This therefore makes men more vulnerable to road crashes yet in most cases they are the breadwinners of their families. The commuter minibus (taxi) drivers work at different stages where they onload and offload passengers. This was not different from another study that showed a similar organisation amongst commuter minibuses (taxis) (Spooner, Mwanika et al. 2020). This is a way of creating organization within the taxi parks, but it also eases location of the commuter minibuses by the passengers. Over half of the commuter minibus (taxi) drivers had attained secondary education as their highest level of education. This is like a study that showed that 68% of the taxi crew members had attained secondary education as the highest level of education (Spooner, Mwanika et al. 2020). This may be because of the financial challenges that force many of the commuter minibus drivers not to afford further education. These results indicates that most of the commuter minibus (taxi) drivers can read the words and interpret the symbols used on most of the road traffic signs. The results show that majority of the commuter minibus (taxi) do not own the commuter minibuses they drive. Not different from a study that showed that just a few taxi drivers who are owner drivers (Spooner, Mwanika et al. 2020). This is because a taxi costs a lot of money thus not affordable to many of the commuter minibus (taxi) drivers. From this study, most of the commuter minibus (taxi) drivers are not trained. This is like the study which showed that apart from secondary education most drivers and conductors (90%) do not get additional training (Spooner, Mwanika et al. 2020).

7.2 Understanding of road traffic signs by commuter minibus (taxi) drivers.

From this study, all the commuter minibus (taxi) drivers had ever heard of or seen road traffic signs. This indicates that the responsible body that is MoWT has taken an initiative in ensuring that there are road traffic signs on most of the roads within KMA and the country at large.

Generally, the study showed that most of the commuter minibus (taxi) drivers understood less than half of the road traffic signs presented to them for identification and interpretation. This low level of understanding of these important road signs is a threat to road safety in general. This is likely to continue increasing risks of crashes and the burden of road traffic crashes and deaths. The results of this study are not different from another study conducted in Akure City, Ondo state of Niger that also found low levels of understanding of road traffic signs among the drivers ((Makinde and Opeyemi 2012). In addition, all the road traffic signs tested were symbolic and this could have contributed to the low levels of understanding like a study which showed that drivers often misunderstand symbolic signs (Al-Madani and Al-Janahi 2002). The few road traffic signs that the commuter minibus (taxi) drivers understood must be those that they are familiar with similar to a study that showed that drivers can easily guess what the road traffic signs they are familiar with mean (Chan and Ng 2010).

7.3 Compliance of the commuter minibus (taxi) drivers with the road traffic signs. Practices of the commuter minibus (taxi) drivers when they see the road traffic signs.

The study shows low levels of compliance to road traffic signs by the commuter minibus (taxi) drivers. These low compliance levels increase the risk of road traffic crash occurrence which result into either severe injuries or death however, this may also call for more efforts to ensure that these drivers comply. These efforts may include enforcement measure or even awareness creation done by responsible bodies on what the different road traffic signs mean or strictness in licensing by emphasizing the understanding of road traffic signs before issuing a driving permit. These results are similar to a study that showed that understanding has a positive impact on the compliance with traffic rules (Akple, Sogbe et al. 2020). This low level of compliance can be attributed to the failure to understand the meaning of road traffic signs. This is seen in a study that showed non-compliance of motorcycle drivers due to misinterpretation of the road traffic sign no motorcycle entry as motorcycles permitted (Ben-Bassat and Shinar 2006).

7.4 Barriers to compliance to road traffic signs by the commuter minibus (taxi) drivers

Most of the commuter minibus (taxi) drivers agreed that faded road traffic signs hinder their compliance. This is because when a road traffic sign is faded, its physical properties such as color and reflective material have deteriorated making it difficult for the commuter minibus (taxi) drivers to identify these signs along the road or even understand what the sign instructs them to do. In

addition, a faded road traffic sign may not be easily identified rainy conditions or even at night due to the non-reflectivity of its material. Fading of the color of a road traffic sign is attributed to continuous exposure to sunlight and rain (Kuang, Fu et al. 2018). This calls for periodic maintenance and follow up on the conditions of the road traffic signs by the responsible body. Most of the commuter mini (taxi) drivers disagreed that rainy conditions do not hinder their compliance with the road traffic signs. This is because the commuter minibuses (taxis) have wipers that sweep off the raindrops on the wind screen. Therefore, the commuter minibus (taxi) driver can see ahead thereby identifying the road traffic signs on the road and thus promoting compliance. However, this contradicts with a study which shows that driver visibility is strongly affected by raindrops on the windshield (Sato, Domany et al. 2012). Another study also shows that weather conditions such as rain affect the clarity of the sign images (Kuang, Fu et al. 2018). Over half of the commuter minibus (taxi) drivers disagreed that time of the day does not affect their compliance with the road traffic signs. This is because light from the vehicle headlights is reflected by the retroreflective material of the road traffic sign making it visible for the driver to rightfully interpret the text and symbols on the signs (Saleh and Fleyeh 2021). This therefore motivates the commuter minibus drivers to comply to the road traffic signs thus promoting road safety.

7.5 Motivators of compliance to road traffic signs by the commuter minibus (taxi) drivers

From this study, commuter minibus (taxi) drivers strongly agreed that the reflective material motivates their compliance with the road traffic sign. Reflected light is affected by the type of retroreflective material of the sign, environmental conditions, and the color as well as brightness of the vehicle headlights (Saleh and Fleyeh 2021). A study showed that the retroreflective sheeting material of road traffic sign increases their visibility mostly during the night (Khrapova 2019). Therefore, with increased visibility comes easy identification of the road traffic signs on the road by the commuter minibus (taxi) drivers and hence complying to what the sign instructs them to do. Over half of the commuter minibus (taxi) drivers agreed that color and size of the road traffic sign motivates their compliance. The uniqueness in color and shape of the road traffic signs increases the driver's ability to distinguish them from the other signs while on the road. A study conducted showed that there is a link between object properties that is color and size and its visibility (Porathe and Strand 2011). From this study, the number of commuter minibus (taxi) drivers who agreed that exposure to the road traffic signs and driving experience motivates their compliance was the same. Driving experience is how long someone has been a driver, and this

comprises of driving frequency. Driving frequency is directly proportional to the driver's exposure to the road traffic signs. Therefore, the more the driving frequency, the more the driver is exposed to these signs. With an increased exposure to road traffic signs, chances are high that the commuter minibus (taxi) drivers can develop curiosity which influences their need to understand what the signs mean. A study conducted showed that there is a direct proportionality between the level of understanding the meaning of road traffic signs and the driving frequency (Ng and Chan 2008). This in the end increases the level of compliance to road traffic signs.

7.6 Study weaknesses and strengths

Study weaknesses

Social desirability bias. Since data was collected through a self-reported interview, there is a possibility that the respondents answered the questions from the interview basing on what the researcher wanted to hear.

Generalizability the results cannot be generalized to the whole of Kampala since it was conducted only in Makindye Division.

A few of the road traffic signs were used not all and they were all symbolic. This is because the researcher focused on the road traffic signs most common on roads in Makindye division, Kampala.

It was not possible to conduct qualitative interviews to validate the quantitative given the mobile and busy nature of the respondents.

Study strengths

The sample size was big enough to generalize the results to commuter minibus drivers in Makindye Division.

As far as the researcher and literature reviewed is concerned, this is the first research of its kind that has ever been conducted in Makindye division.

CHAPTER EIGHT

8 CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

Generally, most of the commuter minibus (taxi) drivers do not understand what the road traffic signs mean, and they do not comply with these signs. Barriers to the compliance of the commuter minibus (taxi) drivers is majorly faded road traffic signs which affects the color as well as the reflective material of the sign thus affecting the driver's ability to read or even identify these signs on the road. Motivators to the compliance of the commuter minibus (taxi) drivers are color, size and reflective material of the road traffic signs.

8.2 Recommendations

To the Ministry of Works and Transport

- Adding brief text to the symbols on the different road traffic signs as this improves the understanding and hence interpretation of what is the sign means at a reduced processing time. This addition should be done to all the similar road traffic signs throughout to create familiarity among the commuter minibus (taxi) drivers to these signs.
- Maintenance of the road traffic signs to replace those that are faded, misplaced, or broken and those with missing portions.
- Provide training sessions through which the commuter (taxi) drivers are equipped with information on the road traffic signs thus boosting their understanding.
- Should put in place measures to ensure compliance such as fines and punishments for those who do not comply.

To the commuter taxi drivers

- They should avail themselves for the training session to receive the necessary information on what the different road signs mean and what is expected of them.
- Since many of the commute minibus taxi drivers were conductors in the first place, peer sharing of information should be done such that the drivers who have been equipped with the information on road traffic signs share it with those they train to become drivers.

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10APPENDICES

10.1APPENDIX I: CONSENT FORM

Good morning/ afternoon Sir

My name is Nakaggwa Patricia, a student at Makerere University School of Public Health. I am conducting a research study “EXPLORING THE UNDERSTANDING AND COMPLIANCE TO ROAD TRAFFIC SIGNS AMONG COMMUTER MINIBUS (TAXI) DRIVERS IN

MAKINDYE DIVISION, KAMPALA”. I am requesting for your participation in my research study.

Purpose of the research

This study focuses on the understanding and compliance to road traffic signs among commuter minibus (taxi) drivers in Makindye division, Kampala. This research is purely academic and does not have any negative impact on you. Your participation in this study will help us generate information on improving road safety in Kampala and Uganda at large.

Procedure

If you agree to take part in this study, you will be required to sign this form to show that we have not forced you. After that, we will ask you some questions about your knowledge regarding traffic signs. This process will not take more than 15 minutes of your time.

Possible benefit

The study does not have direct benefits to the participants. However, the information obtained will guide the stakeholders come up with better measures for promoting compliance to traffic signs in the fight against road traffic crashes in Uganda.

Risk of participation

We do not anticipate any risks to you if you choose to participate in this interview. **Confidentiality**

Information collected from the participant in this study does not include the participant’s name even in the results to be disseminated. The information will be kept confidential with the participants known to only the researcher and will only be used for purposes of this research study. No one will identify anything you said.

Your rights

Participation in this study is voluntary. No one will force you to be interviewed. You have the right to ask questions on anything you have not understood. You don’t have to answer some questions that make you uncomfortable. You have the right to withdraw from this study at any time you want. In case you have any questions, feel free to contact the researcher, Ms. Patricia NAKAGGWA, on +256782303295 or on email patricianakaggwa@gmail.com

Statement of consent

The researcher has explained to me the details of this study and I have understood everything. I agree to be interviewed without any coercion or force.

Participant's signature: **Date:**

10.2 APPENDIX II: QUESTIONNAIRE

QUESTIONNAIRE NUMBER

Interview date

Parish

Stage name

SECTION A: SOCIAL DEMOGRAPHICS

1. How old are you as of your last birthday?

- 20-24 years
- 25-29 years
- 30-34 years
- 35-39 years
- 40-44 years
- 45-49 years
- 50 years and above

2. What is your marital status

- a) Single
- b) Married/Cohabiting
- c) Others (specify)

3. What is your religion?

- a) Catholic
- b) Protestant
- c) Muslim
- d) SDA
- e) Others (specify)
.....
.....

4. What is your highest level of education?

- a) None
 - b) Primary
 - c) Secondary
 - d) Tertiary (including university)
5. How long have you done this work?
- a) 1-2 year
 - b) 3-4 years
 - c) 5 years and above
6. How many people live in your household?
7. Do you own the commercial minibus (taxi)?
- a)Yes b) No

SECTION B

UNDERSTANDING OF ROAD TRAFFIC REGULATIONS AND SIGNS.

8. Where were you trained to operate a commuter minibus (taxi) from?
- a) From a friend/relative
 - b) From driving school
 - c) Not trained
9. Have you ever heard of road traffic signs?
- a) Yes b)No

If no, skip to question 14

10. From where did you hear about the road traffic signs?
- a) Fellow commuter minibus (taxi) drivers
 - b) Traffic officer
 - c) Internet
 - d) Driving School
 - e) Friend/relative
 - f) Other (specify)
-

11. What do you understand by these traffic signs?

SIGN 1



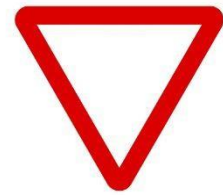
SIGN 2



SIGN 3



SIGN 4



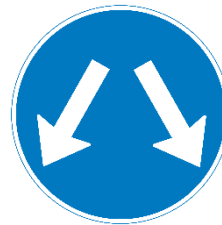
SIGN 5



SIGN 6



SIGN 7



SIGN 8



SIGN 9



SIGN 10



SIGN 11



SIGN 12



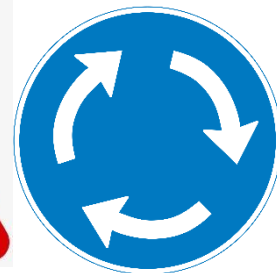
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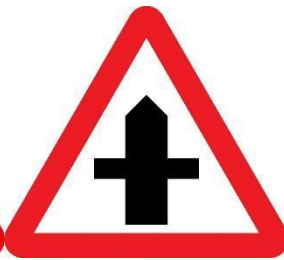
SIGN 15



SIGN 16



SIGN 17



SIGN 18



SIGN 19



SIGN 20



SIGN 21



12. Do the commuter minibus (taxi) drivers understand the traffic signs above?

Road traffic sign	Meaning	Understood meaning	
		YES	NO
SIGN 1	Pedestrian crossing		
SIGN 2	Children crossing		
SIGN 3	Speed hump		
SIGN 4	Give way		
SIGN 5	No U-turn		
SIGN 6	No left turn		
SIGN 7	Pass either side		
SIGN 8	Bend to right		

SIGN 9	Speed limited		
SIGN 10	No entry		
SIGN 11	No parking		
SIGN 12	No overtaking		
SIGN 13	One way		
SIGN 14	Road work		
SIGN 15	Round about		
SIGN 16	Side road to the left		
SIGN 17	Crossroads ahead		
SIGN 18	T-intersection		
SIGN 19	Traffic light		
SIGN 20	Use seat belt		
SIGN 21	Hospital		

SECTION C

COMPLIANCE WITH THE ROAD TRAFFIC SIGNS

13. Are there road traffic signs along the roads you use?

a) Yes

b) No

If no, skip to question 17

14. What do you do when you see road traffic SIGN 1?

a) Slow down.

b) Ignore the traffic sign and continue driving.

c) Take caution while driving.

d) Stop for the pedestrians to cross the road.

e) Others (specify)

15. What do you do when you see road traffic SIGN 2?

- a) Stop and let the children cross.
- b) Slow down.
- c) Ignore the traffic sign and continue driving.
- d) Drive with caution.
- e) Others (specify)

16. What do you do when you see road traffic SIGN 3?

- a) Ignore the traffic sign and continue driving.
- b) Slow down.
- c) Others (specify)

17. What do you do when you see road traffic SIGN 4?

- a) Slow down.
- b) Give way for another vehicle to pass.
- c) Ignore and continue driving.
- d) Others (specify)

18. What do you do when you see road traffic SIGN 5?

- a) Make a U-turn.
- b) Do not make a U-turn.
- c) Others (specify)

19. What do you do when you see road traffic SIGN 6?

- a) Turn to the left.
- b) Do not turn to the left.
- c) Others (specify)

20. What do you do when you see road traffic SIGN 7?

- a) Ignore sign and continue driving
- b) Drive on either side.
- c) Others (specify)

21. What do you do when you see road traffic SIGN 8?

- a) Drive in the direction of the arrow.
- b) Slow down.
- c) Drive in a direction opposite to the arrow.
- d) Others (specify)

22. What do you do when you see road traffic SIGN 9?

- a) Drive at a speed of 50km/h or less
- b) Drive at speed above 50km/h.
- c) Others (specify)

23. What do you do when you see road traffic SIGN 10?

- a) Drive along the road where the sign is.
- b) Do not drive from where the traffic sign is.
- c) Others (specify)

24. What do you do when you see road traffic SIGN 11?

- a) Park where the traffic sign is.
- b) Do not park where this sign is.
- c) Others (specify)

25. What do you do when you see road traffic SIGN 12?

- a) Overtake.
- b) Do not overtake.
- c) Others (specify)

26. What do you do when you see road traffic SIGN 13?

- a) Drive in the direction of the traffic sign.
- b) Drive in the direction opposite to the traffic sign.
- c) Others (specify)

27. What do you do when you see road traffic SIGN 14?

- a) Slow down.
- b) Drive along the allocated area.
- c) Drive faster.
- d) Ignore the traffic sign and continue driving.
- e) Take caution as you drive.

f) Others (specify)
.....

28. What do you do when you see road traffic SIGN 15?

- a) Give way.
- b) Slow down.
- c) Stop driving.
- d) Ignore the traffic sign and continue driving.
- e) Others (specify)
.....

29. What do you do when you see road traffic SIGN 16?

- a) Ignore the traffic sign and continue driving
- b) Give way.
- c) Stop driving.
- d) Slow down
- e) Others (specify)
.....

30. What do you do when you see road traffic SIGN 17?

- a) Stop driving.
- b) Slow down.
- c) Give way for other road users to pass.
- d) Ignore the sign and continue driving.
- e) Other (specify)

31. What do you do when you see road traffic SIGN 18?

- a) Take caution while driving.
- b) Slow down.
- c) Stop driving.
- d) Ignore the sign and continue driving.
- e) Others (specify)

32. What do you do when you see road traffic SIGN 19?

- a) Slow down.
- b) Take caution to see what the traffic lights instruct me to do.
- c) Ignore the traffic sign and continue driving.
- d) Others (specify)

33. What do you do when you see road traffic SIGN 20?

- a) Wear the seat belt.
- b) Ignore the traffic sign and continue driving.
- c) Do not wear the seat belt.
- d) Others (specify)

34. What hinders you from complying with the road traffic signs?

Barriers	Strongly Agree	Agree	Disagree	Strongly disagree
I don't know what road traffic signs are				
I have eyesight problems				
I cannot read				
The road traffic signs are faded				
The location of the				
road traffic signs				
The road traffic signs are obstructed				
Rainy conditions				
Nature of the road				

Time of the day				
Rush moments				

35. What motivates you to comply to the road traffic signs?

Motivator	Strongly Agree	Agree	Disagree	Strongly disagree
The size of the road traffic signs				
Availability of the road traffic signs on the road				
The color of the road traffic sign				
Reflective material of the road traffic signs				
Presence of traffic officers				
Driving experience				

How often the driver is exposed to the road traffic signs				
Color of the headlights				

36. Have you ever heard of the speed limit

a) Yes b) No

37. If yes, which of the following represents the speed limit

a) 100km/h c) 30km/h

b) 50km/h d) 80km/h

THANK YOU FOR YOUR PARTICIPATION

10.3 APPENDIX III: TRANSLATED CONSENT FORM

EKYOKUGATTAKO I: FOMU Y'OKUKKIRIZIGANYA

Amakyaamalungi/ akawungeeziSsebo

Amannyagangenze Nakagwa Patricia, muyizi mu Makerere University School of Public Health. Nkolaokunoonyereza “OKUNOONYEREZA OKUTEGERA N’OKUGONDERERA OBUBONERO BW’EBITABO KU NGUUDO MU DDEREEVA BYA MINIBUS (TAXI) ABASAJJANJABE MU MAKINDYE DIVISION, KAMPALA”. Nsabaokwetaba mu kunoonyerezakwange.

Ekigendererwaky’okunoonyereza

Okunoonyerezakunokwesigamyekukutegeeran’okugobereraobubonerobw’ebiddukakunguudo mu bavuziba minibus (takisi) abasaabaze mu divizoniy’e Makindye, Kampala.

Okunoonyerezakunokwakusomakwokka era tekulinabuzibubwonnakuggwe. Okwetabakwo mu kunoonyerezakunokijjakutuyambaokufunaamawulireagakwatakukutumbulaobukuumikunguudo mu Kampala ne Uganda okutwalizaawamu.

Omutendero

Bw’obaokkirizzaokwetaba mu kunoonyerezakuno, ojjakwetaagibwaokussaomukonokufoomuenookulagantitetukukaka. Oluvannyumalw’ekyo, tujjakukubuuzaebibuuzeobimukuby’omanyiebikwatakubupandebw’ebidduka. Enkolaenotejjakutwaladdakiikazisukka mu 15 kubuddebwo.

Omugasooguyinzaokubaawo

Okunoonyerezakunotekulinamigasobutereevueriabeetabye mu kunoonyerezakuno. Wabulaamawulireagafunibwagajjakulungamyaabakwatibwakookuvaayon’enkolaennungiey’okut umbulaokugobereraobubonerobw’ebidduka mu kulwanyisaobubenjebw’ebiddukakunguudo mu Uganda.

Obulabebw’okwetabamu

Tetusuubirabulabebwonnagy’olisingaosalawookwetaba mu boozed eno.

Okukuumaebyama

Amawulireagakung' aanyiziddwaokuvaericyeetabye mu kunoonyerezakunotegalimulinyalyamuntueyeetabye mu kunoonyerezakuno ne mu bivuddemuebigendaokusaasaanyizibwa. Amawuliregajjakuumibwanga ga kyamangaabeetabye mu kunoonyerezakunobamanyiddwaomunoonyerezeyekka era gajjakukozesebwa mu bigendererwaby'okunoonyerezakunokwokka. Tewaliajjakuzuulakintukyonnaky'oyogedde.

Eddembelyo

Okwetaba mu kunoonyerezakunokwakyeyagalire. Tewaliajjakukakakubuuzibwayintaviyu. Olinaeddembeokubuuzabibuuzokukintukyonnaky'ototedgedde. Tolinakuddamubibuuzoebimuebikuleeteraobutabeerabulungi. Olinaeddembeokuva mu kusomakunoessaawayonnagy'oyagala. Bw'oba opine ekibuuzokyonna, ultra ngaoliwaddembeokutuukiriraomunoonyereza, Patricia Nakaggwa, ku +256782303295 oba ku email patricianakaggwa@gmail.com

Ekiwandiikoekiragaokukkiriza

Omunoonyerezaannyonyoddeebikwatakukunoonyerezakuno era bulikimunkitegedde. Nzikiriziganyaokubuuzibwaebibuuzoawatalikukakibwawaddeokukaka.

Omukonogw'omwetabamu: **Olunaku:**

10.4 APPENDIX V: TRANSLATED QUESTIONNAIRE

EKYOKUGATTAKO II: EBIBUZO

ENNAMBA Y'EKIBUZO.....

Olunakulw'okukubaganyaebirowoozo

Ekigo

Erinnyaly'omutendera

EKITUNDU A: ENKOZESA Y'EMBEERA Y'ABANTU

1. Olinaemyakaemekaokutuukakumazaalibwa go agasembayo?

- a) Emyaka 20 – 24
- b) Emyaka 25 – 29
- c) Emyaka 30 – 34
- d) Emyaka 35 – 39
- e) Emyaka 40 – 44
- f) Emyaka 45 – 49
- g) Emyaka 50 n'okudawagulu

2. Embeerayo mu bufumboerietya?

- a) Wuulu
- b) Baawuddwamu
- c) Mufumbo
- d) Yanoba
- e) Nnamwandu
- f) Ebirala (lambika)

.....

...

3. Eddiiniyoerietya?

- a) Omukatoliki
- b) Omupolotesitante
- c) Omusiraamu
- d) SDA
- e) Abalala (lambika)

.....

...

4. Obuyigirizebwoobw'okuntikkobuli ki?

- a) Tewali
- b) Pulayimale

- c) Siniyaeyokubiri
- d) Tertiary (nga ne yunivasitemw'otwalidde)

5.Omulimugunoogumazebbanga ki?

- a) Emyaka 1-2
- b) Emyaka 2-5
- c) Emyaka 5 n'okuddawaggulu

6. Abantubamekaababeera mu maka go?

7. Ggwennannyini minibus (takisi) ey'ebyobusuubuzi?

- a) Yee
- b) Nedda

8.Mu lunakulumu, ssentemmekaz'okolakukigero?

EKITUNDU B

OKUTEGERA EBIRAGIRO BY'EBITABO KU NGUUDO N'OBUBONERO.

9.Watendekebwa okuvuga minibus (takisi) ey'abasabazeokuvawa?

- a) Okuvaerimukwanogwo/ow'oluganda
- b) Okuvakussomeroly'okuvugammotoka
- c) Okusinzirakubumanyirivu
- d) Tebatendekebwa

10.Waliowuliddekokubupandebw'ebiddukakunguudo?

- a) Yee
- b) Nedda

Bwekibantedda, gendakukibuuzo 14

11.Ebipandebw'ebiddukakunguudowabiwuliddewa?

- a) Ba ddereevabannaffe aba minibus (taxi) abasabaze
- b) Omukunguavunaanyizibwakubidduka
- c) Intaneeti
- d) Essomeroly'okuvugammotoka
- e) Mukwano/ow'oluganda
- f) Ebirala (lambika)

13.Bubonerobunoobw'ebiddukaotedgedde ki?

AKABONERO 1 AKABONERO 2 AKABONERO 3 AKABONERO 4



AKABONERO 5 AKABONERO 6 AKABONERO 7 AKABONERO 8



AKABONERO 9 AKABONERO 10 AKABONERO 11 AKABONERO 12



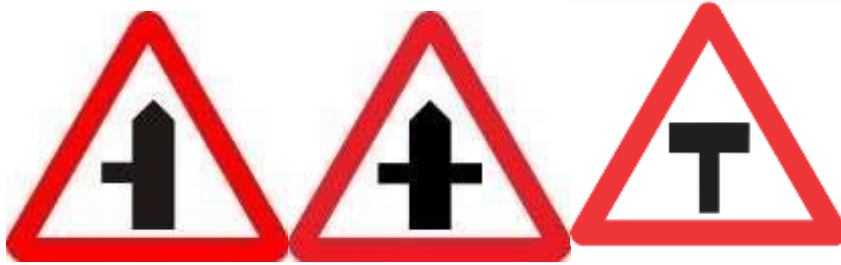
AKABONERO 13 AKABONERO 14 AKABONERO 15



AKABONERO16

AKABONERO 17

AKABONERO 18



AKABONERO 19

AKABONERO 20

AKABONERO 21



14. Abavuziba minibus (taxi) abasaabazebategeeraobubonerobw'ebiddukawaggulu?

Akabonerok'ebiddukakuluguudo	Okutegeeza	Amakuluagategereke	
		YEE	NEDDA
AKABONERO 1	Okusalakw'abatembeeyi		
AKABONERO 2	Abaanangabasala		
AKABONERO 3	Sipiidi hump		
AKABONERO 4	Muweekkubo		
AKABONERO 5	Tewalikukyukakwa U-turn		
AKABONERO 6	Tewalikukyukakukkono		
AKABONERO 7	Yitamukubuliludda		
AKABONERO 8	Fukamirakuddyo		
AKABONERO 9	Sipiidiekoma		
AKABONERO 10	Tewalikuyingira		

AKABONERO 11	Tewalipaakingi		
AKABONERO 12	Tewalikusukka		
AKABONERO 13	Engeri emu		
AKABONERO 14	Emirimugy'enguudo		
AKABONERO 15	Okwetoolola		
AKABONERO 16	Oluguudolw'ebbalikukkono		
AKABONERO 17	Emitalaw'enguudo mu maaso		
AKABONERO 18	Enkulungoya T		
AKABONERO 19	Ebitaalaby'ebidduka		
AKABONERO 20	Kozesaomusipi		
AKABONERO 21	Edwaliiro		

EKITUNDU C

OKUTANDIKA OBUBONERO BW'EBIKOLWA KU NGUUDO

15. Waliwo obubonero bw'ebiddukakunguudokunguudoz'okozesa?

a) Yee

b) Nedda

Bwekibantinedda, gendakukibuuzo 17

16. Bwekibantiyee, okusinziirakubupandeobuliwaggulu,
bikiebibimukubipandebw'ebiddukakunguudoebirikunguudoz'okozesa?

.....

.....

.....

17. Bw'olaba AKABONERO 1 okola ki?

a) Kendeezakusipiidi.

b) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.

c) Weegenderezeng'ovuga.

d) Yimirirakoabatembeeyibasomokeoluguudo.

e) Ebirala (lambika)

18. Bw'olaba AKABONERO 2 okola ki?

a) Yimirakoabaanabasomoke.

b) Kendeezakusipiidi.

c) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.

d) Vugan'obwegendereza.

e) Ebirala (lambika)

.....

19. Bw'olaba AKABONERO 3 okola ki?

a) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.

b) Kendeezakusipiidi.

c) Vugakusipiidi.

d) Ebirala (lambika).....

20. Bw'olaba AKABONERO 4 okola ki?

a) Kendeezakusipiidi.

b) Mwaekkubommotokaendalaeyitewo.

c) Vugakusipiidi.

d) Buusaamaaso era ogende mu maason'okuvuga.

e) Ebirala (lambika)

.....

21. Bw'olaba AKABONERO 5 okola ki?

a) Kola 'U-turn'.

b) Tokola 'U-turn'.

c) Ebirala (lambika)

.....

22. Bw'olaba AKABONERO 6 okola ki?

a) Kyukirakukkono.

b) Tokyukakuddakukkono.

c) Ebirala (lambika)

23. Bw'olaba AKABONERO 7 okola ki?

- a) Vugakuluddalwonna.
- b) Vugakunjuyizombi.
- c) Ebirala (lambika)

24. Bw'olaba AKABONERO 8 okola ki?

- a) Vuga mu kkuboakasaale we kali.
- b) Kendeezakusipiidi.
- c) Vuga mu kkuboerikontanan'akasaale.
- d) Ebirala (lambika)

25. Bw'olaba AKABONERO 9 okola ki?

- a) Vugakusipiidiyakiromita 50 bulissaawa.
- b) Vugakusipiidietsukkakiromita 50 bulissaawa.
- c) Vugakusipiidiesukka mu kiromita 50 bulissaawa.
- d) Ebirala (lambika)

26. Bw'olaba AKABONERO 10 okola ki?

- a) Vugang'oyitira mu luguudoawaliekipande.
- b) Tovugang'ovaawaliakabonerok'ebidduka.
- c) Ebirala (lambika)

27. Bw'olaba AKABONERO 11 okola ki?

- a) Paakaawaliakabonerok'ebidduka.
- b) Tosimbaawaliekipande kino.
- c) Ebirala (lambika)

28. Bw'olaba AKABONERO 12 okola ki?

- a) Okuyitawaggulu (overtake).
- b) Tosukkakusukka.
- c) Ebirala (lambika)

29. Bw'olaba AKABONERO 13 okola ki?

- a) Vuga mu luddalw'akabonerok'ebidduka.
- b) Vuga mu kkuboerikontanan'akabonerok'ebidduka.
- c) Ebirala (lambika)

30. Bw'olaba AKABONERO 14 okola ki?

- a) Kendeezakusipiidi.
- b) Vugang'oyitira mu kifoekiweereddwa.
- c) Vugakusipiidi.
- d) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.
- e) Weegenderezeng'ovuga.
- f) Ebirala (lambika)

31. Bw'olaba AKABONERO 15 okola ki?

- a) Muweekkubo.
- b) Kendeezakusipiidi.
- c) Mulekereawookuvuga.
- d) Ebirala (lambika)

32. Bw'olaba AKABONERO 16 okola ki?

- a) Vugakusipiidi.
- b) Muweekkubo.
- c) Mulekereawookuvuga.
- d) Kendeezakusipiidi
- e) Ebirala (lambika)
.....

33. Bw'olaba AKABONERO 17 okola ki?

- a) Mulekereawookuvuga.
- b) Kendeezakusipiidi.
- c) Muweekkuboabakozesaoluguudoabalalaokuyita.
- d) Buusaamaasoekipandeky'era weyongereokuvuga.
- e) Ebirala (lambika)

34. Bw'olaba AKABONERO 18 okola ki?

- a) Weegenderezeng'ovuga.
- b) Kendeezakusipiidi.
- c) Mulekereawookuvuga.
- d) Buusaamaasoekipandekyo era weyongereokuvuga.
- e) Ebirala (lambika)

35. Bw'olaba AKABONERO 19 okola ki?

- a) Kendeezakusipiidi.
- b) Weegenderezeolabe Amidala bye gandagiraokukola.
- c) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.
- d) Ebirala (lambika)

36. Bw'olaba AKABONERO 20 okola ki?

- a) Yambalaomusipigw'obukuumi.
- b) Buusaamaasoekipandeky'ebiddukaogende mu maason'okuvuga.
- c) Toyambalamusipi.
- d) Ebirala (lambika)

37. Bw'olaba AKABONERO 21 okola ki?

- a) Kendeezasipiidi
- b) Weegenderezeng'ovuga.
- c) Buusaamaasoekipandekyo era weyongereokuvuga.
- d) Ebirala (lambika)

38. Kiki ekikulemesaokugobereraobubonerobw'ebiddukakunguudo?

Ebiziya	Nzikiriziganya Nnyo	Okukiriza	Temukkiriziganya	Sikkiriziganyanyo
Simanyibubonero bwa biddukakunguudo kye ki				

Nninaobuzibu mu kulaba				
Sisobolakusoma				
Ebipandebw'ebiddukakunguudobifudde				
Ekifoobubonerobw'ebiddukakunguudo we bubeera				
Ebipandebw'ebiddukakunguudobiremesebw aebipandeebiralaebirikunguudo				
Embeeray'enkuba				
Obutondebw'ekkubo				
Ekiseeraky'olunaku				
Ebiseeraeby'okufubutuka				

39. Kiki ekikukubirizaokugobereraobubonerobw'ebiddukakunguudo?

Omukubiriza	Nzikirizi ganya Nnyo	Okukkiriza	Temukkiriziganya	Sikkiriziganyo
Enkulay'obubonerobw'ebiddukakunguudo				
Okubeerawokw'obubonerobw'ebiddukakuluguudo				
Langi y'akabonerok'ebiddukakuluguudo				
Ebintuebitangaazakububonerobw'ebiddukakunguudo				
Okubeerawokw'abaserikaleb'ebidduka				
Obumanyirivu mu kuvuga				

Emirundiemekaddereevagy'alabaobubonero bw'ebiddukakuluguudo				
Langi y'amataalag'omumaaso				

40. Mmotokayoerinaomusipiogukola?

a) Yee

b) Nedda

41. Omusipigw'okoze saemirundiemeka?

a) Bulikaseera

b) Obutasoboka

c) Oluusi

d) Lumunalumu

42. Lwakiokoze saomusipi?

a) Kinkwata mu kifongabwenvuga

b) Ekuumaddereevasingaagwakukabenje

c) Ekwataantebeyaddereeva mu kifong'avuga

d) Obutakwatibwabaserikalebabidduka

43. Omuvuziwamini bus (taxi) akoze sezaomusipingaavugaokuva mu takisipaaka? a) Yee

b) Nedda

44. Waliowuliddekokusipiidi ekoma?

a) Yee

b) Nedda

45. Bwekibantiyee, ku bino wammangakiruwaekikiikiriraekkomokusipiidi?

- a) Kiromita 100 bulissaawa
- b) 50km bulissaawa
- c) 30km bulissaawa
- d) Kiromita 80 bulissaawa

46. Lwakikyamugasookuban'ekkomokusipiidi?

- a) Okukendeezakukalippaganok'ebidduka.
- b) Okwewalaokukwatibwaabaserikaleb'ebidduka.
- c) Okukendeezakubuzibubw'obuvuneobuvakukabenjek'ebiddukakuluguudo.
- d) Okwewalaokukoonaabatembeeyin'abavuzibapikipiki.
- e) Okukuumaabasaabazengatebalinabulabe

MWEBALE OLW'OKWETABAMU.