



Kamuzu College of Nursing

**RISKS AND PREVENTION STRATEGIES OF ROAD TRAFFIC INJURIES IN
CHILDREN IN URBAN MALAWI: PERSPECTIVES OF CAREGIVERS AND
TRAFFIC POLICE OFFICERS**

MSc IN CHILD HEALTH NURSING THESIS

**Submitted to Faculty of Nursing, Kamuzu College of Nursing, in partial fulfilment of the
requirements for the award of Master of Science Degree in Child Health Nursing**

By

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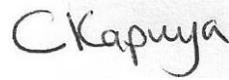
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Declaration

I, **Cosmas Kapuyanyika**, hereby certify that this thesis titled **RISKS AND PREVENTION STRATEGIES OF ROAD TRAFFIC INJURIES IN CHILDREN IN URBAN MALAWI: PERSPECTIVES OF CAREGIVERS AND TRAFFIC POLICE OFFICERS** is my own original work that has not been previously submitted to any institution for awards. In addition, all sources of information used in the thesis have been appropriately acknowledged by referencing.

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.....

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15th May 2020

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Certificate of approval

We, the undersigned hereby certify that this thesis is Cosmas Kapuyanyika’s own work and effort and has been submitted with our approval.



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Dedication

This work is dedicated to the Almighty Jehovah God for sustaining me throughout my studies, to my beloved family for their support and encouragement. My child population that I care for in the hospital wards at Kamuzu Central Hospital God bless you all. Above all, may God mercifully use me for His Glory.

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Above all, I thank Almighty Jehovah God for keeping me safe and alive throughout the research process. His name be glorified forever.

Abstract

In urban Malawi, road traffic injuries (RTIs) in children are on the increase, and yet there are no studies that have been conducted to explore the risk and prevention strategies for childhood RTIs. This study explored the caregivers and traffic police officers' perspectives of risk and prevention strategies of childhood RTIs in urban Malawi. The specific objectives of the study were: to describe perceptions of caregivers and traffic police officers on risks associated with childhood RTIs, and to describe prevention strategies. Ethical approval and clearance certificates were granted by the College of Medicine Research and Ethics Committee to conduct the study. The office of the Inspector General of Police, Hospital Directors of Kamuzu, and Queen Elizabeth Central Hospitals granted written authorizations to collect data from their institutions.

The study used a qualitative exploratory design. 32 participants were recruited purposively; 20 caregivers of children hospitalized with RTIs at Kamuzu and Queen Elizabeth Central Hospitals, 12 traffic police officers in Lilongwe and Blantyre. All participants gave written consents and in-depth interviews using semi-structured interview guides were administered by the researcher face-to-face to collect data which was recorded verbatim. The data was converted into categories, then coded to establish subthemes. The predetermined themes were developed from the study objectives.

Findings: the participants' perceived risks for childhood RTIs were: **overpopulated urban areas with poor road infrastructure**, permanent buildings within road reserve spaces, as well as **role fulfillment challenges** particularly by caregivers, drivers, and school teachers that manifest as lack of adult supervision on child road users, exposing children to child labour that involves road usage; lack of teaching on road safety and drunken driving. The participants' perceived

prevention strategies for childhood RTIs were: improving road safety knowledge through outreach programs; promoting compliance with road safety rules and regulations through improving adult supervision of children on safer road usage, more protection of children from child labour; improving road infrastructure with more traffic lanes, traffic signs, computerized monitoring of traffic offenders; avoiding placement of permanent buildings within road reserves.

In conclusion, there is a need for a multisectoral approach to the implementation of the prevention strategies for childhood RTIs in urban Malawi.

Keywords: road traffic injuries, risks, prevention

List of abbreviations and acronyms used in the study

BAC:	Blood alcohol concentration
COMREC:	College of Medicine Research and Ethics Committee
HIC:	High income countries
IG:	Inspector General of Police
KCH:	Kamuzu Central Hospital
LMIC:	Low to medium income countries
QECH:	Queen Elizabeth Central Hospital
RBT:	Random breath testing
RTAs:	Road traffic accidents
RTIs:	Road traffic injuries
RTO:	Regional Traffic Officer
TBIs:	Traumatic brain injuries
TPO:	Traffic police officer
UNICEF:	United Nations International Children's Emergency Fund
WHO:	World Health Organization

Operational Definitions

Chichewa: the major local language spoken in central and southern regions of Malawi.

Child: any person aged below 18 years.

Caregiver: any adult relative taking care of a child hospitalized with road traffic injuries.

Head injury: any trauma to the scalp, skull, or brain that can reduce physical, social, or intellectual capabilities of a child.

Pedal cyclist: a child cycling a bicycle; also referred to as a bicycle rider or child bicyclist.

Peri-urban areas: rural areas immediately surrounding a city.

Road reserve: the legal distance from the road and permanent dwellings which is meant only for the existence of road infrastructure-related constructions that include roadways and footpaths for public travel.

Traumatic brain injury: type of head injury that involves damage to brain tissue due to road traffic accidents.

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Chapter 1

Introduction and Background

1.1 Introduction

Road traffic injuries (RTIs) are a public health concern globally, in all countries. Childhood head injuries are a common cause of many neurological disorders that are due to road traffic accidents (RTAs) (Curry et al., 2011; Chalya et al., 2012). RTIs are the top causes of injury burden globally; they contribute 25 % of the injury burden in High-Income Countries (HICs), and 27 % of the injury burden in Low and Medium Income Countries (LMICs) (Higashi et al., 2015).

Tanya et al. (2011) reported that RTIs are a leading cause of morbidity, disability, and mortality in developing countries where traffic safety gets little public health attention, due to other competing burdens of infectious diseases. The increase of RTAs in LMICs has increased the number of RTIs in the vulnerable road users; the child pedestrians, bicyclists, motorcyclists, and passengers (Higashi et al., 2015).

RTIs are often preventable because the basic preventive strategies for successful prevention exists (Chalya et al., 2012). Several researchers have reported that the basic preventive strategies include observing legal speed limits, drink-driving law, regulation of the volume of vehicles and the road-worthiness of vehicles on the road, as well as the state of road infrastructure (Emejuluet al., 2010; Curry et al., 2011; Chalya et al., 2012).

In Africa, Casey et al. (2012) revealed that RTI was the major mechanism of injuries in children, accounting for 43.2% of all injuries in Tanzania, 49% in Uganda, and 29% in Ghana. In 2012, RTIs in South Africa accounted for USD10.5 billion of health services expenditure, or 3% of gross domestic product (Wesson et al., 2016). In Kenya, according to Bachani et al. (2012), RTIs were estimated to cost Kenyans as much as US\$3.8 billion annually, corresponding to 5 percent of the annual gross domestic product. This was a conservative estimate because it did not include costs associated with lost productivity. In Tanzania and Botswana, the most common causes of RTIs were driver-related causes namely: recklessness, drunkenness, inattention, sleepiness, and the increasing traffic congestion during rush hours in the urban areas (Kircher & Andersson, 2013).

In Malawi, likewise, childhood RTIs are due to RTAs and is a leading cause of admissions in hospitals. The drivers have been observed over-speeding, ignoring traffic signs, and overtaking on the road (Malawi Road Traffic Accident Report, 2014). In addition, pedestrians have been observed crossing roads carelessly, walking in the middle of the road, passengers boarding or alighting carelessly while travelling with children; particularly in the cities of Blantyre and Lilongwe

In 2014, admission registries at both QECH and KCH showed that RTIs in the form of head injuries were the leading cause of injury-related admissions due to the rising RTAs involving children. However, very little is known about the risk and prevention of RTAs and the consequent RTIs in children. Minimal research has been conducted in child population regarding risks and prevention strategies for RTAs involving children. Therefore, this study was conducted to describe the experiences of the caregivers of the RTA child victims and Traffic Police Officers who attend to children on the accident spot, regarding risk and prevention of RTAs and the subsequent RTIs.

1.2 Background

Globally road traffic-related injuries like a traumatic brain injury in children account for 60% of the brain injuries and are due to RTAs. All parts of the world have experienced multiple problems such as impairments in memory or cognition, disability, and the actual death of children following RTAs. RTIs are now referred to as the “silent epidemic” (Wesson et al., 2016). Of all types of injury, those of the brain are among the most likely to result in disability or death (Curry et al., 2011; Chalya et al., 2012; Kraemer et al., 2012). Wesson et al. (2016) reported that RTIs are a leading cause of injury-related deaths, accounting for 10 deaths per 100,000 people globally. This has even worsened according to ‘The global report on road safety’, WHO (2018), that RTI related deaths now account for 27.5 deaths per 100,000 population. The risk of a road traffic death is more than three times higher in LMICs than in HICs where the average rate is 8 deaths per 100,000 population. Purcell et al. (2017) reported that globally, RTIs account for almost 16% of the world-wide burden of disease. In addition, RTIs in the form of traumatic brain injury is a major cause of premature death and disability in children worldwide and remains the leading cause of death. Unfortunately, LMICs bear a large burden of trauma morbidity and mortality, where 90% of all trauma-related deaths and 95% of paediatric injuries occur. The World Health Organization and United Nations Children’s Emergency Fund (UNICEF) consider paediatric trauma, RTIs, a major health concern requiring urgent attention.

In developing countries such as those in Latin America, South, and East Asia, the majority of road traffic accident (RTA) victims are not the motorized vehicle occupants, but pedestrians, motorcyclists, bicyclists, and non-motorized vehicles (NMV) occupants (Verma et al., 2009). In addition, children, aged between 3 – 17 years suffer most RTIs in developing countries. Furthermore, RTIs were the leading cause of hospitalization amongst children aged between 3 – 17 years.

Direct economic costs of global road traffic accidents are estimated at \$518 billion. For developing countries, the costs are estimated at \$65 billion, more than the total amount of all foreign aid donated. Direct costs include hospitalization fees, long-term medical care for the injured, and loss of productivity. The average annual cost to the society of RTAs ranges from 0.3% of the Gross National Product in Vietnam to nearly 5% in Malawi and South Africa (WHO, 2018).

Sub-Saharan Africa (SSA) likewise, has suffered the most RTIs in the whole world (Purcell et al., 2017). SSA demonstrates a higher RTIs-related incidence rate range from 150 to 170 per 100,000 compared to a global rate of 106 per 100,000. This has been attributed to rapid urbanization with shared use of roads by motor vehicles, bicyclists, pedestrians, and other modes of transportation. These figures have been declared to be less than the true picture of the huge RTI burden due to the paucity of data regarding trauma outcomes in LMIC's, especially regarding pre-hospital deaths, as most LMIC's also lack trauma surveillance registries. In addition, there is nonadherence to traffic rules and regulations as safety belts are rarely used. In SSA, RTIs were observed to involve a vehicle versus pedestrian or vehicle versus bicyclist. Younger children were at higher risk of RTIs due to their larger and heavier cranial vault, which resulted in higher degrees of damage, and decreased myelination. RTIs were identified to be the primary cause of death following paediatric trauma. There is underreporting and a lack of reliable data due to incomplete records (Higashi et al., 2015). RTIs are the second leading cause of deaths in children aged 5-14 years. It is projected that if current trends continue and prevention initiatives are not instituted, by 2020, RTAs and consequent deaths in children; in developing countries could increase to 80%. The funeral costs, hospitalization fees, or extended medical care for severe injuries can cause poverty in a family the community, and the nation as children are the future.

Just as children are immunized against infectious diseases, they should also be protected from RTAs to prevent the consequent RTIs whose complications such as neurological disorders, have a profound effect on the lives of the child and the family and are probably the most disruptive of all the health problems in children (Glasper & Richardson, 2011; Tanya et al., 2011; Phillipset al., 2008;). Furthermore, RTIs are currently the leading cause of death for children aged 5–17 years, signaling a need for a shift in the current child health agenda which, to date, has largely neglected road safety.

In Malawi, RTIs remains a major cause of paediatric mortality (Purcell et al., 2017). The majority of these deaths are attributed to RTIs. Therefore, the mortality burden is underestimated if accounting for intrahospital deaths alone (Purcell et al., 2017). In most African countries RTIs prevention should be prioritized because access to professional first aid care in the country are almost nonexistent, except in a few city fire departments and private ambulance services. Furthermore, there is compromised rapid transportation of RTIs victims to a hospital because of limited first aid knowledge and a lack of access to basic safety equipment (Chokotheo et al., 2017).

There are scanty local studies on childhood RTIs except a few which showed that children were at high risk of being involved in RTAs (Kraemer et al., 2012; Quresh, et al., 2013; Chokotheo et al., 2015). At KCH and QECH from January to December 2014, the Casualty Department and Surgical Ward Registers recorded a total of 96 and 81 children with RTIs respectively. On average, 9 and 7 children were admitted with RTIs every month respectively, with the age range of 4 to 14 years. The two hospitals share similar characteristics of being central, urban academic and referral institutions in Lilongwe, the largest city in Malawi, and Blantyre, the second biggest city.

1.3 Problem Statement

Globally and regionally there has been an increase in the number of RTA-related deaths in children, more in many low-income countries for years compared to high-income countries (WHO, 2018). In Africa, the rates of road traffic deaths are highest with a death rate of 26.6/100,000 people, while South-East Asia has a death rate of 20.7/100,000 people (WHO, 2018). In Africa, RTIs, which include childhood head injuries, are a common cause of various neurological disorders (Curry et al., 2011; Chalya et al., 2012).

In Malawi, childhood RTIs were the leading cause of admissions as recorded in the Paediatric Surgical and Casualty registries at KCH and QECHs in Lilongwe and Blantyre. In 2014, in urban Malawi, RTIs were the leading cause of preventable trauma including deaths in children (Higashi et al., 2015; Tyson et al., 2015). RTIs led to the highest injury admissions; the most common ones being head or spinal injuries (Tyson et al., 2015). RTIs were observed to cause nerve injury, long-term disabilities, and death. The consequences of RTIs were an economic burden for individuals, families, and communities. There are a lot of RTAs and consequent admissions of children with RTIs as of the National Traffic Report (2014), which revealed high numbers of child RTAs in Lilongwe and Blantyre. RTIs caused mild to severe head injuries, fractured femur, humerus, ulna, and radius. In 2014 six children in the age range of 4 to 14 years were admitted monthly at the two hospitals. However, no research has been conducted in urban areas of KCH in Lilongwe and QECH Blantyre to describe risk factors and the prevention strategies for childhood RTIs, hence the need to conduct this study.

1.4 Significance of the study

The study might influence the development of research-based multi-sectoral approach to strategies for the prevention of childhood RTIs. Education strategies implemented by departments of

Transport, Justice and Legal Affairs, Education, Science and Technology, non-governmental organizations jointly might prevent RTAs. Study findings might assist in the establishment of research-based prevention strategies for RTIs to inform practical prevention approaches to reduce childhood RTIs in urban Malawi by nurse practitioners, nurse educators, administrators, and researchers to lessen the burden of childhood RTIs through safer road safe use by children. The study can ultimately be more utilized by children themselves, caregivers, families, traffic police officers, school teachers, and other members of the community in effecting the preventive strategies for childhood RTIs.

1.5 Justification of the Study

Since prevention is cheaper than cure, the study seeks to establish preventive strategies for childhood RTIs in urban Malawi as childhood RTIs do not only cause loss of life but also long-term disabilities and other consequences including economic burden for individuals, families, and communities. Treatment of RTIs such as brain trauma requires skilled and competent health workers in both pre-hospital care setting and facility-based care level; expensive drugs and equipment such as computed tomography scanners, magnetic resonance imagers, and tools for vital signs monitoring. RTIs involving the nervous system are associated with various complications such as learning disabilities and post-traumatic seizures in children. In Malawi, with its limited resources for the care of children with RTIs, there is a need for the establishment of research-based information on the leading causes of childhood RTIs to gather evidence for prevention strategies, particularly in urban Malawi (Chokotho et al., 2015). Such research-based information may help to inform practical prevention approaches to reduce childhood RTIs in urban Malawi by teachers, nurse practitioners, nurse educators, administrators, and researchers to lessen the burden of childhood RTIs through safer road use by children.

1.6 Study objectives

1.7 Broad Objective

To explore perceptions of care givers and traffic police officers regarding risk and prevention of road traffic injuries.

1.8.1 Specific Objectives

1. To identify perceptions of care givers and traffic police officers regarding the risk of childhood road traffic injuries.
2. To describe perceptions of care givers and traffic police officers regarding the prevention of childhood road traffic injury.

Chapter 2

Literature Review

2.1 Introduction

This chapter presents a review of global, regional, and local literature on risks and prevention strategies for road traffic-related injuries that involved children in urban settings. The reviewed literature was organized according to the study objectives. The risk factors that contributed to childhood RTIs included: lack of adult supervision, child-pedestrian behaviour, child-bicyclist behaviour, driver behaviour, infrastructural deficits, and volume of traffic. The preventive strategies for childhood RTIs are also presented under similar subheadings.

Peer-reviewed articles utilized were published from 2010 -2018, except for only a few from 2008 – 2009 that were included because of the unique richness of the information in those articles. However, there is little literature on studies conducted in Malawi.

The search engine utilized was Google Scholar. The electronic databases used were: Hinari, AFJOL, and Pubmed/Medline. Search terms included the following: child AND traffic injury, child pedestrian, child cyclist, over speeding, drunken driving, globe, Africa, Southern Africa, Malawi; as well as grouped terms: road traffic injury AND high-income countries, road traffic injury AND low-income countries OR Africa, childhood road traffic injury AND Malawi, risk factors for road traffic injury in children in urban settings, prevention strategies of road traffic injury in children in urban settings. To supplement the literature review, some current specialist books and government publications relevant to the study objectives were used.

2.2 Risk factors associated with childhood road traffic injuries

2.2.1 Lack of adult supervision

Globally, lack of child supervision was listed as a risk factor for childhood injuries (Fenget al., 2015; Pedenet al., 2008). It was estimated that 90% of injuries in children occurred around their home when they were supposedly being supervised by a caregiver. Child supervision is vital for protection from harm that includes road traffic injuries (RTIs). Supervision refers to behaviours that are related to attention such as watching, listening, touching, or being within reach. Lack of child supervision was a result of impaired parents, single parenthood, or caregivers who did not spend ample quality time with their children. Supervision of children may be left to older children, but supervision by an older child may not be adequate. In addition, poor parental education was associated with poor parental supervision, poor parental teaching of rules about safety, and mechanisms to prevent child RTIs. Parents took injuries as something unlikely to occur to their children. To them, child injury would be expected to happen occasionally. Many parents did not recognize the importance of responding to a child's injury with education; they sometimes presumed their child had "learned the lesson" from an injury and therefore neglected to use that injury as an opportunity for child education about safety.

In the USA, Shin et al. (2011), conducted a quantitative study in Chicago, Los Angeles, California, New York, and Philadelphia that aimed to investigate risks for child RTIs. Town planning officials from 13 cities were interviewed. The results showed that parents were not aware of their role in preventing child injuries. Another study was conducted by Schwebelet al., (2012) in the USA that aimed to investigate the risk factors for child pedestrian injury. The results showed that parents did not recognize the importance of responding to a child's injury with education or discipline; parents did not use the opportunities they had to teach children about pedestrian safety.

In Asia Verma et al., (2009) evaluated the type of paediatric injuries encountered in the emergency room amongst 225 children (boys 151, girls 64; age range, 2 months -12 years). The study aimed to understand child trauma profile in an Indian tertiary hospital. Data were collected using a structured injury proforma over 12 months. They found that low parental education resulted in a lack of awareness of the appropriate steps that a parent takes to prevent child injury.

In Africa, Casey et al., (2012) conducted a study to evaluate risks for childhood RTIs at a referral hospital in Tanzania. They utilized a retrospective chart review of 10 622 patients presenting to the emergency department at Kilimanjaro Christian Medical Centre, a standardized data collection form was used for data abstraction from the emergency department logbook and the complete medical record for all injured patients whose demographics, mechanism of injury, location, type, and outcomes were then recorded. Findings showed that parents in poverty lacked child supervision that resulted in their children sustaining RTIs because they lacked education and resources for RTA prevention.

In South Africa, Koekemoer et al. (2017), conducted a cross-sectional, non-randomized self-report survey to assess pedestrian safety knowledge, road-crossing behaviour, and pedestrian RTIs of primary school children in selected low-income settings in Cape Town. The survey focused on three primary schools and 536 children aged 6–15 years, answered a questionnaire in their home language of isiXhosa. The results showed that walking was the form of travel for 81% of the children, many walked unsupervised and only 12% were accompanied by an adult. This survey revealed that children who walked to or from school on their own were younger and reported risky road-crossing behaviour, such as the lack of pedestrian safety knowledge. About 54% of the reported pedestrian collisions involved a bicycle.

In Malawi, Samuel et al. (2009) conducted a prospective study in which data were collected from 1,474 patients, with a peak age group of less than 5 years, with RTIs presenting at KCH from

February to June 2008. The study aimed to understand the epidemiology of injuries at the tertiary hospital in Lilongwe. Data were collected on injured children presenting to KCH in Lilongwe, Malawi, from February to June 2008. Out of the sample, 75.7% were males. The results showed that lack of adult supervision of children, especially of primary school-going age, the use of roadways contributed to higher incidents of children's involvement in RTIs.

Other quantitative studies by Kraemer et al.(2012) and Chokotho et al. (2015), in urban and rural Malawi also found that lack of adult supervision of children, mostly of the primary school-going age, on use of roadways contributed to higher childhood RTIs.

2.2.2 Child-pedestrian behaviour/Child-bicyclist behaviour

A child's age or gender **factors were observed** to contribute to childhood RTIs. Road usage by children of the age range 4-17 years has been identified as a risk group. A quantitative study was conducted in Latin America that aimed to identify the risks for road traffic injuries, particularly traumatic brain injury (TBI) amongst children. In 2,492 children, 33.5% were 0 -2 years, 43.8% were 4-9 years and 22.7% were 10-15 years. RTIs were the leading cause of injury amongst children aged 4-9 years (Verma et al., 2009). The study conducted in the South East Asian community on childhood injuries revealed that injuries were responsible for 30% of deaths in 1-to 3-year-olds, with 40% in 4-year olds and 50% to 60% among the 5 to 17 years olds (Peden et al., 2008).

However, in the United States, a quantitative study conducted by Theurer and Bhavsar, (2013) found that children aged 5 – 14 years were not likely to sustain RTIs, but adolescents aged 15 to 17years were observed to be at the highest risk of RTIs. The study revealed that for emergency department visits, hospitalizations, and deaths combined, children aged 3 to 4 years, and adolescents aged 15 to 17 years were more likely to sustain RTIs than other age groups.

Male children showed a higher risk of RTIs than girls. In Iran, India, Latin America, South, and East Asian community, children aged between 3 – 17 years males were observed to largely sustain RTIs compared to any other age group of female children (Peden et al., 2008; Verma et al., 2009; Theurer & Bhavsar, 2013; Tabibi et al., Feng et al., 2015). The finding was attributed to their more independent use of roadways or streets. Besides, in the Middle East and Asia, quantitative studies that were conducted showed that male children aged 7-11 years practiced risky road use deliberately; because pedestrian safety skills are already fully developed in them and risky crossing behaviours are just pursued knowingly.

In Africa, quantitative studies were conducted in Tanzania and South Africa (Chalya et al., 2012; Schrieff et al., 2013) which also revealed that school children age range 6-12 years were usually involved in RTAs as they rushed through heavy traffic to and from their schools. These school-age group children were active and were often less supervised than pre-school age children. Coupled with the paucity of boarding school facilities for children of their age as well as lack of school buses, school-children had to walk distances to and from school thereby increasing risks for sustaining RTIs.

Koekemoer et al. (2017), conducted a cross-sectional, non-randomized self-report survey to assess pedestrian safety knowledge, road-crossing behaviour, and pedestrian RTIs of primary school children in selected low-income settings in Cape Town, South Africa. The survey focused on three primary schools and 536 children aged 6–15 years, answered a questionnaire in their home language of isiXhosa. This survey revealed that children who walked to or from school on their own reported risky road-crossing behaviour, such as the lack of pedestrian safety knowledge. Older boys (10–15 years) were most at risk of experiencing a severe pedestrian injury than girls.

In Malawi, quantitative studies conducted by Kraemer et al. (2012); Quresh et al., (2013); Chokotho et al., (2015); Purcell, et al., (2017) showed that school-age children were at high risk of

being involved in RTAs. In another study, which was conducted by Kiser et al. (2012) in Lilongwe found that older children with an average age of 7 years represented 30.6% of all RTA related trauma patients at KCH. These victims were observed to be mostly pedestrians aged from 6 – 16 years. Furthermore, results showed that 97% of students walked to school every day.

Various studies in urban Malawi agreed that older children aged above four years, were the ones at more risk of RTAs than younger ones, partly due to some road infrastructural problems (Kraemer et al., 2012; Kiser et al., 2012). However, infrastructure deficits combined with vehicle aspects of unfitness for road safety and other traffic-related problems in the environment have been altogether declared as not the main causes of RTAs as all these risk factors were calculated to contribute only 12% of RTAs (Ali, 2010).

2.2.3 Driver behavior: over speeding and drunken driving

Globally, over speeding and drunken driving have contributed to many road traffic accidents involving children (Wilson et al., 2010; Chisholm et al., 2012; Higashi et al., 2015; Banstola & Mutton, 2016). A global survey by the World Health Organization on global road safety in urban settings revealed that only 46 countries have laws that meet best practice criteria for speed (WHO, 2018). While maximum speed limits in urban areas should be lower than or equal to 50 km/h, the results of the survey showed that Malawi is among countries with poor enforcement of urban speed limits of 50 km/h, together with other best practice on road safety (WHO, 2018:9).

In a study conducted in London, Curry et al. (2011) found that the probability of pedestrian death from road crashes increases significantly when the speed is over 30 km/hour. In urban areas of

United Arab Emirates, Abu-Zidan and Eid, (2015) found that the vehicle over speeding was one of the most important factors affecting the severity of road traffic collision injuries in children.

In Africa, particularly South Africa, Wesson et al. (2016) found that speeding beyond the country's legal speed limits was a well-identified risk factor in 30 - 50% of road traffic accidents in that country. In Africa and indeed in Malawi, there is little or no evidence base to support whether there are adequate speed limit zones along with all the road systems and evaluative studies to determine their effects on the reduction of RTAs. In addition to speeding, a survey by WHO revealed that 5–35% of all road deaths were reported as alcohol-related (WHO, 2018).

In South Africa and Tanzania, studies revealed that alcohol misuse by drivers was one of those countries' well-described RTI risk factors (Chalya et al., 2012; Wesson et al., 2016). In Tanzania, it was revealed that drink-driving laws were not sufficiently enforced via random breath testing (RBT) of drivers at roadside checkpoints due to lack of resources (Chalya et al., 2012). This exposed more children to RTIs.

In urban Malawi, not observing legal speed limits has been attributed as the top main cause of RTAs in the country, contributing 56% as a direct cause of RTAs (Ali, 2010). A global survey by World Health Organization on global road safety in urban settings revealed that maximum speed limits in urban areas should be lower than or equal to 50 km/h, but the results of the survey showed that Malawi is among countries with poor enforcement of urban speed limits of 50 km/h, in line with best practice (WHO, 2018:9). Further evaluative research of the specific impact of traffic enforcement strategies on speed regulation in Malawi needs to be carried out in order to determine more accurately

the impact of the different road safety measures that monitor speeding by motorists in relation to children's safety on the roads.

2.2.4 Road infrastructural deficits

Globally, it has been agreed that rapid motorization of low and middle-income countries has come along with some rise in unroadworthy vehicles on the roads with the same challenges of infrastructural deficits, and this has led to increasing rates of road traffic injury that have involved children (Curry et al., 2011; Chisholm et al., 2012; Higashi et al., 2015; Banstola & Mutton, 2016). Some studies confirmed that challenges in road infrastructure such as narrow, high street vendor density, low-light conditions, and absent lane demarcations; such roads having a high volume of traffic and high vehicle speed, as well as lack of parental supervision on older children on the safe use of such existing road facilities, have been attributed to higher incidences of RTAs involving children in many countries (McKinlay et al, 2008; Curry et al., 2011; Staton et al., 2016).

In Chicago, New York, and Philadelphia in the United States of America, Shin et al. (2011) carried out a quantitative study that found that limited sidewalks, narrow roads with high vehicle speeds and volumes increased children's exposure to road traffic injuries. In a Sub-Saharan study, Curry et al. (2011) found that in LMICs including Malawi, child pedestrians comprise 30–40% of all road traffic deaths as the road was a shared space for driving, walking, cycling, and playing for children. The high volume of traffic in narrow roads, high vehicle speed, high street vendor density, and absent lane demarcations were observed as risk factors. The researchers also revealed that most pedestrian fatalities occurred in low-light conditions.

In urban Tanzania, Chalya et al. (2012) identified that pedestrians including children were most vulnerable to injury and death due to several factors, including lack of pedestrian facilities in

road design. Besides, a high incidence of pedestrian injuries in the study reflected low public awareness on-road use in which pedestrians were less likely to use walking pavements even if they were available. In Malawi, it is unknown whether walking pavements are adequate as there is no specific research done to confirm it.

Similarly, another study in Tanzania by Casey et al. (2012) revealed that ‘low- and middle-income countries comprised only 32% of the world’s vehicles, they accounted for more than 85% of the global burden of motor vehicle fatalities.’ They further reported that: ‘this was likely related to increased motorization in the setting of inadequate transportation infrastructure maintenance, lack of safety device use such as restraints and helmets, mixed road use by pedestrians or non-motorized vehicles such as bicycles.’

Chomba et al., (2017) conducted a quantitative study in Lusaka and Copperbelt provinces, the most urbanized places that had the highest number of road traffic accidents in Zambia: 74,207 and 26, 690 road traffic accidents respectively. The reported road traffic incidents were partly due to a lack of appropriate road designing methods and legal enactment of traffic laws which have led to unplanned settlements in road reserves. They stressed that human behavioural characteristics, specifically rush and negligence, had the highest contribution to road traffic accidents involving children.

2.3 Preventive strategies for childhood road traffic injuries

2.3.1 Adult supervision

Worldwide, adult supervision of children has been recommended as one effective way of a promotive intervention that leads to the reduction of road traffic injuries in children. Globally, better

parental education and better socio-economic status of families were observed to be associated with better-prepared mothers who might be aware of the appropriate steps that a parent could take to prevent child injury through parental supervision and teaching of rules about road safety (Peden et al., 2008; Verma et al., 2009). In a world report on child injury prevention, Peden et al., (2008) recommended the need for further studies on the role of supervision and guidelines for its age-appropriate application in various settings of injury risk. They further recommended that models of good supervision should be developed, and cultural influences on the ways supervision was conducted should be examined. Child training on road safety has been stressed as a prevention measure for childhood road injuries.

A behavioural study in the United States of America, by Schwebel et al. (2012) reviewed risk factors for child pedestrian injury, and effective intervention and prevention programs and confirmed that caregivers must consider the child's development since young children simply cannot cross streets safely, and should not be permitted to do so. By age 7 or 8, and certainly, by age 9 or 10, many children can learn to cross streets safely. Such training ideally would come from multiple sources such as parents, teachers, and other professionals in the community. Also, they reminded caregivers that beyond education, they should collaborate with other professionals to advocate for safer pedestrian environments such as road engineering (for example, traffic calming; building footbridges), use of crossing guards near schools, and community organization of pedestrian safety initiatives.

In a quantitative study across large cities in the USA, Shin et al. (2011), interviewed town planning officials from 13 large cities including Chicago, New York; Philadelphia, Pennsylvania, California, to discuss high-risk population groups and institutional barriers in relation to child road traffic injuries, and concluded that a pedestrian-friendly environment can also be promoted through

suggestions, meetings of stakeholders and cooperation of caregivers, City Councils and other professionals in order to prevent road traffic accidents involving children and also adults. Citizens were urged to submit complaints and suggestions to City Councils in order to promote road safety for all including children. This was observed to also influence political will to improve investment in road safety activities that resulted in the reconfiguration of several complex intersections, widening of sidewalks, installation of separate bicycle pathways, and the provision of street furniture for pedestrians.

In Southern Africa, particularly Tanzania, Chalya et al. (2012), conducted a prospective hospital-based study of road traffic accident victims at Bugando Medical Centre in Northwestern Tanzania between March 2010 and February 2011. A total of 1678 road traffic accident victims were studied. Both Chalya et al. (2012) and Schrieff et al. (2013) revealed that students were usually involved in RTAs as they rushed through heavy traffic to and from their schools. These school-age group children were recommended to be given more adult supervision as one effective way of a promotive intervention that may lead to a reduction of their involvement in road traffic injuries.

2.3.2 Child-pedestrian/ child-bicyclist behaviour

Globally, more than half of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists (WHO, 2018). As one of the counter-measures or strategies of child injury prevention, Peden, et al., (2008) recommended ‘wearing of safety helmets as they make children more resistant to head injuries.’ Internationally, some studies revealed that in India, Latin America, South, and East Asian community, children aged between 3 – 17years were the group of children who formed the majority amongst children who suffered RTIs such as traumatic brain injuries (TBI) (Peden et al., 2008; Verma et al., 2009). Furthermore, they stressed that bicycle helmets may reduce the risk of head injuries to child cyclists; however, helmets were not uniformly worn by

all bicycle users. In addition, legislation has been enacted in some countries and jurisdictions to mandate helmet use by cyclists, however, the issue remains controversial with opponents arguing that helmet laws may inhibit people from bicycle riding and thus from gaining the associated health benefit of physical fitness (Macpherson & Spinks, 2008). The Decade of Action for Road Safety 2011 - 2020, a global effort by WHO to reduce RTAs, emphasized the need to increase the legislation and enforcement of the use of helmets as one way to reduce road traffic injuries (RTIs) and related deaths in children (WHO, 2013; Wesson et al., 2016).

In their quantitative study across large cities in the USA, Shin et al. (2011), interviewed town planning officials from 13 large cities to discuss high-risk population groups and institutional barriers in relation to child road traffic injuries. The researchers concluded that the pedestrian-friendly environment on the roads such as sidewalks, separate pavements for cycling bicycles helped to reduce childhood injuries. Walking and biking for children between the ages of 5 and 14 years was shown to be safer if sidewalks, separate pavements for cycling bicycles were in place. The study exposed that the City Department of Transportation was also working with nonprofit organizations such as New York City Safety, Inc., which is responsible for the Safety City program, an educational program on street safety and biking for children between the ages of 5 and 14 years. In the city, there is a pedestrian task force that conducts training workshops, seminars, conferences, and education programs to raise the public's awareness of pedestrian safety while utilizing media like brochures to deliver traffic safety messages to protect both children and adults from road traffic injuries.

In the USA, Schwebel et al. (2012) reviewed over 100 relevant manuscripts, in a review of effective intervention and prevention programs. The researchers found that children need safe and accessible play areas because lack of immediate access to a play area may lead them to play in driveways and streets or to walk long unsafe distances to seek play or recreational areas and get hit

by vehicles during such travel. They also found out that even when children have cognitive and perceptual development to be safe pedestrians, their safety might be jeopardized if they are distracted while crossing streets by eating, drinking, smoking, talking, or use of mobile phones.

Furthermore, caregivers need to closely supervise road use by children of ages less than 8. By toddlerhood (ages 1–2), most children can see and hear traffic. Peripheral vision to see traffic is fully developed to near-adult levels by age 7. Younger children (roughly ages 5–8) have more trouble selecting safe traffic routes than older ones (roughly ages 9 and older). These younger children may take longer to translate a decision into the physical movement of the legs, hence caregivers need to closely supervise road use children of ages less than 8 (Schwebel et al., 2012).

Further than that, safe pedestrians use advanced cognitive skills that improve as children get older. In selecting a safe route across a street, children must avoid mid-block crossing or diagonal crossing but must cross at safer places like marked crosswalks (or Zebra crossing), and walk bridges (or flyovers). Deductive reasoning skills and memory for rules and regulations are important for making safe decisions when using the roads. In children aged below 8, more complex aspects of perception are problematic, for example, a safe pedestrian must not only recognize oncoming traffic but must judge vehicle speed and acceleration/deceleration in order to estimate when the vehicle might arrive at the crossing area. Unless until about age 12 when deductive reasoning capacity and memory for rules reach an adult level, children less than 12 are not skilled at estimations such that they underestimate the time until a vehicle will arrive. Road features like bends, inclines, or curves can impair perception and they also change vehicle speed in challenging ways, and pedestrians must perceive and then process those changes. Children must search all these road environmental dangers and such skills develop with age, usually around age 7 or 8, and become fully developed at 12. The

small stature of children increases their risk in a road environment in that they are less visible than adults, hence caregivers need to escort younger children, particularly below 8 (Peden et al., 2008).

Marquez and Farrington (2013) found that the poorest communities in South Africa often live alongside the fastest roads, their children may need to negotiate the most dangerous routes to school, and they may have poorer outcomes from injuries due to limited access to post-RTA emergency health care. In Malawi, there is a need for both quantitative and qualitative studies to replicate studies from Tanzania and South Africa for there are scanty local studies on childhood RTI except a few which showed that children were at high risk of being involved in RTAs (Kraemer et al., 2012; Quresh, et al., 2013; Chokotho et al., 2015).

2.3.3 Driver behaviour

The speed at which a vehicle travels influences the risk of a crash as well as the severity of injuries. A global survey by World Health Organization on global road safety in urban settings revealed that effective speed management is central to most road safety intervention strategies such that setting national speed limits is an important step in reducing speed (WHO, 2018). In addition, maximum urban speed limits should be lower than or equal to 50 km/h, together with other best road safety practices. Further than that, local authorities should have the legislative power to reduce speed limits further, allowing them to take into account local circumstances such as the presence of schools or high concentrations of vulnerable road users.

Across the world, according to a systematic review of thirty-five studies by Wilson et al. (2010), to assess whether the use of speed cameras reduces the incidence of speeding, road traffic crashes, injuries and deaths, excessive speed has been found to contribute to a substantial number of RTAs. Furthermore, it was predicted that, if the number of speeding drivers is reduced, both the

likelihood and severity of a crash will be lowered. In addition, interventions aimed at reducing traffic speed are considered essential to preventing childhood road traffic injuries and deaths. The enforcement of safe speeds with speed cameras and associated automated devices, as well as random breath tests for alcohol levels, are examples of such measures. The Decade of Action for Road Safety 2011 - 2020, a global effort by WHO to reduce RTAs, emphasized consistent enforcement of such measures as drink driving laws; and speed limits in order to reduce RTIs and deaths (WHO, 2013; Wesson et al., 2016). According to 'The global report on road safety', WHO (2018), since 2014, global safety rules recommended restriction of child passengers on motorcycles, and only 63 countries, representing 33% of the world's population, restrict child passengers on motorcycles.

In Europe and the Middle East, drivers were encouraged to observe legal speed limits and avoid distractions while driving in order to prevent childhood RTIs. In Europe, Curry et al. (2011) in their review of RTI prevention in developing and developed countries, identified that avoiding the use of mobile phones during such times was observed to be one way of a promotive intervention that may lead to the reduction of childhood RTIs. In London city, in the United Kingdom, Curry et al., (2011) confirmed that the probability of pedestrian death from road crashes increases significantly when the speed is over 30 km/h. Furthermore, in the United Kingdom where 20-mile per hour speed zones were installed in special areas since 1986, as part of traffic calming, it has been shown that road casualties reduced by 40% and have the greatest effect on children aged 0-15 years. In urban areas of the United Arab Emirates, Abu-Zidan and Eid, (2015) found that the vehicle over speeding was one of the most important factors affecting the severity of road traffic collision injuries in children. They concluded that strict speed limit enforcement was observed to be an injury prevention priority in their community.

In Africa, joint efforts or collaboration between various agencies can help reduce childhood road traffic injuries. The Bloomberg Philanthropies Initiative for Global Road Safety an initiative that focuses on implementing evidence-based interventions to reduce the risk of road traffic fatalities and injuries in ten low and middle-countries that account for half of the global road crash fatalities – Brazil, Cambodia, China, Egypt, India, Kenya, Mexico, Russia, Turkey, and Vietnam, and 10 cities reported that in the Ethiopian city of Addis Ababa, the joint traffic safety campaigns by media and traffic law enforcement reduced drink driving by 50%. In Addis Ababa, out of such collaboration came out a Road Safety Strategy and they established an inter-agency road safety council (Bloomberg Philanthropies 2015).

Furthermore, some researchers agreed that motorcycle riders must be considered as unprotected vehicle users. Emejulu et al. (2010) conducted a 24-month retrospective study of all head injury patients who met the criteria for traumatic brain injury in the Accident and Emergency Department of a tertiary health institution in Nigeria. This study aimed at defining the peculiar demographic and associated risk factors in traumatic brain injury among a total of 510 patients. Data were collected from emergency cards and case notes. The results confirmed that drivers and child passengers on motorcycles to both wear crash helmets to prevent head injuries in case of a road traffic accident. In reiteration, Chisholm and Naci (2008) recommended mandatory use of motorcycle helmets among all the riders, or passengers that may include children. The WHO (2018) report on road safety emphasized that head injuries are the leading cause of death and major trauma for two- and three-wheeled motor vehicle users including children and correct helmet use can lead to a 42% reduction in the risk of fatal injuries and a 69% reduction in the risk of head injuries. The use of helmets is, as such, an increasingly important means of preventing road traffic injuries and deaths.

Also in Africa, driving under the influence of alcohol markedly increases the risk of being involved in a road traffic accident. Consequently, many countries have passed laws that ban driving a vehicle over a certain blood alcohol concentration (BAC limit). Chisholm and Naci (2008) and Chalya et al.(2012) agreed that the effects of alcohol on motorcycle riding skills can be observed at blood alcohol concentration (BAC) as low as 0.05 g/dl. In addition, alcohol usage causes carelessness and loss of concentration as well as over speeding. While the WHO recommendation for a blood alcohol concentration limit for driving is 0.05 g/dl or less for the general population and 0.02 g/dl for young drivers aged 20 years and younger, Malawi has been identified as observing this practice (WHO, 2018:10). But, in Malawi, there are no local studies to confirm the burden of drink-driving in relation to its contributions to RTAs and RTIs in children.

In Western Africa, in Ghana, according to the Bloomberg Philanthropies (2015) reported that the Accra Police enforced the law on helmet use and red-light violation in the city of Accra for a sustained period of two months and over 200 defective motorbikes and over 120 riders were processed for courts for various road infringements. This directly impacts driver behaviour that in turn promotes child safety on the roads.

In Eastern Africa, particularly in Kenya, Bachani et al. (2012) in their quantitative study to present the current epidemiology of RTIs in Kenya using data from the police and vital registration systems in that country, echoed that wearing helmets have shown to be effective in preventing head injuries and the resulting fatalities among motorcycle riders, reducing the risk of a fatality in the event of a road traffic accident by approximately 20 percent and as much as 50 percent. In Southern Africa, particularly in Tanzania, Chalya et al. (2012) recommended avoiding passenger overload, promotion

of certified driver training, and valid licensing as common areas of violations as more people owned cars in Tanzania.

In Tanzania, it was recommended that drink-driving laws should be enforced via random breath testing (RBT) of drivers at roadside checkpoints, as this was observed to reduce traffic fatalities by 25% in a region (Chalya et al., 2012). Furthermore, these researchers also recommended that drink-driving laws needed a sustained programme of enforcement together with mass media campaigns highlighting the dangers of driving under the influence of alcohol and the penalties associated with breaking drink-driving laws. In Malawi's roadsides, it is unknown how well resourced are the traffic law enforcement agencies in carrying out random RBT. There is a need for research to confirm this gap and come with affordable and realistic recommendations.

Another study in Tanzania by Casey et al. (2012) revealed that injury prevention efforts focusing on speed limit enforcement had a potential impact as some of the specific promotive interventions that may lead to the reduction of road traffic accidents and the possible consequent traumatic brain injuries in children.

In South Africa, Wesson et al. (2016) stressed the need for an increase in the legislation and enforcement of drink driving laws; and speed limits, required a multi-sectorial approach to help reduce childhood road traffic injuries (RTIs) and related deaths.

In Malawi, among other interventions, frequent police patrols to monitor legal speed limit adherence, since speed violations contributed 56% of RTAs nationally, was recommended as one of an important promotive intervention that may lead to a reduction of RTAs (Ali, 2010). According to the WHO (2018:9) report on road safety showed Malawi is among countries with poor enforcement

of urban speed limits of 50 km/h, therefore, nationally there is a need to improve monitoring and control over speeding drivers.

2.3.4 Improving infrastructure, volume and roadworthiness of vehicles

Globally, several researchers agreed that upgrading infrastructural deficits such as narrow highways, high street vendor density, low-light conditions, and absent lane demarcations, can potentially reduce RTAs that may involve children (McKinlay et al., 2008; Staton et al., 2016). WHO (2018) proposed a safer infrastructure like dedicated lanes for cyclists and motorcyclists, as well as improved vehicle standards. According, to the Bloomberg Philanthropies Initiative for Global Road Safety (2015), an initiative that focuses on implementing evidence-based interventions to reduce the risk of road traffic fatalities and injuries in ten low and middle-countries that account for half of the global road crash fatalities – Brazil, Cambodia, China, Egypt, India, Kenya, Mexico, Russia, Turkey, and Vietnam, many low- and middle-income countries road infrastructure is strongly linked to fatal and serious injury causation in road traffic collisions, and improvements to road infrastructure, particularly design standards that take into account the safety of all road users, are critical to making roads safe. Moreover, these countries have little or no regulatory safety standards for vehicles. Peden, et al. (2008) recommended separate bicycle and pedestrian pathways from the road used by motorized vehicles. Caregivers, drivers, and other stakeholders were recommended to influence government agencies by demanding such safer transport systems.

Furthermore, the Bloomberg Philanthropies (2015), stated that ‘road safety improvements such as shoulder widening, controlled crosswalks, lane marking and separation, intersection improvement, and other measures reduce the risk of road traffic fatalities and injuries for all road users, including car occupants, motorcyclists, bicyclists, and pedestrians by 25% to 40%.’ Besides, roads are made safer by reducing car travel and designing secure modes of transit, including mass

transportation systems, walking infrastructure, and bicycle routes. One example of mass transport are big buses, which can reduce fatalities and crashes by 40% to 50%.

In Africa, Chisholm et al. (2012) suggested that prevention of hazardous speeding included the use of fixed speed cameras which are practically unaffordable in resource-poor countries where use of mobile/hand-held speed cameras or roadside breath testing for excessive alcoholism, at randomly chosen checkpoint sites along the roads, are more suitable. It also encompasses improved road design or layout such as the construction of special zones, and separate lanes to separate moving vehicles from pedestrians.

In Southern Africa, particularly Tanzania, Casey et al (2012); Chalya et al. (2012) revealed that students were usually involved in RTAs as they rushed through heavy traffic to and from their schools. These school-age group children were in an environment of varying infrastructural deficits that included the paucity of boarding school facilities for children of their age as well as of school buses; they had to walk varying distances to and from school. As students formed one of the largest groups of road traffic victims, and improved school transportation system and more boarding school facilities were suggested as ways to reduce the incidence of RTAs.

In Malawi, Kiser et al. (2012) recommended that if road infrastructure was improved, and at the same time responsible authorities conducting mass education dissemination via mass media such as radios, RTAs involving children would be greatly reduced in Malawi. Better lighting along roads, dedicated pedestrian lanes or sidewalks, and education about road safety were recommended as appropriate prevention initiatives. Also, these researchers divulged that media campaigns via the radio and cell phones, educating children of school-going ages including adolescents on behavioural changes could increase their safety as vulnerable road users.

Marquez and Farrington (2013) conducted ‘a comprehensive review of the literature and on input from policy makers, researchers, and practitioners to address the growing burden of non-communicable diseases (NCDs) and road traffic injuries (RTIs). Marquez and Farrington, (2013), found that the poorest communities in South Africa often live alongside the fastest roads, their children may need to negotiate the most dangerous routes to school, and they may have poorer outcomes from injuries due to limited access to post-RTA emergency health care.

In Southern Africa, particularly Tanzania, Chalya et al. (2012) revealed that students are usually involved in RTAs as they rush through high volumes of traffic to and from their schools. These school-age group children are usually very active and are often less supervised than pre-school age children. Coupled with the paucity of boarding school facilities for children of their age as well as of school buses, school-children have to walk varying distances to and from school. As students formed one of the largest groups of road traffic victims, an improved school transportation system and more boarding school facilities may reduce the incidence of RTAs.

According to Chalya et al. (2012), an increase in traffic in that country has allegedly come along with the proliferation of unroadworthy vehicles that have been attributed to causing an increase in RTAs; to that effect, the country has witnessed at least a fivefold rise in recorded traffic-related fatalities during the last decade. In a further elaboration, this in part was due to a phenomenal increase in the number of motor vehicles, many of which are old, and not road-worthy. Casey et al., (2012); Chalya et al. (2012) recommended the implementation of traffic rules and regulations to control passenger overload, lack of certified driver training and valid licensing as these were observed to be common traffic violations as more people own cars in Tanzania. Chomba et al. (2017) conducted a quantitative study in Lusaka and Copperbelt provinces, the most urbanized cities that had the highest number of RTAs in Zambia. 74,207 and 26, 690 reported road traffic accidents respectively. Results

revealed that increased car ownership and rapid urbanization had increased traffic congestion and accidents.

A comparative investigation study was conducted in Malawi, Sudan, Oman, New Zealand that aimed to describe traffic accident characteristics and fatality rates. The study findings showed that road infrastructure deficits combined with vehicle aspects of unfitness for road safety and other traffic-related problems in the environment contributed to 12% of RTAs (Ali, 2010). In Malawi, studies conducted found that there was a lack of studies to support prevention efforts for the reduction of RTAs (Ali, 2010; Chen, 2010; Kiser et al., 2012; Younget al. 2016). In Malawi, Samuel et al. (2009), in their study of the pattern of RTAs, concluded that Malawi's proportion of victims due to motorcycle injuries (1.6%) was less than in other sub-Saharan countries, including Ghana (4%), Tanzania (3.5%) and Nigeria (36.2%). The most likely reason suggested was that there were fewer motorcycle users in Malawi than in these other countries; efforts such as the provision of safety wear to motorcyclists, successful in other sub-Saharan countries, may have less impact in Malawi. What might be appropriate in one African country is not necessarily appropriate in another. Therefore, while it was crucial to wear the motorcycle helmets elsewhere, in Malawi it may not be a priority area to focus at.

A study was conducted in Malawi by Purcell et al. (2017) confirmed there was rapid urbanization with shared use of roads by motor vehicles, bicyclists, pedestrians, and other modes of transportation, there was also a paucity of traffic rules and regulations, for example, many open trucks passengers had no seats and safety belts were rarely used. This was attributed to a rise in RTIs in Malawi.

2.4 Summary of literature review

The literature review has revealed risks for childhood road traffic injuries as follows: lack of adult supervision of children against RTIs, challenges in children's behaviour as they try to use busy roads against their various developmental phases; drunken driving and over-speeding by drivers; congestion of roads with high volumes of traffic; unroadworthy vehicles on the roads, as well as some road infrastructure deficits such as same roadway being used by motorists, cyclists, and pedestrians.

The literature review has revealed prevention measures of RTIs in children such as caregiver supervision of children on road safety; observing speed limits, strict drink-driving laws, regulation of roadworthiness of vehicles on the roads, better road infrastructure that includes availability and utilization of separate pedestrian and cycling lanes, and that a child aged above 8 years can walk on the roads on their own as long as the caregivers are comfortable to let that child do so. However, in Malawi, there are scanty studies on RTIs such that it is vital to understand more the specific risks for childhood RTIs and to what extent the education strategies for prevention of childhood RTIs are being implemented given the rising road traffic accidents involving children.

Chapter 3

Methodology

3.1 Introduction

This chapter presents the research methodology that was used in this study. Research methodology refers to the strategy that the researcher uses to collect and interpret data from the study (Polit & Beck, 2010). These are the study design; study site, study population; sample size and sampling methods; recruitment criteria, data collection, data management, analysis, the trustworthiness of the data, and ethical considerations. The study aimed to investigate the risk and prevention of childhood RTIs in Blantyre and Lilongwe Cities of Malawi.

3.2 Design

An exploratory design with a qualitative approach that utilized a semi-structured interview guide to collect data from the 20 caregivers and 12 traffic police officers in the Surgical Departments of the Children's Wards at Queen Elizabeth Central Hospital (QECH) and Kamuzu Central Hospital (KCH); traffic Police offices in Blantyre and Lilongwe. According to Polit and Beck (2010) in the qualitative approach, the observations and discussions are less structured, allowing participants to express a full range of beliefs, feelings, and behaviours. It emphasizes understanding of the human experience as lived (Groove et al., 2010). This design was chosen because little is known about experiences of caregivers and traffic police officers regarding road traffic accidents (RTAs) and road traffic risks and strategies for the prevention of road traffic injuries (RTIs) in Blantyre and Lilongwe. Thus, the design allowed the researcher to gain an understanding of the experiences of caregivers and traffic police officers regarding risk and prevention strategies of RTAs and RTIs in children. In addition, it facilitated the unlocking of a wealth of information from individual caregivers and traffic

police officers. In addition, the semi-structured interview guide that was administered face-to-face by the researcher maintained participants' responses within the confines of the subject matter to achieve the study objectives while providing flexibility by asking open-ended questions that requested individual's narrations of own opinions.

3.3 Study Setting

The study was conducted at Queen Elizabeth Central Hospital (QECH) in Blantyre District, and Kamuzu Central Hospital in Lilongwe District. These two hospitals are the largest central hospitals in the southern and central regions of Malawi where most cases of childhood RTIs were registered in 2014 (Malawi Traffic Accident Report, 2014). The hospitals offer surgical services to the admitted children who have had RTAs with RTIs. The study setting was chosen because it has surgical wards in Children's Wards where potential study respondents were found. The study setting included Blantyre and Lilongwe Traffic Police Offices. The two traffic police offices were used because all RTAs are registered by the traffic police officers before going to the hospital; hence the two offices were part of the study setting. The four sites were ideal to provide the needed data that was required in the study.

3.4 Study population

The study population comprised of caregivers of children hospitalized due to RTIs at Queen Elizabeth and Kamuzu Central Hospitals, as well as traffic police officers in Blantyre and Lilongwe Cities of Malawi. Caregivers, as primary carers of children, and traffic police officers, as part the first responders to RTA victims, were a great source of the needed information according to the study objectives.

3.4.1 Sample size

The study sample consisted of 32 participants who were caregivers and traffic police officers. There were ten caregivers of children with RTIs admitted at Queen Elizabeth Central Hospital in Blantyre, and ten were from Kamuzu Central Hospital in Lilongwe. There were twelve traffic police officers; five from Blantyre and seven from Lilongwe Cities which have high numbers of children involved in RTAs.

The adequacy of the sample was reached when a clear list of risks and prevention strategies were being repeated over and over; a sign of data saturation had been reached, no new data emerged (Polit & Beck, 2010). As in qualitative research, the sample size was based on informational needs, when no new information was obtained and there was redundancy (Polit & Beck, 2010).

3.4.2 Sampling method

The participants for the study were recruited using a purposive sampling method. Purposive sampling technique was chosen because it enabled the researcher to select the interviewees based on the judgment premised on the inclusion criteria that they were typically representative of the study phenomenon, knowledgeable about the question at hand (Brink et al., 2012). The researcher decided to purposely select only those participants that were judged to be typical of the study population or particularly knowledgeable about the study objectives. Therefore, participants that were deemed to be knowledgeable about the risks and prevention strategies for childhood road traffic injuries were caregivers and traffic police officers who met the inclusion criteria.

3.4.3 Inclusion criteria

Inclusion criteria included:

A caregiver that was admitted to KCH and QECH respectively with a child who had suffered injuries after a RTA. The caregiver understood and spoke Chichewa. Voluntarily consented to participate in the study and had a child aged within 3 to 14 years.

A traffic police officer that had worked in the traffic office in Lilongwe and Blantyre for 5 years; understood and spoke Chichewa; voluntarily consented to participate in the study.

3.4.4 Exclusion criteria

Exclusion criteria included:

A caregiver that was not admitted to KCH and QECH respectively with a child who had not suffered injuries after a RTA; was not in the age range 3 to 14 years. The caregiver did not understand and speak Chichewa. A caregiver who did not consent to participate in the study. A caregiver who had lost a child to death or with a child on oxygen therapy or any clinically unstable child as this would affect the emotional well being of such a caregiver. A traffic police officer with less than 5 years of traffic work experience, did not understand and speak Chichewa; did not consent to participate in the study.

3.5 Development of the study instrument

Semi-structured interview guides were developed based on gaps identified in the literature reviewed (Polit & Beck, 2010), and experts in child trauma also gave input to the instrument. All the reviewed literature was in English language and the instrument was initially developed in the English language, and translated into the Chichewa language which was understood and spoken by caregivers who had the experiences of child trauma due to RTIs (Polit & Beck, 2010). An expert in both Chichewa and English languages was consulted for the accuracy and precision of the translation of the instrument from English to the Chichewa language. Similar questions were used to interview both caregivers and traffic police officers in Chichewa and English languages, respectively. Semi-structured interview guides were chosen because they used both closed and open-ended questions to collect the required data with flexibility; while maintaining the focus of the study objectives (Brink et al., 2012). The instrument was less time consuming, approximately 30-45 minutes; given that some study participants such as traffic police officers are typically busy members of the society. The first part of the instrument collected demographic data of caregivers and traffic officers, while the second and third parts collected data based on the specific objectives of the study.

3.6 Pre-test of the study instrument

Pre-testing of the study instruments was done at Kamuzu Central Hospital and Central region traffic office. This was done to determine the feasibility, relevance, and clarity of the instruments. Experts in child trauma also gave input to the instrument. The pre-test data were not used as part of the study data. The pretest was helpful because it strengthened the feasibility, relevance and clarity of the instrument since there were no changes done to the final instrument.

3.7 Data Collection Procedure

After obtaining research approval from COMREC, Inspector General of Police on behalf of Central and Southern Regional Traffic Offices, Regional Traffic Officers (RTOs) of Central and Southern regional traffic offices, KCH Director and QECH Director, the Principal Investigator sought an audience with caregivers and traffic officers respectively to explain to them about the study in detail. The study title, design, objectives, benefits and risks, taking of field notes, the use of a voice recorder for the comprehensiveness of data, and that participation was voluntary. This was done to develop a relationship and provide awareness about the research study that was being conducted. With the assistance of the person-in-charge at the various study sites, the investigator identified a place that fostered audio-visual privacy. After explaining to the person-in-charge at the each study site on the inclusion and exclusion criteria for the recruitment of study participants, the researcher was assisted further in identifying the individual participants by purposive sampling technique and then got to the identified private room, where the researcher explained to the participant about the study, the title, design, objectives, benefits, and risks, taking of field notes, the use of a voice recorder for the comprehensiveness of data, and that participation is voluntary; that could withdraw from the study at any time without penalty. If the participant verbalized that the information was clear, they were asked to sign the informed consent form as evidence that information about the research was clear and were participating in the study voluntarily (**Appendices 7a, 7b, 8a & 8b**). Then in-depth interviews using semi-structured interview guides were administered by the researcher on the face-to-face with each study participant. The researcher utilized the data collection tool that had the first section that aimed to elicit information about the socio-demographic characteristics: age, marital status, living situation, education, and occupation. The second section aimed to elicit information specific to the study objectives had questions for clarifications and probes as well as reinforcements where necessary as guided by the research tool. The whole conversation between the researcher and the study participant

was voice recorded for completeness and accuracy of the data and took approximately 30 to 45 minutes. While the conversations were audiotaped, field notes were taken by the researcher about the participant and environment, for example, an observation about participant's non-verbal communication (facial expressions, posture, and other body language). The individual interviews helped to explore individual experiences in detail. While in privacy, each participant was deemed to be more comfortable to express and share their experiences.

Data collection was conducted during the scheduled dates communicated to the various sites. Data gathered in Chichewa was transcribed into English for data analysis and presentation of findings (Bailey, 2008). The structured interview guides, consent forms, field notes, and recorded memory cards bore codes and not names of participants, dated according to sites, and were kept under lock and key in the investigator's office and were accessed by the investigator and the supervisors only. The codes helped to avoid attaching information to specific individuals thereby maintaining anonymity and confidentiality.

3.8 Data Management and Analysis

Voice recorded interviews were transcribed word for word and the following connotations were used: pause were denoted in the transcript with dashes, gaps, or prolonged pauses with dots and all exclamation and laughter were included. Collected *Chichewa* (local language) data were transcribed into English. Back translation of the Chichewa data was done by another expert in both Chichewa and English languages (Bailey, 2008).

Predetermined themes were developed from the study objectives. Sub-themes emerged from the collected data as follows: the data was converted into categories which were small and meaningful units that could be retrieved and reviewed (Brink et al., 2012). The researcher then assigned codes to the categorized data. All the data were analyzed by coding it to establish subthemes. A code was a label given to pieces of data that contributed to a particular subtheme (Brink et al., 2012). The codes were put together to create subthemes that were described showing linkages between them. The subthemes were described to show connections between them.

According to King and Brooks (2012), *themes* are recurrent features of participants' accounts characterizing particular perceptions and/ or experiences that the researcher sees as relevant to their research question; *coding* is the process of identifying themes in accounts and attaching labels (codes) to index them. In addition, *a priori* themes or predetermined themes were identified in advance of coding. These a priori themes were identified because the research project had started with the assumption that certain aspects of the research objectives being investigated would be focused on. After the literature review, a priori themes were used since the risk and prevention of childhood road traffic injuries were very well-established. Furthermore, a priori themes were very useful in accelerating the initial coding phase of data analysis, which saved time.

3.9 Trustworthiness of the study

Trustworthiness is a demonstration that the evidence for the study findings are sound and the argument made on them is strong. Based on Polit and Beck (2010:492-493). In this study, trustworthiness was achieved by utilizing Lincoln and Guba (1985) outlined the criteria for achievement of trustworthiness as follows:

Dependability was ensured by explaining in detail the whole research process, keeping audit trails that included field notes and personal notes which were made available for peer reviews by experts such as the research supervisor. The study had a detailed explanation of the step by step research process, future researchers could repeat the study and possibly gain similar findings (Polit & Beck, 2010).

Credibility was ensured by collecting data until saturation was reached, repeatedly reading and reflecting on the field notes and the translations; compared the current phenomena with the state of the science through literature review. The semi-structured interviews and transcribed data with the original *Chichewa* versions were made available for peer reviews, for example, by the research supervisor, who has vast experience in research and would compare whether the predetermined themes and the emerging sub themes were similar to those of the principal investigator. Discussions were done to verify the accuracy of the themes and sub-themes.

Transferability was enhanced by providing detailed discussions of the study context and setting, background information of the participants, data that were collected, analyzed, and interpreted. This would enable other people to judge whether the study findings could apply to them or not. However, the nature of this study and its limitations made the study findings to only apply to the study population in Lilongwe and Blantyre Cities.

Confirmability, which deals with freedom from the researcher's unacknowledged biases, was enhanced by explaining comprehensively the details of the methods and procedures of this study

which could be audited, even by an outsider using audit trails to evaluate the conduct of the study (Polit & Beck, 2010). The collected data were made available for reanalysis by peer reviewers, with permission from the participants.

3.10 Ethical considerations

The study proposal was reviewed and approved by COMREC before data collection in order to ensure ethics for the research procedures were adhered to (Appendix 1). Approval to conduct the study was sought from the Hospital Directors of KCH and QECH before data collection (Appendices 3 & 4). The inspector general (IG) of police for Blantyre and Lilongwe Cities was approached for written approval to conduct the study in the respective traffic police offices (Appendix 2). The study respected and upheld the human rights of caregivers and traffic police officers as study participants with an emphasis on the rights to privacy, confidentiality, anonymity, self-determination, fair treatment, and protection from any harm. Each participant signed a consent form to confirm their voluntariness to participate in the study. Before signing the consent form, they were given detailed information on the aim of the study, data collection procedures, duration of interviews, use of a voice recorder, benefits or risks of the study to participants, and the relevance of the study to the public in Malawi and beyond. Participants were informed that their withdrawal from the study if they wished, without effects on their access to health care services. They were also assured that the collected data would be treated with strict confidentiality. The field notes and recorded tapes did not bear the names of participants, but only code numbers for anonymity and all the collected data were locked and accessed by the researcher and supervisor only. The participants were assured that their identity would not be disclosed even in the final report or published articles.

Chapter 4

Presentation of Findings

4.1 Introduction

This chapter presents the findings of the study that aimed to explore perceptions of caregivers and traffic police officers regarding risks and prevention of road traffic injuries (RTIs) in children in Blantyre and Lilongwe Cities of Malawi.

The study findings are presented in two sections. The first part contains the demographic characteristics of the twenty caregivers and twelve traffic police officers that were interviewed. The second part presents the findings from the in-depth interviews under two predetermined themes based on the study objectives and four subthemes that emerged from the qualitative data (See Table 1).

Table 1: Themes and the subthemes

Predetermined theme	Subtheme
Theme 1: Perceived risks for childhood RTIs	<i>Overpopulated urban areas</i>
	- <i>Poor road infrastructure</i>
	- <i>Permanent buildings within road reserves</i>
Theme 2: Perceived prevention strategies for childhood RTIs	<i>Role fulfilment challenges</i>
	- <i>Lack of adult supervision: Lack of teaching on road safety, child labour, low socio-economic status</i>
	- <i>Drunken driving</i>
	<i>Improving road safety knowledge</i>
	- <i>Outreach programs</i>
	<i>Compliance with road safety rules and regulations</i>
	- <i>Adult supervision; protection from child labour</i>
	- <i>Improving infrastructure: saved road reserve space, more lanes, traffic signs, and computerized monitoring of traffic offenders</i>
	- <i>Tougher traffic penalties</i>

4.2 Demographic characteristics of the study participants

Demographic information of the study participants is shown in Tables 2 and 3. Table 2 shows that most of the caregivers were females; they were the mothers of hospitalized children. The caregivers were aged between 20 – 49 years and were married. Their level of education was a primary school. They were peasant farmers and small scale vegetable vendors. Their families had more than seven members each. Half of the caregivers were from families where both the mother and the father were still part of the family, while the rest had a single parent in the form of either a mother or a grandmother.

Table 2: Demographic characteristics of caregivers

Table 1: Characteristic		KCH Caregivers (n=10)	QECH Caregivers (n=10)
Gender	Male	3	1
	Female	7	9
Age in years	20 – 29	4	3
	30 – 39	3	0
	40 – 49	2	5
	50 -59	1	2
Tribe	Chewa	5	2
	Tumbuka	1	1
	Lomwe	2	4
	Yao	2	3
Religion	Christianity	10	10
	Islam	0	0
Level of education	Standard 1 – 5	4	5
	Standard 6 – 8	5	5
	Form 1 – 2	1	0
Marital status	Married	6	6
	Divorced	2	3
	Separated	2	1
Occupation	Peasant farmer	4	4
	Vendor	4	5
	Security guard	2	1
Size of family	2 – 4	4	3
	5 – 6	0	1
	7 – 9	6	6
Relationship to sick child	Father	3	1
	Mother	6	8
	Grandmother	1	1

Table 3 shows that the traffic police officers were mostly males, aged between 25 and 35 years, and with five years of work experience. Each of them had witnessed at least five RTAs per year that involved children with RTIs.

Table 3: Demographic characteristics of traffic police officers (TPOs)

Characteristic		Lilongwe (n=7)	Blantyre (n=5)
Gender	Male	6	3
	Female	1	2
Age in years	25 – 35	3	2
	36– 45	2	1
	46- 55	2	2
Tribe	Chewa	3	2
	Tumbuka	2	1
	Lomwe	2	2
Religion	Christianity	6	5
	Islam	1	0
Work experience in years			
	5 – 10	3	13
	11 – 20	4	2
Number of RTAs witnessed involving children per year			
	5 – 10	5	0
	11 - 20	2	5

Findings from Qualitative Data

Findings from in-depth interviews with participants on risks and prevention strategies for childhood road traffic injuries are presented under the following themes: perceived risk for childhood RTIs and perceived prevention strategies for childhood RTIs as shown in Table 3. 4.3.

4.3 Theme 1: Perceived risks for childhood RTIs

From the thematic analysis of the collected data, many risks for childhood RTIs were revealed and grouped under two sub-themes that emerged as follows: Overpopulated urban areas and Role fulfilment challenges. The perceived ‘overpopulated urban areas’ included a lack of road infrastructure and permanent buildings within road reserves. ‘Role fulfilment challenges’ included lack of adult supervision, child labour, low socio-economic status of society, and lack of teaching on road safety.

4.3.1 Subtheme: Role fulfilment challenges

Role fulfilment challenges by guardians, teachers, drivers, traffic police officers, and government included lack of adult supervision, drunken driving, child labour, and low socio-economic status of society as well as lack of teaching on road safety.

4.3.1 Lack of adult supervision

Treating ‘under-aged’ children as independent pedestrians and bicyclists and lack of teaching on road safety were perceived to be risk factors for RTIs. Children were said to have poor judgment when crossing the road thereby exposing them to RTIs. Some participants said school-going ages of between five and fourteen years were at higher risk of sustaining RTIs. Other participants expressed

that allowing child labour and coming from families of lower socioeconomic status were also risk factors for childhood RTIs.

There were differences in what the study participants termed an ‘under-aged’ child pedestrian or bicyclist.

Police #11 stated: ‘A child aged below six years is underaged to be an independent pedestrian.’

Police #5 said: ‘Parents are careless; they don’t escort their children aged below ten years to and from school. Most of the time, the casualties of RTAs are the under-aged pedestrian school children who are independent, that is, not escorted by adults.’

Some said that they lacked responsibility. One participant said:

Our family is now used to allow our six-year-old daughter to be an independent road user; as a family, we are used to the fact that she can move alone on the roads. She was sent to buy some sweets by her auntie, who is our neighbour. As she was returning home, she was hit by a car as she tried to cross the M1 road (a busy road way). I lacked responsibility, I did not fulfill my (parental) responsibility since I allowed her as an independent pedestrian at the age of six years (Caregiver #3).

As much as some caregivers are careless, some children are cunning and also careless and end up on the roads where they are exposed to RTIs.

Police #20 said: ‘Children are cunning, once they see the caregiver is away, they go to the road to play there and suddenly they are knocked by speeding vehicles. This is what I have observed.’

Police #7 alleged: ‘Children have a lack of awareness of how to walk from one side of the road to the other. The carelessness of children when crossing from this side to the other side of the road is one of the risks for childhood RTIs.’

In this study, the findings revealed that *caregivers who do not attempt to teach their children on road safety tips* was a contributing risk factor for childhood RTIs as expressed by caregivers.

Caregiver #6 explained: ‘I have not yet started teaching my child aged 12 and in Standard two of primary school because she is still too young for that. My child may be more prone to road accidents since I have not yet started to teach her on road safety.’

Caregiver #16 expressed:

I never taught my child aged 14 and in Standard eight of primary school on prevention of road traffic accidents. At their school, I am confident that their teachers there are teaching them. I believe a child should start being taught on road safety tips from the age of four years. I feel my son is still very vulnerable to childhood road traffic-related injuries since no family member has ever attempted to teach him on road safety tips.

Another participant pointed out:

No family member has attempted to teach my child aged 14 and in Standard three of primary school on prevention of road traffic accidents because they are taught on that in schools. In my view, a child should start being taught on road safety tips from the age of six years. So,

my son is at a higher risk of being involved in a road traffic accident because, as a family, we have not attempted teaching him on road safety tips (Caregiver #18).

In this study, *poor judgment* by a child when crossing the road was identified as a risk factor for childhood RTIs as said by caregivers and traffic police officers.

Police #12 explained: 'Human error is a risk factor to children's involvement in road traffic accidents because they misjudge things by thinking that I will pass or cross the road, then they are hit by a car.'

Police #5 explained:

A child can see a vehicle at a short distance, but you will find that he or she will still try to cross the road while the vehicle is at a short distance. The major factor should be maturity; children do not think the way adults think... They take a vehicle as a toy; as something that does not kill. They will only notice that: 'Oh, this thing is dangerous'- when they are involved in an accident.

He also narrated:

Children may try to cross the road so unexpectedly which is unlike adults who know the calamity or disadvantage of trying to cross while there is an oncoming cruising vehicle. Children will think if they cross while there is that oncoming vehicle, they are playing with that vehicle. If they manage to cross, they will say, 'I have crossed and it has not found me.' Then if there is a remaining child or there are more children, they will be told by those who have crossed that, 'Come. It will not get you.' That is a lack of maturity in children, they are not thinking like adults. This may result in childhood RTIs.

Police #4 narrated: 'Children think that a vehicle is far away, then cross while the vehicle is just there. This is the thinking of children. So a road accident can happen.'

According to Police #9:

Once a child aged between five and seven years sees that their friend has crossed the road, he or she will not check both sides, left and right. These five to seven-year-olds will just say, 'I am late, let me just cross also.' Not knowing that there is a vehicle close enough to hit them.

Caregiver #15 explained:

My nine-year-old son was carried on a bicycle carrier by his twelve-year-old friend. A huge herd of cattle was coming in front of them on the same road. My son asked his friend to pull out of the road and give way to the cattle, but the older boy refused and continued cycling ahead saying that the cattle were going to move out of the road and give way to them. Instead of them giving way to the animals, they mistakenly remained on the road, in the way of the cattle. When the older boy noticed that the cattle were not at all giving way to them, and they were about to crash into them, he jumped off the bicycle for his safety and sped away uninjured, leaving my son still on the carrier. Then my son, while still on the carrier, fell badly and got injured.

Caregiver #4 said: 'Here in Malawi, the main problem is on crossing from one side of the road to the other. Children like running while crossing the road. So they may easily lose balance and fall on the road and maybe hit by a vehicle.'

Police #1 observed: 'Sometimes there will be a number of children, one crosses, the other one remains. So the remaining one just thinks of running to join the one who has already crossed and just runs without checking for any vehicles. In doing so, could end up being hit by a running motor vehicle.'

Police #2 remembered: 'Most of the children fail to cross properly... They are used to run when crossing the road. One case I experienced was of two kids. One crossed the road, then the other one just crossed while running as if chasing the other one. The one chasing the other was hit by a car.'

The study findings revealed that *allowing 'underaged' children as independent bicyclists* was a risk factor for RTIs as stated by caregivers and traffic police officers. In this study, there were five child pedal cyclists with RTIs aged between eight and 15 years. The participants had different age limits on whom they termed an 'underaged' bicyclist.

Police #12 explained:

Parents have contributed to RTAs. How can you allow your daughter or son who is seven years old to cycle a bicycle on their own? This area is being overlooked. Acquiring a bicycle is not a problem, but how to use it. Parents forget that my son or daughter is under aged for cycling independently on the road on their own, hence endangering their lives. At that age of seven, they do not know that if I do this, I am endangering my life while independently cycling on the road.

Caregiver #19 specified: 'Any child aged below 18 is an 'underaged' pedal cyclist...the under-aged child cyclist can cause road accidents due to immature decisions.'

Caregiver #10 believed: 'Any child aged below 15 is an 'underaged' pedal cyclist who makes immature decisions that can result in more road accidents.'

Police #12 said: ‘Any child aged below 14 is an ‘underaged’ pedal cyclist who is dangerous to self and others on the road as far as RTAs are concerned.’

The study findings revealed that being of *school-going age of five to fourteen years* was a risk factor for childhood RTIs as stated by caregivers and traffic police officers. These children were said to be involved in RTAs when going to or coming from school. The findings revealed that the children were involved in the RTAs and sustained RTIs in the morning hours between 8 am – 11 am.

Caregiver #3 specified: ‘Children of the age of around five to fourteen years are involved in RTAs when rushing to school during the morning or around eight o’clock and also when knocking off school from around 11 a.m.’

Caregiver #17 expressed: ‘In my view, children aged from five to fourteen years usually get involved in RTAs when rushing to school early morning from seven to eight o’clock, and when knocking off school at lunch hour or around four o’clock in the afternoon.’

Another participant explained:

‘Children who are five to about fourteen years of age usually get involved in RTAs around 8 am, when they are going to school and drivers are also cruising for work. Then 11 am to 12 noon, when they are knocking off from school, or are at break time, and drivers are also on the same road going for lunch’ (Police #2).

The study findings revealed that *boys are more vulnerable to RTIs than girls* as stated by caregivers and traffic police officers. Various opinions were given as reasons for more boys' vulnerability to RTIs compared to girls.

Police #9 said: 'Girls tend to be more listening than boys when traffic police officers give out sensitization talks on how to use the road safely. This leaves girls less vulnerable to RTAs than boys.'

Police #1 said: 'In fact, boys are more vulnerable to childhood RTIs because they like moving around without company or guidance of parents or caregivers than girls.'

Police #5 alleged: 'Naturally, men are more active than women; boys are also more active compared to girls. Boys like to be moving up and down more than girls. Even men are more mobile than their wives. This puts boys at more risk of RTAs than girls.'

Caregiver #1 said: 'Boys are more mobile than girls, so they are more exposed to road traffic and possible road accidents; girls are more inside their houses and therefore are safer from road accidents.'

Caregiver #13 expressed: 'Boys like to play far away from the home where they may cross the road or even play on the road, unlike girls who play at home. So, boys are more prone to road accidents.'

As much as boys were said to be more vulnerable to RTIs compared to girls, there was a contrasting opinion that girls are more prone to RTIs.

Police #6 observed: 'Girls are more afraid when crossing the road than boys. Unlike boys, boys are more confident. Most of these kids (girls) cross with one leg and decide to go back where they came from and maybe hit by a vehicle.'

The study findings revealed that allowing *child labour* involving tasks that require crossing or walking on busy roads was perceived as a risk factor for RTIs as stated by caregivers and traffic police officers.

Police #4 said: ‘There is the negligence of parents who are sending children for tasks to... even fetch firewood where they cross busy roads. Such child labour is exposing children to being hit by vehicles.’

Another participant explained:

I delegated my children with some routine labour of fetching firewood for the family. My six-year-old son was in the company of his 15 years old brother. They overloaded a lot of the cattle-drawn cart with firewood. This child (the six-year-old) secretly climbed up to the top of the firewood pile in the cart. His older brother was not aware that he had climbed on top of the firewood pile. While the cart was in motion on the road, one of the logs dislodged after some pulling by the child. Then the child fell off while that log followed behind him. The child was the first to hit the ground, then the log hit and harmed the child... The older child could not see that his younger brother had climbed on top of the firewood pile because the younger brother was on the other side of the cart which was too overloaded for the older brother to notice him as he was also busy whipping the cattle to pull faster the overloaded cart; the cattle had no one leading them... cattle can dangerously overpower and injure...children if left alone (Caregiver #9).

One participant narrated:

Parents are sending their ‘underaged’ child...to buy something from the markets, especially when things are urgently wanted, the child will run as fast as possible, and will not be mindful of checking for approaching vehicles. That child will dangerously judge that any given car is

far away enough for the child to cross the road, this is the child's way of reasoning when in reality the car would be close enough and hits the child. (Caregiver #4).

Another participant pointed out: 'Parents send their children below six years of age to buy them some items in accident-prone high-density areas (of Blantyre city) such as Chemusa trading centre, Mbayane and Ndirande, and they are exposed to the risk of being hit by a vehicle' (Police #11).

The study findings revealed that parents are *avoiding attending road traffic safety meetings* where they have been formally invited to be empowered on how to prevent RTAs and the subsequent RTIs in both adults and children as stated by traffic police officers.

Police #5 said:

Most of the time...parents of today do not see traffic safety tips as essential; parents are avoiding attending road safety meetings with us (traffic police officers). Only after one of their children is involved in RTA is when they realize that: 'Oh, sensitization concerning road safety is very important to everyone.' ...So the parents, after a meeting whereby you say: 'Okay, after the meeting everyone will receive one thousand kwacha (Malawi currency equivalent of about US \$1.33) each as an incentive.' Then, they will attend better. But, you are teaching someone how to take care of their child, they still do not see the importance of such meetings. Instead, they focus on money, of which as Police we cannot manage. That's why it is better to teach children in schools unlike inviting parents who need more money, which according to them is a sitting allowance.

In this study, the findings revealed that a *lack of government commitment to prioritize road safety* was a risk factor for childhood RTIs as stated by traffic police officers.

Police #12 said:

Previously, the government was concerned with road safety, but now concentration on and commitment to prioritize safety by the government is less. You will bear with me, previously in schools, we were learning ‘Civics’. The teachers who were teaching it were very strictly concerned with road safety. Therefore, as a country, we don’t have a good foundation for traffic safety, as a result, we are having many children who are being hit by vehicles.

Another participant alleged:

It is unfortunate because we as traffic police officers, do not have the power to influence the government to make better roads. Yes, we meet the Traffic Safety Council, and when we meet them, they just say; ‘Wait for the budget.’ We just beg the government to maintain the roads to safer standards because children are being exposed to RTIs (Police #3).

In this study, coming from *families of lower socioeconomic status* was perceived as a risk factor for childhood RTIs as stated by traffic police officers.

Police #8 specified:

In low-density areas, parents drive their children to school because they are well to do, but in high-density areas, the school children walk to and from school alone and they are prone to be hit by cars... children should walk on their own when they are aged above 12 years.

4.3.1.1 Drunken driving and unroadworthy vehicles on roads

In this study, driving under the *influence of alcohol* was perceived as a risk factor for childhood RTIs as expressed by caregivers and traffic police officers.

Police #1 asserted: ‘Most of the small vehicle drivers are drunkards; they do not care about road traffic signs, for example, they do not care who is crossing on the Zebra line. They are causing many RTAs.’

Caregiver 2 said: ‘Some drivers are drunken while they are driving; they drive dangerously to themselves and other road users.’

Police #5 said: ‘Malawians have learned to drink and drive. They think that when they are drunk, they enjoy the driving, which is not correct because they end up being involved in accident, fatal ones. The danger of RTAs due to drunken driving is likely to continue.’

Police #8 expressed: ‘Motorists are causing the most RTAs to children due to over speeding due to carelessness of some drivers or driving under the influence of intoxicating liquor.’

The study findings also revealed that driving *un-roadworthy vehicles* and prioritizing making money at the expense of road safety was a perceived risk factor for childhood RTIs.

Caregiver #4 said: ‘Transport owners know their specific vehicles that are not roadworthy, but because of love for money, they still operate such transport on the roads. This is increasing road accidents that are involving our children.’

One participant pointed out: ‘The motorcyclist who knocked down my 12-year-old daughter was over speeding because his motorcycle was not registered, had no insurance, but he was carrying passengers for business. He was running away from traffic police officers for fear of prosecution’ (Caregiver #6).

According to Caregiver #18:

Many drivers are driving vehicles while breaking road traffic rules and regulations, for example, driving vehicles with no brakes. Even if they are aware that the vehicle will cause a road traffic accident, they still knowingly take it for a drive. Some do not have the required insurance covers, but they still just ply on the roads to make money at the expense of road safety.

According to Police #11:

If an un-roadworthy vehicle driver sees that there is a traffic police officer ahead, they avoid and try to run away. In the process, they lose control and get involved in accidents and victims have serious injuries and even die. They usually run away and their vehicles are usually not registered and therefore difficult to trace. The CFO (Certificate of Fitness) is very high these days, so they resort to running away from traffic police officers.

Police #3 said: ‘When drivers know they have a traffic offense such as un-roadworthy vehicles when they see us (traffic police officers), they make a U-turn and run away to avoid us. In the course of running away, they may hit child pedestrians and even adults.’

Police #4 narrated:

The minibus driver was avoiding traffic police officers by running away from them. He thought of running away to a place where he could not be easily found by the traffic police officers, and in the process of running away from the police, he hit my ten-year-old son despite that he (the child) was walking on the far right side of the road. There were many adult witnesses, and because of them, we learned that it was the driver who was in the wrong since he was running away while over speeding to avoid being caught by traffic police officers.

4.3.2 Subtheme: Overpopulated urban areas

The ‘overpopulated urban areas’ included permanent buildings within road reserves and a lack of road infrastructure and equipment.

4.3.2.1 Permanent buildings: residential houses and schools, within road reserves

The study findings revealed that having permanent buildings, namely: residential houses and schools, within road reserves, was a risk factor for childhood RTIs as stated by caregivers and traffic

police officers. The road reserve was alluded to as allowing for at least three metres of space from a major roadway when building houses or schools, as reported by one caregiver:

Our residential houses are too close to the busy roadway, too close indeed, like from here to our toilets and the shower rooms there (a couple of metres away), is that not too close? ... This is our situation, more so, the road is too close, too close that one cannot notice that a child has gone to the road unless one saw the child taking leave to the road; if the caregivers happen to be inside our brick fenced yard, they will never know that a child has gone to the road being at risk for road accidents (Caregiver #14).

Another participant narrated:

Sometimes, residential houses are too close to roads and children can easily play on the roads. Some of the children play along, or on the sides of the road. Therefore, a driver who might lose control of the vehicle, due to over-speeding, incompetent driving skills, un-roadworthiness of vehicles such as, worn-out tyres might burst and hit children (Police #1).

4.3.1.2 Lack of road infrastructure and equipment

The study findings revealed that *lack of road infrastructure and equipment* together with *vandalism of traffic signs* and *increased vehicular traffic volume* were contributing risk factors for childhood RTIs as expressed by caregivers and traffic police officers.

The roads were said to be slippery, potholed, and narrow, with no separate pavements for pedestrians, bicyclists, and lanes for motorists. The roads lacked road traffic signs, humps, and rumble surfaces. The participants expressed that vandalism of road traffic signs and increase of road traffic volume compromised road safety and exposed children to RTIs, as stated one participant who said:

Usually, our roads are not marked in a way to protect crossing children. For example, a school near a road can have children regularly crossing it, so it needs some road traffic signs like Zebra crossing (crosswalk). So the children are left to command themselves; some who have just crossed will tell the remaining ones, 'That vehicle did not get us, so come.' Yet the oncoming car is at a short distance of hitting them, and the drivers end up hitting such children." He said: 'Even the Paul Kagame road (a major dual carriageway in Lilongwe City) lacks road markings, for example, for those who want to turn either right or left (Police #5).

Lack of equipment for use by traffic police officers was a perceived risk factor for childhood RTIs as uniquely expressed by traffic police officers. They said they lacked equipment such as transport, breathalyzers, and speed cameras or traps.

Police #3 expressed:

We are failing to access our outreach areas because of lack of vehicles. People in villages surrounding towns need services of community policing to teach and civilize them on how to use the road...When they come to town, they cannot become RTA victims. But the lack of transport prevents us to reach these people. Lack of transport also prevents us to rush to assist school pupils cross certain roads.

Police #7 specified: 'Lack of transport or vehicles in traffic operations is our number one challenge...We have no transport to move to schools to tell them what to do on the roads, the kids are, therefore, likely left to the dangers of RTAs.'

Another participant specified:

We need more speed traps and breathalyzers because, here in Malawi, if people say I have enjoyed much today, they must take alcohol. So, the government should buy us these gadgets...There is only one-speed trap and breathalyzer at our Headquarters and Lilongwe Police Station. If you go to Lingadzi, Kawale, Area 36 (high-density suburbs in Lilongwe city)...there is none of these...If we can have these gadgets, we can reduce accidents because we cannot rely on the few gadgets here; we are also human beings, we get tired (Police #7).

Police #11 said:

The drunken drivers now know that traffic police officers have no breathalyzers, so they repeat the same traffic offence of not observing traffic rules and regulations because of being drunk with alcohol. We have a high record of drunkenness during driving; they know where there are no breathalyzers. This may not break the rise of RTAs that may involve children.

Vandalizing of road traffic signs was a perceived risk factor for childhood RTIs as expressed by one participant who narrated:

Some road traffic signs have been vandalized, there is vandalism of road traffic signs. So drivers cruise unknowingly of speed restrictions thereby causing road accidents that may involve children (Police #9).

Increased vehicular traffic volume was a perceived risk factor for childhood RTIs as expressed by one participant who narrated:

Every day, people are importing second-hand vehicles, and the volume of vehicles is increasing daily. These vehicles come mainly to Blantyre and Lilongwe cities where there are now ever-increasing traffic volumes and congestion, and yet they will use the same narrow roads. More children become exposed to RTIs (Police #8).

Another participant observed:

The population is high and the number of vehicles is also high in high-density areas of Blantyre city. The number of vehicles is increasing every year, but they are using the same narrow roads. This has led to congestion on our roads and more RTAs involving children can easily occur (Police #10).

4.4 Theme 2: Perceived prevention strategies for childhood RTIs

From the thematic analysis of the collected data on perceived preventive strategies for childhood RTIs, two sub-themes emerged and these were: ‘Improving road safety knowledge’ and ‘Compliance with road rules and regulations.’ Improving road safety knowledge included outreach programs, improving literacy levels as well as compliance with road safety rules and regulations. ‘Compliance with road rules and regulations’ included adult supervision on-road use by children, protection from child labor; more traffic lanes, traffic signs and computerizing monitoring of traffic offenders, permanent buildings being at least 30 metres from the road as well as tougher traffic penalties.

4.4.1 Subtheme: Improving road safety knowledge

Prevention of RTIs could be achieved through improving road safety knowledge through *outreach programs* that empower more collaborators in schools, market places, media houses, and hospitals.

4.4.1.1 Outreach programs: teaching on road safety

Improving road safety tips was said to involve outreach services by traffic police officers as well as teaching on the same by caregivers and teachers to children in communities and schools.

Police #11 shared:

At a flyover at HHI (Hendry Henderson Institute) School, each time a school pupil was hit by a car early in the morning. What we did is: we sensitized the pupils that, ‘If you do not use that flyover, we will come and catch you.’ Now, we can stay even a month without any RTA that involves children. This means they do listen and apply our RTA prevention messages through the school outreach programs.

Another participant said:

We conduct outreach programs on RTA prevention for school children ...We do outreach through chiefs, churches; in public places such as market places for a few minutes. I am suggesting mobile cinemas on outreach vehicles for more effective dissemination of road safety messages to members of the public. The use of vehicles with mobile cinemas, advertisement based on a short film, can be used to help us in the prevention of childhood RTIs (Police #3).

Police #9 remembered: ‘Our Safety Services branch sent personnel to train teachers who help children to cross the road near *Chimwankhunda* primary school (in Blantyre City). This was a prevailing RTA hot spot, but now no RTAs are happening there.’

In this study, the findings revealed that caregivers should start *teaching on road safety tips when a child is aged two to about six years* as stated by caregivers and traffic police officers. The study participants had different age limits on when caregivers should start teaching on road safety tips as a way to prevent childhood RTIs.

Caregiver #16 said: ‘It is just unfortunate that it is overlooked, for better teaching, it is ideal to start when the child is aged three or four years. At three or four years, the child starts understanding the lessons better. That is one-way childhood RTIs can be prevented.’

Caregiver #18 said: ‘The teaching on road safety tips should start at six years of age, once a child starts going to school. At that stage, the child is ready for basic RTA prevention lessons.’

Police #3 expressed: ‘The teaching should start when the child is aged five years. These make their toys and drive them on the road. So we can teach which side of the road to keep when driving, walking, and cycling and this can help in the prevention of childhood RTIs.’

The participants expressed that a child pedestrian has to be able to first look at the right, then left, then right again before crossing a road as one way to prevent childhood RTIs.

Police #3 explained:

Once parents are taught by traffic police officers, parents can teach their children, for example, while taking a meal, a parent can remind their child that: ‘When crossing the road, first look at the right, and then the left, and the right again, before crossing a road’. The father can say to their child: ‘What was taught in church on crossing the road?’ The child would say: ‘First look at your right, then left, then right again’. Then the father says: ‘Yes, that is right, keep it up’.... This strengthens the childhood prevention of RTIs.

In this study, the findings revealed that *sensitizing specific collaborators in road safety* could be a prevention strategy for childhood RTIs as stated by caregivers and traffic police officers.

Police #2 stressed:

Mechanics and garage owners should report any damaged cars to traffic police officers. They know the kinds of damages that are hit and run damages but they do not report. Many drivers hit and run away from victim pedestrians. We need to know the number of garages in each community. Then we need to have an outreach program to encourage the mechanics and garage owners to report to traffic police officers so that we prosecute such drivers thereby reducing RTAs in our country.

Police #11 explained:

Some garage do report to traffic police officers on suspicious vehicles of hit and run offences. For example, in Ndirande (a high-density suburb in Blantyre City), the garage personnel observed that the windscreen damage was of someone who had hit a pedestrian and was trying to hide and to destroy evidence. We did our investigations and found out that he had hit someone to death. We prosecuted him successfully. But garage people cannot be reporting all the time because they are also after money, that's the challenge. However, we need to sensitize them to be reporting a hit and run cases so that we prosecute the drivers and that helps to discourage such reckless driving thereby helping to prevent childhood RTIs.

Caregiver #19 narrated: 'A *member of parliament* (MP) is a potentially powerful crowd-puller, the gathering then is then taught on RTA prevention; a counselor is also able to conduct such a meeting. Family members and traditional leaders can explain road safety tips in our village.'

Police #8 explained: 'Traffic police officers need to work with *school authorities and parents* to prevent RTAs. We traffic police officers should take advantage of the Parent-Teacher Association (PTA) days so that we educate both parents and teachers on traffic safety tips.'

Caregiver #4 said:

'To help prevent RTAs, gospel *musicians*, because their music is played in both churches and beer halls and households, so they can release songs on road safety tips for the public to hear and benefit from. *Dramatists* and various *sports players* can help disseminate road safety messages to the public. Preachers should disseminate road safety messages in the churches.

Police #9 explained: ‘At every Police Station there is a branch called *Community Policing*, which meets villagers regularly. So, traffic police officers join them and spread road safety messages that aim at reducing RTAs that may involve children.’

Police #8 expressed:

Because our colleagues from the *Ministry of Health* (MOH) handle RTA victims daily, and also because they understand the severity, the physical and socio-economic consequences of RTAs in better and easy to understand words to parents, teachers, children; this will carry weight and impact in the prevention of childhood RTIs.

Police #4 said:

Practically, we do not work as an island, if some *well-wishers* can help us to buy air time to be on the radio with road safety tips so that people including those in villages can get regular messages from all the radio stations in Malawi. This will help in the prevention of childhood RTIs.

Police #9 remembered: ‘Toyota Malawi came in at Chimwankhunda primary school, put in a zebra crossing, bought reflectors, STOP and GO signs. This helps vulnerable school children to be protected from RTIs.’

Police #12 said:

I encourage companies to come forward and assist. For example, Chibuku products, Toyota Malawi, Lafarge cement have given equipment such as reflectors to a few schools to be used to assist pupils to safely cross the road. It is our concern that only a few schools in Blantyre urban have the equipment.’

4.4.2 Subtheme: Compliance with road safety rules and regulations

Compliance with road traffic rules and regulations included adult supervision, protection from child labour, improving the road infrastructure, saving the road reserve as well as tougher traffic penalties.

4.5 Theme 1: Perceived risks for childhood RTIs

From the thematic analysis of the collected data, many risks for childhood RTIs were revealed and grouped under two sub-themes that emerged as follows: Overpopulated urban areas and Role fulfilment challenges. The perceived ‘overpopulated urban areas’ included a lack of road infrastructure and permanent buildings within road reserves. ‘Role fulfilment challenges’ included lack of adult supervision, child labour, low socio-economic status of society, and lack of teaching on road safety.

4.5.1 Adult supervision

In this study, the findings revealed that adult supervision when children are crossing the road to access their school was a prevention strategy for childhood RTIs as said by a caregiver and traffic police officers.

Caregiver #13 explained:

Commonly, urban schools have some trained teachers who facilitate pupils in safe crossing of a nearby road to access their school without being involved in RTAs. I am now seeing only a couple of peri-urban schools emulating that practice. But it is my wish that all deserving schools practice this can have a huge impact on the prevention of RTAs that involve children.

Police #5 believed:

In my view, one way to prevent childhood RTIs is that school children below ten years of age need to be assisted and guided when crossing the road such as when accessing their school. An adult should be stopping vehicles and guiding the children to cross the road safely. Otherwise, it's dangerous for them to cross on their own.

The study findings revealed that a caregiver should hold his or her child by their hand on the road to prevent childhood RTIs by traffic police officers.

Police #3 stressed:

Below 12 years, they (children) are preoccupied with crossing the road without prioritizing oncoming vehicles, these children must be held by their hands to prevent them from being involved in RTAs. If they are two, the caregiver should hold the first one on the left hand and the second one on the right hand. Failure to do so, you leave your child to fate (of RTAs).

Police #1 specified:

Parents in the escort of a child, say four to nine years old, should hold the child by the hand because the child can go away. The parent can be in escort, yet not in control, so they must hold their child by the hand so that the child cannot go away from control. This helps to prevent RTAs involving children.

The study findings revealed that a caregiver should allow children aged from eight to eighteen years as safe independent bicyclists in order to prevent childhood RTIs as expressed by caregivers and traffic police officers. The five child pedal cyclists with RTIs in the study were aged between eight and 15 years. The study participants had different age limits on whom they termed 'independent

child bicyclists' who can uphold road safety thereby preventing childhood RTIs. The differences in the age limits came out as follows:

Caregiver #18 believed: 'A child of 8 years of age or above should be allowed to cycle a bicycle on their own on the roads. An eight-year-old child can cycle a bicycle alone in busy trading centres and roads while preventing RTAs.'

Police #12 stressed:

Parents forget that my son or daughter is below the age of cycling on the road on their own, hence endangering their lives. In my personal opinion, if someone is 14 or 15, he or she can know what to do, can cycle on their own. At that age, they know that if I do this, I am endangering my life, so he or she can prevent RTAs.

The study findings revealed that *preventing child labour* was a prevention strategy for childhood RTIs as stated by caregivers.

Caregiver #9 expressed:

Children should not be involved in child labour because it helps to prevent their involvement in road accidents. For example, parents should avoid delegating children to fetch firewood using a cattle drawn cart since the children cannot make decisions that can prevent road accidents in such a situation. Those who harness cattle for a cattle drawn cart should be adults, not children because cattle can dangerously behave and injure children if they are left alone.

4.5.2 Improvement in infrastructure and equipment

The study findings revealed that residential houses should not be built ‘too’ close to the busy roadway in order to prevent childhood RTIs as stated by caregivers and traffic police officers. The participants did not specify the distance of the residential houses from the road except Police #12 who specified: ‘...build a residential house at least 30 metres away from the road.’

Police #12 expressed:

In my view the law says, build a residential house at least 30 metres away from the road, in order to promote road safety to people including children. That is not the case for us here in Blantyre; the residential houses are too close to roads. This very much compromises road safety for children. This pains me much...Let me site Mbayane or Chirimba, you will find residential houses less than three metres from M1 road (a busy major road).

The study findings revealed that improving road infrastructure was a perceived prevention strategy for childhood RTIs as expressed by caregivers and traffic police officers.

Caregiver #7 said:

They should put humps on accident-prone places, especially trading centres and schools along our M1 road (a busy major roadway), just as they put humps at St Johns (a common crossing place in Lilongwe City along M1 road) and Wakawaka (another common crossing place in Lilongwe City along M1 road). They should put humps at trading centres such as Kaphiri (another common crossing place in Lilongwe City along the M1 road).

Caregiver #11 observed: ‘In Blantyre city, I urge that authorities should erect enough road traffic signs in all the roads because this helps to inform drivers on the safe speed to travel at, thereby helping to prevent RTAs.’

One participant suggested:

If we can have a flyover near Mt Sochi (a hotel in Blantyre city), along Angoni road, most people from Mbayane (a high-density suburb in Blantyre city) are crossing there. So there is a big congestion there. Accidents are happening there. If the government or other departments can assist us with a flyover there, we can reduce RTAs in town. As a way of preventing RTAs, City Assemblies should do timely maintenance of road signage. Zebra crossings (crosswalk) can wear off because of rains, so the City Assembly must put new ones. The City Assembly is supposed to replace the vandalized road traffic signs (Police #11).

Police #7 said:

Pedestrians and pedal cyclists squeeze themselves on the same tarmac with motorists. There are no pavements for pedestrians and pedal cyclists in Lilongwe. If the roads were wider, it could be a better way to prevent childhood RTIs. Better still, if the government can construct separate lanes for motorists, pedestrians, and pedal cyclists.

In this study, the findings revealed that reducing vandalism of road traffic signs and computerizing the monitoring of traffic offenders can help to prevent childhood RTIs as expressed by traffic police officers.

Police #10 suggested:

To me, if we are to prevent childhood RTIs, one way is to have street lights during the night, this may reduce vandalism of road traffic signs and thieves can be seen. For example, we should have street lights in Bangwe road up to Mvula, Thyolo road up to Bvumbwe, Zomba road up to Mapanga. In Blantyre, we do not have street lights. We do not need the street lights to the rural areas but in the peri-urban areas where vandalism is higher.

Police #8 suggested: 'Road traffic signs should be made of concrete because people can't vandalize them since they will breakdown into unusable pieces. The concrete road traffic signs will stay longer in place thereby helping to prevent RTAs which may involve our kids.'

Police #3 said: 'Rumble surfaces should be put in place for they are warning signs on their own, and cannot be vandalized which can help bring down the cases of childhood RTIs.'

In this study, the findings revealed that improving the availability of equipment including vehicles, breathalyzer, speed cameras and other computerized monitoring systems of traffic offenders for use by traffic police officers can help in monitoring the compliance with road safety rules and regulations that prevent childhood RTIs as stressed by traffic police officers.

Police #11 explained:

For drunken driving, we can't stop Carlsberg (a beer manufacturing company in Malawi) from manufacturing beer, nor stopping drivers from taking beer. The only best solution is to have enough breathalyzers to enable us to determine who is illegally drunk while driving as a key effort to prevent childhood RTIs.

According to Police #1: 'The physical presence of traffic police officers on the road encourages drivers to drive carefully which helps to prevent RTAs. We need vehicles, one or two at each police station for traffic police officers' patrols to monitor traffic offences like drunken driving.'

Police #3 specified:

In the Central region, we need ten vehicles for community policing that will be accompanied by traffic police officers. The government needs to improve us by buying more vehicles for us traffic police officers. We need vehicles with mobile cinema that advertises RTA prevention to the public, as well as improving more of our visibility on the road.

Police #9 said:

We need more vehicles to be deploying and re-deploying traffic police officers after about three hours because, tactically, they need not be fixed at one place for a long time. When it is raining...there is a need for shelters along the roads so that they can hide and continue their duties of controlling and checking traffic in order to minimize RTAs. Vehicles can be used for hiding from rains, but we do not have enough vehicles.

According to Police #11:

If there are two or three computers for monitoring traffic offenders on top of the only one that there is in Blantyre, there can zero incidences of RTAs. If we can do computerization on our roads – but Malawians we are poor to have that; but if we can have two or three places identified to place those computers, then we have zero incidences of hit and run cases that sometimes involve children. I know there is a computer at the District Council office there. If someone drives through a red robot at HHI (Hendry Henderson Institute), it indicates there at the DC (District Council) office. If someone drives Victoria road while the robot is red, it also indicates there. So, when the driver goes to renew their CFO (Certificate of Fitness), it is already in the system that they have a traffic offence that has been recorded. So, even for someone who hit and run someone, it can be recorded if we had such more computers.

Another participant explained:

Just like our friends in the Anti-Vehicle Theft unit, they are online and have an internet connection with MRA (Malawi Revenue Authority). We, traffic police officers, should be online through the internet, it won't be nice to be chasing suspected traffic offenders because in the course of that more RTAs can occur. So, if we are online, we just quote the number plate of their vehicle and we enter the information into the internet system. That entry is at the

same time seen and noted by our colleagues in the Road Transport and Safety Services Department (RTSSD) that this driver has committed such and such offence. And if we are connected through internet with RTSSD and we can give them that number plate of the one who made U-turn and ran away, so that when they go there to pay for their, or renewal of their CFOs (Certificates of Fitness) fees, they will be interrogated, and the traffic law will catch up with them. So, this deters motorists from running away because they know they will still be caught, and in this is one way we can help to protect our children from RTAs (Police #8).

4.5.3 Tougher penalties for traffic offences

In this study, the findings revealed that effecting *tougher penalties* for traffic offences can help to prevent childhood RTIs as stressed by traffic police officers.

According to Police #11:

I think there should be a heavy penalty for those who hit and run and kill pedestrians. They should receive life in prison or at least six months in prison or 17 years. But you will find they will just pay a fine of K200.000 (Malawian currency equivalent of US\$260) and they are free. To them, it's not much money and they will go back and repeat the same crime. That section of law needs to be revised to make it tougher, to make it not finable; this becomes restrictive for drivers to go on committing traffic offences that may involve children in RTAs.

Police #8 suggested:

Fines for drivers who carelessly injure or kill pedestrians in RTAs, are too low. They are charged K40.000 (Malawian currency equivalent of US\$52), they are quickly back on the road enjoying their dangerous driving. I propose to ban them from driving for life in order to bring down cases of childhood RTIs. That can deter even other would-be offenders.

Police #10 said:

The government should increase fines on motorists who break traffic rules and regulations. For example, excessive speeding, they should be charged one million kwacha (Malawian currency equivalent of US\$1.300.00), those who hit and run away, three million kwacha (Malawian currency equivalent of US\$3.900.00) because they do not consider the lives of others. Such high fines can be deterrents for law-breaking of traffic laws which can help to prevent numbers of RTAs that may involve children in Blantyre and even our country.

4.6 Summary of the Study Findings

The study findings revealed the perceived risks for childhood RTIs were overpopulated urban areas with lack of road infrastructure, permanent buildings within road reserves, and vandalism of road traffic signs. The other risks were related to role fulfilment challenges by caregivers, teachers, drivers, traffic police officers, and government, and included: lack of adult supervision, child labour, low socio-economic status of society, lack of teaching on road safety, drunken driving, and unroadworthy vehicles on the roads.

The perceived preventive measures for childhood RTIs included improving road safety knowledge through outreach programs; teaching on road safety. These preventive strategies also included compliance with road safety rules and regulations through adult supervision, protection from child labour, improving infrastructures such as having more traffic lanes and traffic signs; separate lanes for motorists, bicyclists, and pedestrians, computerizing monitoring of traffic offenders, erecting permanent buildings at least 30 metres away from the road, effecting tougher traffic penalties and

engaging specific collaborators in road safety such as mechanics and garage owners reporting a hit and run away cases.

Chapter 5

Discussion, Conclusion, and Recommendations

5.1 Introduction

This chapter presents a discussion of the study findings based on the study objectives, starting with demographic characteristics of participants, perceptions of caregivers, and traffic police officers on risks associated with childhood RTIs, as well as the participants' perceptions regarding the prevention of childhood RTIs. This chapter also presents the conclusion, recommendations, and limitations of the study.

5.2 Demographic characteristics of participants

In the current study, participants were caregivers and traffic police officers. The caregivers were mostly females; they were the mothers of the hospitalized children aged between 20 – 49 years and were married. Their level of education was a primary school. They were peasant farmers and small scale vegetable vendors. Their families had more than seven members each. Half of the caregivers were from families where both the mother and the father were still part of the family, while the other half had a single parent in the form of either a mother or a grandmother. It was important to know the listed characteristics because the age of the caregiver had a significance in the ability to have knowledge and skills for child risks as well as prevention strategies for the prevention of RTAs. The educational level of caregivers was important to know as it had significance, for ability or inability to read the road signs and teach the children. In agreement with a quantitative study in Tanzania by Casey et al. (2012) which found that caregivers of lower socioeconomic status and with lack of education were limited in their capacity to teach their children on road safety tips that resulted in higher RTIs, the participants in this current study appeared to be of lower socioeconomic status with lack of education as well.

The traffic police officers were mostly males, aged between 25 and 35 years, and with five years of work experience. The work experience was important to the researcher for the ability to give the needed information as per the study objectives on risks and prevention strategies of RTAs. There were more males attributed to the study setting where the career was mostly dominated by males until recent years when females can join the traffic police career. This finding is unique to this study and inconsistent with the findings from previous quantitative study conducted in Ethiopia by Tarekegn et al. (2014) who did not have study participants as a combination of caregivers of child RTA victims and traffic police officers. The inconsistency in findings is attributed to the study designs, as the current study used qualitative design while other researchers used quantitative design. The current study finding contributes a unique finding that was verbalized by the caregivers of child RTA victims and traffic police officers in two different cities of Malawi.

The findings of this study showed that participants who were interviewed independently, from Caregiver # 1 to 20; Police #1 to 12, expressed similar themes and subthemes on the perceived risks associated with childhood RTIs as well as themes and subthemes on perceived preventive strategies for childhood RTIs. This could be explained by the fact that both cities of Blantyre and Lilongwe have high numbers of child-related RTAs. Therefore, for ease of understanding of the discussion of the findings, the researcher will discuss a subtheme on the perceived risk associated with childhood RTIs, then immediately discuss the perceived preventive strategy as presented by the participants.

5.3 Perceptions of Risks Associated with Childhood RTIs, and Perceived Preventive Strategies.

Based on the subthemes of the study findings, this chapter discusses overpopulated urban areas versus compliance with road traffic rules and regulations; role fulfilment challenges versus improving road safety knowledge.

5.4 ‘Overpopulated urban areas’ versus ‘Compliance with road rules and regulations’

The study findings revealed that permanent dwellings namely, residential houses and schools built ‘just along’ a busy roadway, were a risk factor for childhood RTIs as stated by both caregivers and traffic police officers. The study identified the dangers of lack of road reserve space, that is, the legal distance from the roadway and permanent dwellings which is meant only for the existence of road infrastructure-related constructions that include roadways and footpaths for public travel. The study has revealed that constructing permanent dwellings within the road reserve, sometimes known as encroachment into the road reserve, compromises road safety. This problem has been found in some high-density suburbs where permanent dwellings are built within the road reserve space, for instance, within a distance of only less than three metres from the main road, thereby exposing children to road traffic accidents and the consequent RTIs. Road reserve space was probably compromised by the effects of overpopulation and urbanization and people were scrambling for space to build dwelling houses or schools for business.

This finding is similar to previous quantitative studies and publications that were conducted by Curry et al. (2011) and Gopalakrishnan (2012), Staton et al. (2016) in Asia, Government of Canada (2009); in Europe by Li et al. (2016); Kiss et al. (2010); Isaac et al. (2015) on RTIs in urban settings which revealed that building within road reserves was a risk factor for increased RTAs with consequential RTIs and even deaths involving children. The similarities are alluded to the similar study objectives, setting, and study population despite that the previous studies were of quantitative design while the current study utilized a qualitative one.

In North America, for example, in Canada, Ontario City, it is one of the risk factors for RTIs that may involve children to build a permanent dwelling like a residential house or a school within a distance of less than fourteen metres from the main road (Government of Canada, 2009). Furthermore, if residential houses and schools are built close to roads, children tend to use them as playgrounds

thereby risking being hit by vehicles. In agreement with Staton et al. (2016), the findings of this study reiterated that if residential houses and schools are built close to roads, children tend to use them as playgrounds thereby risking being hit by vehicles.

In Africa, for example, Tanzania, there is evidence that it is one of the risk factors for RTIs that may include child victims to build a residential house or a school close to the main road. A study in urban Tanzania confirmed that most childhood RTIs occur on a major roadway, therefore houses or schools that are built just along the main road become a risk factor for children's involvement in RTAs (Zimmerman et al., 2012).

In Malawi, it is one of the risk factors for RTIs that may involve children to build a residential house or a school inside a road reserve that is broadly defined as a distance of less than sixty metres from a highway, thirty metres from a road that directly branches off a highway or fifteen metres for local roads in neighbourhoods within towns (Malawi Government, 2012). Building houses or schools inside these road reserves may expose children to easily play on the adjacent roads or frequently crossroads thereby increasing their vulnerability to RTIs.

The study findings did not reveal the recommended distance to build permanent dwellings from the roads, except for one participant who crudely suggested a distance of thirty metres from the main road. As alluded to, in North America, for example, in Canada, Ontario City, people should build a permanent dwelling within a distance of at least fourteen metres from the main road (Government of Canada, 2009).

In Africa, for example, Uganda, the road reserve is 15 metres from the major roadway where the road reserve should be kept clear, and no person should, except with the permission of the roads authority, erect any building or plant any tree or crops in the road reserve (Roads Act of Uganda, Chapter 358 of 1949, Section 3).

Similarly, in Malawi, as already elaborated, people are supposed to build a residential house or a school at a distance of not less than sixty metres from a highway, thirty metres from a road that directly branches off a highway or fifteen metres for local roads in neighbourhoods within towns (Malawi Government, 2012). The road safety recommendations on road reserves in Malawi are similar to those in high-income countries, such as Canada, as well as African countries such as Tanzania and Uganda. However, in Malawi, as well as other developing countries, there appears to be lack of implementation of the existing policy on saving the road reserve in order to reduce childhood RTIs (Malawi Government, 2012; Zimmerman et al., 2012 & WHO, 2018).

5.5 ‘Role fulfilment challenges’ versus ‘Improving road safety knowledge.’

The study findings revealed that ‘underaged’ children were treated as independent pedestrians and bicyclists, allowed children to labour, caregivers and teachers not teaching children on road safety, being of low socioeconomic status, male gender, and of school-going age were perceived as risk factors for childhood RTIs. The literature review showed that the above-mentioned perceived risk factors for childhood RTIs were being experienced in almost all cities around the world, but were more common in urban cities of developing countries (Tabibi et al., 2012; Schwebel et al., 2013; Ferenchak, 2016; Staton et al., 2016; WHO, 2018; Highway Code of United Kingdom, 2019). The similarities could be due to the similar study settings and similar study population since this study was conducted in two urban cities of Blantyre and Lilongwe, Malawi. Likewise, the study population was similar, the child population vulnerable to RTIs.

In Asia, Staton, et al. (2016) confirmed that school-going ages of 5 to 14 years tend to be involved in RTAs in cases where their schools are built just along main roads, whereas those aged four years and below tend to be involved in RTAs in cases where their residential houses are close to main roads. A literature review of previous studies showed that there is no specific age that children

can be declared to be safe cyclists or pedestrians. However, some few studies in America and Africa showed that walking and biking for children between the ages of 5 and 14 years was shown to be safer if sidewalks, separate pavements for cycling bicycles were in place (Shin et al., 2011; Bonnet et al., 2018; Casey et al., 2012). Some evidence confirms that it should be up to caregivers to be comfortable to allow their children to be independent pedestrians or cyclists (Ferenchak, 2016; Huaronget al., 2018; Highway Code of United Kingdom, 2019). Other researchers argue that, developmentally, children above eight years of age have almost adult capacity of deductive reasoning skills and can walk or cycle safely on the roads (Schwebel et al., 2012; Zimmerman et al., 2012). In view of the available evidence, it appears safer to allow children as independent pedestrians or cyclists when the caregivers are comfortable to allow them after they have taught and supervised them on road safety because the age when they can understand, demonstrate, and apply the road safety basics on their own differs with each child (Highway Code of United Kingdom, 2019). In addition, ‘children learn by example, so caregivers should always apply the guidelines of their local Highway Code whenever they are on the road with their children. They are responsible for deciding at what age children can use it safely by themselves.’ For those children that the caregivers are not comfortable to allow as independent road users, the children need to be handheld firmly, and not allowed to cross the road diagonally and must utilize nearby crossing facilities such as a footbridge, or a zebra crossing (Highway Code of United Kingdom, 2019).

According to Ferenchak (2016), pedestrians who do not use the available crossing infrastructure are more likely to enter risky situations of being hit by vehicles. In addition, Ferenchak, (2016) observed that males as young as 5 – 8 years show higher risk behaviour when crossing the road in the presence of motor vehicles than girls. These males are less likely to perceive risk than girls, the males are more willing to violate regulations and make unsafe crossing decisions. Furthermore, male pedestrians tend to wait over a shorter period of time than girls when crossing the

road thereby increasing chances of boys' vulnerability to RTIs. This leaves caregivers with the responsibility for deciding at what age their children, whether male or female, can use the road safely by themselves. Despite this study revealing that male gender is more prone to childhood RTIs than the female one, and global, as well as local studies confirming this trend, this study cannot confirm this assertion because of its design that makes its findings to be of limited generalizability. However, research evidence points to the fact that the RTI preventive measures have been recommended to be the same for all children, despite their gender. For example, both boys and girls need protection from child labour including that exposes them to childhood RTIs (Employment Act No. 6, Republic of Malawi, 2000). In addition, both boys and girls need escorting on the roads accordingly, that is, based on the assessment of their caregivers on the vulnerability of their children whether they can walk or cycle bicycles independently on the roads. In Cape Town city of South Africa, 81% of the children walked unsupervised with only 12% were accompanied by an adult (Koekemoer et al., 2017), while in Malawi 97% of students walked to school unsupervised (Purcell et al., 2017). In this current study, many children were involved in RTAs because they were also unsupervised road users. A study in Tanzania recommended the use of school buses to transport school children and utilizing of more boarding schools which would reduce the need for frequent road usage by these children (Chalya et al., 2012). The Bloomberg Philanthropies (2015) also recommended the use of buses to transport school children to and from school. In addition, evidence suggests constructing dedicated pedestrian lanes or sidewalks, and more education about road safety to schoolchildren (Chalya et al., 2012; Bloomberg Philanthropies, 2015; Purcell et al., 2017).

The findings of this current study also revealed that caregivers and teachers not teaching children on road safety, coming from families of low socioeconomic status, traffic police officers', as well as government's lack of commitment on implementing preventive measures of childhood RTIs, were risk factors for worsening of the trauma burden in children. In this study, all the families indicated they were residing in high-density locations, where there is more road traffic congestion, and they were of low-income status as they were mostly peasant farmers and small scale vendors with low formal education, low levels of literacy (Table 1). Globally, regionally as well locally, literature has confirmed all these as risk factors for childhood RTIs (Zimmerman, et al., 2012; WHO, 2018; Feng et al., 2015; Peden et al., 2008; Verma et al., 2009; Theurer & Bhavsar, 2013; Tabibi et al., Wesson et al., 2016; Ali, 2010). However, one unique finding from this study is that the participants revealed that a subject in Malawian schools that used to be known as Civics in recent years before its disappearance from being a stand-alone or distinct subject in primary school curricula, has been isolated as a subject that helps reduce childhood RTIs. In other countries, road safety lessons are more intensively taught than in others. For example, in the USA and Iran, there are even video assimilation of crossing busy roads safely on top of formal lessons on road safety that start from kindergarten through to ages 12 (Schwebel et al., 2012). In Pakistan, road safety education is also taught in primary schools as a subject (Ahmaet al., 2018). These researchers recommended that 'school children may be educated about road safety using storybooks with colourful pictures, which tends to increase the child's interest in the text.' The International Automobile Federation Report, (2017) recommended road safety to be taught as a mandatory subject in Elementary and Secondary school programs as a graded subject. In addition, in Denmark, road safety tips are taught from as early as 4 years of age, a fact that has contributed to its being one of the countries with the lowest traffic accident rates. In further agreement, the findings of this current study, underscored that the teaching of children on road

safety tips should start in nursery schools in the Malawian setting where they also enroll in the age ranges of 3 or 4 years.

The study findings also revealed that some driver behaviour such as drunkenness, fatigue, and distracted driving may lead to more childhood RTIs. In this study, the participants expressed lack of resources to monitor such driver behaviour, for example, traffic police officers often lack vehicles for patrolling the roads to monitor traffic offences; they also lack breathalyzers for assessing blood levels of alcohol concentration in suspects of drunken drivers. Previous studies already revealed these findings. However, researchers bemoan lack of implementation of preventive measures to such known risk factors as these, particularly in low and medium-income settings including Africa and indeed Malawi which has been attributed to lack of governments to invest more in RTI prevention programs (Bonnet et al., 2018). Specific education to drivers on road safety tips has been shown to improve road safety regionally and locally (Olumide & Owoaje, 2016).

5.6 Conclusion

In urban Malawi, this study has revealed major risk factors for childhood RTIs affecting school-going ages, particularly 4 to 14 years. The major risk factors appeared to be: overpopulated urban areas with poor road infrastructure, permanent buildings built within the road reserves, lack of adult supervision of children on roads, coming from families of lower socioeconomic status, allowing child labour that exposes to road use, and lack of teaching on road safety. The preventive measures for these childhood RTIs have been revealed to be: improving road safety knowledge through outreach programs by traffic police officers, more compliance with rules and regulations. The preventive measures also included: adult supervision of child road users, imposing tougher penalties on traffic offenders, protection of children from child labour, installing more lanes, traffic signs and

computerizing the monitoring of traffic offenders, and erecting permanent buildings within legal distances from the road reserves.

The caregivers have the responsibility for deciding at what age their children, whether male or female, can use the road safely by themselves. However, there is a lack of interventions in the field of road safety on the continent of Africa, including countries such as Malawi (Bonnet et al., 2018). The most adapted road safety interventions in African settings including Malawi are traffic safety education as well as raising traffic protection awareness (Bonnet et al., 2018). Neglecting childhood RTIs can be costly to families, the community, and the country. Malawi as a developing country cannot deal with childhood road traffic injuries, therefore it is critical to observe the preventive measures for road traffic accidents.

5.7 Recommendations and areas for further research

Recommendations

This study recommends some aspects that have a direct or indirect impact on nursing education, practice, administration, and research.

Prevention of childhood RTIs needs to be included in child survival programmes. According to Peden et al. (2008), in low and medium-income countries, that include Malawi, it has been recommended that there is a need for RTA prevention to be included in child survival programmes such as breastfeeding, growth monitoring, immunization, and oral rehydration therapy, because as children grow up and are subjected to RTIs, then impact of the large investments in such maternal and child health care may be lost.

Caregivers should be more responsible in teaching, demonstrating, and supervising their children on road safety. The training of the children ideally should come from parents, teachers/schools, and other professionals in the community such as traffic police officers. Beyond education, parents and professionals should advocate for safer pedestrian environments such as road engineering for example building foot-bridges), use of crossing guards near schools, and community organization of other initiatives on pedestrian safety should be promoted (Schwebel et al., 2012)

In Malawi, this study recommends that RTI prevention should be as a subject in Primary Schools. RTI education sessions may be incorporated into school curricula using storybooks as teaching tools. In some countries, road safety education is also taught in primary schools as a subject (Ahmaduet al., 2018).

In Malawi, this study recommends that better data collection in trauma registries as tools to inform researchers and public health officials about injury patterns and help to establish priorities related to research, treatment, and prevention of RTIs (Kiser et al., 2012).

In Malawi, people should build a residential house or a school at a distance of not less than sixty metres from a highway, thirty metres from a road that directly branches off a highway or fifteen metres from local roads in neighbourhoods within towns (Malawi Government, 2016). The road safety recommendations on road reserves in Malawi are similar to those in high-income countries, such as Canada, as well as African countries such as Tanzania and Uganda. However, in Malawi, as well as other developing countries, there appears to be lack of implementation of the good policy on saving the road reserve in order to reduce childhood RTIs (Malawi Government, 2016; Zimmerman et al., 2012 & WHO, 2018).

Collaboration between various agencies or stakeholders is recommended in the fight to reduce RTIs (Shin et al., 2011). The study findings of this study have revealed a unique or new working collaboration between traffic police officers and healthcare workers in giving health education talks on RTI prevention in hospital and community settings.

This study has agreed with many global and regional studies that there is need for separate lanes for motorists and pedal cyclists and pedestrians in order to reduce congestion on the same narrow roads (Chalya et al., 2012; Casey et al., 2012; Shin et al., 2011). Based on the study findings, this study emphasizes the replacement of traffic signs that are made of metal with the ones made of concrete particularly in places where vandalism of the metal traffic signs is common. However, no previous studies were done in support of this measure for the prevention of childhood RTIs.

According to Schwebel et al. (2012), “Real change can only happen if political will and financial commitment are activated.” This study recommends that the government of Malawi, through relevant agencies such as the Directorate of Road Traffic and Safety Services of Malawi, ‘commit to policy change that puts road users, especially (child) pedestrians and cyclists, at the centre; stronger enforcement of traffic laws; funding that meets the severity of the road crisis; and the involvement of NGOs and other stakeholders in collaborations that harness the unique expertise of different partners.’ Traffic police officers need improved remuneration and better working conditions with more resources such as vehicles, speed cameras, and breathalyzers so that they are more motivated to implement to traffic safety measures in their fullest capacity possible; corruption may be the reason for the low implementation of traffic law enforcement (Gupta, 2010; Grimm & Treibich, 2010).

This study also recommends the availability of more boarding schools, and also more buses as public transport for school children to reduce the risk of exposure to RTIs as they walk long

distances to and from school; more buses also may mean less traffic congestion as more children are carried by one bus instead as of many private cars (Chalya et al., 2012; Casey et al., 2012; Chomba et al., 2017).

Areas for further research

- Qualitative studies with focus group discussions on childhood road traffic injury prevention in urban Malawi
- Effects of caregiver demographics on childhood road traffic injury prevention in urban Malawi
- Effects of child demographics on childhood road traffic injury prevention in urban Malawi
- Survey of road infrastructure deficits in urban Malawi road networks and effects on prevention of childhood road traffic injuries
- Physical planning in urban Malawi and its current effects on prevention of childhood road traffic injuries

5.8 Study Limitations

The study could have included participants amongst preschool and primary school teachers, community health nurses, Emergency Department nurses, traffic police officers from Zomba and Mzuzu cities of Malawi, but lack of time and money made it difficult to do so. The study could have included focus group discussions between the researcher and the study participants in order to have

more rigor, but time constrained the researcher. If it were not for all these limitations, the collected data could have been richer and the findings generalizable.

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Appendices

Appendix 1: COMREC certificate of approval



Appendix 2: Approval letter from office of Inspector General of Police, Republic of Malawi

Cable Address: POLGEN Lilongwe 3
Telephone: 01 796 404
Telex: 44102
Fax: 01 797 979
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In reply please quote No C/75/L.....



**REPUBLIC OF MALAWI
OFFICE OF THE INSPECTOR GENERAL OF POLICE**

**MALAWI POLICE SERVICE
PRIVATE BAG 305
CAPITAL CITY
LILONGWE 3
MALAWI**

30TH January, 2017.

TO : The Commissioner of Police
Southern Region Police Hqs
P.O Box 24
Blantyre

TO : The Commissioner of Police
Central Region Police Hqs
P.O Box 10
Lilongwe

CC : Mr Cosmas Kapuyanyika ✓
Kamuzu College of Nursing
P.O Box 415
Lilongwe

RE-REQUEST FOR PERMISSION TO CONDUCT A RESEARCH PROJECT AT SOUTH AND CENTRAL REGION TRAFFIC OFFICE

I write in reference to the letter attached regarding the above subject matter.

I am directed to inform you that permission has been granted for Mr. Cosmas Kapuyanyika to conduct research project from Traffic officers in your respective Regions.

You are therefore advised to give him the required information when approached by the applicant.

Yours in service,

J.W. Chambuluka, SDCP
**HUMAN RESOURCE MANAGEMENT
FOR/THE INSPECTOR GENERAL OF POLICE**

Appendix 3: Approval letter from Hospital Director: KCH

Kamuzu College of Nursing

P.O. Box 415

Blantyre.

Cell: 0999110183

Email: cosmaskapuyah@gmail.com

8th November, 2016.

Through: Associate Professor M. Mbeba

Kamuzu College of Nursing

P.O. Box 415

Blantyre.

Cell: 265888895764

Email: marymbeba@ken.unima.mw.

To: The Hospital Director

Kamuzu Central Hospital

P.O. Box 149

Lilongwe

Dear Sir,

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH PROJECT AT KAMUZU CENTRAL HOSPITAL (KCH).

I am Cosmas Kapuyanyika, a student at Kamuzu College of Nursing and am requesting your good office for permission to conduct a research project titled "Exploring primary causes of childhood traumatic brain injuries (TBI) due to road traffic accidents in Blantyre and Lilongwe districts in Malawi: Guardians and traffic officers' perspective," as part of requirement for the acquisition of a MSc degree in Child Health Nursing. KCH has been chosen because it is one of the biggest referral hospitals in Malawi where TBI cases are managed.

The study aims to identify more effective strategies and synergies to reduce the physical and socio-economic burdens of children's involvement in RTAs in our country. The study findings shall be shared with your office and other government departments for more effective cooperation on protection of our children from being victims of road traffic crashes.

This study is under the supervision of Associate Professor Dr. M. Mbeba from the Medical-

I am aware of the depth of observation
Please carry on



Authenticity granted but the HOD needs to be aware of it.

[Signature]
HOD
10/12/16

Surgical Department of Kamuzu College of Nursing, Blantyre Campus.

I will adhere to all ethical principles of research. Permission to conduct the study has been granted by College of Medicine Research Ethics Committee (COMREC); please, kindly see the attached copy.

My contact details, as well as my supervisor's, are as written above.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'C. Kapuyanyika', written in a cursive style.

Cosmas Kapuyanyika

Appendix 4: Approval letter from Hospital Director: QECH

— Has Passed

Please, assist this student

Kamuzu College of Nursing

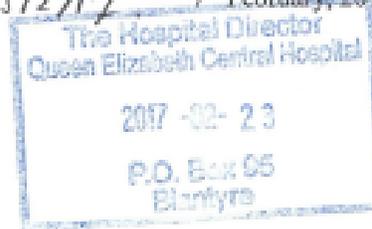
P.O. Box 415

Blantyre.

Cell: 0999110183

Email: cosmaskapuyah@gmail.com

23/2/17 7th February, 2017.



Through: Associate Professor M. Mbeba

Kamuzu College of Nursing

P.O. Box 415

Blantyre.

Cell: 265888895764

Email: marymbeba@kcn.unima.mw

To: The Hospital Director

Queen Elizabeth Central Hospital

P.O. Box

Blantyre

27/2/2017

permission has been granted

Dr Q. D. Dube

Dear Sir,

REQUEST FOR PERMISSION TO CONDUCT A RESEARCH PROJECT AT QUEEN ELIZABETH CENTRAL HOSPITAL (QECH).

I am Cosmas Kapuyanyika, a student at Kamuzu College of Nursing and am requesting your good office for permission to conduct a research project titled "*Exploring primary causes of childhood traumatic brain injuries (TBI) due to road traffic accidents in Blantyre and Lilongwe districts in Malawi: Guardians and traffic officers' perspective,*" as part of requirement for the acquisition of a MSc degree in Child Health Nursing. QECH has been chosen because it is one of the biggest referral hospitals in Malawi where TBI cases are managed.

The study aims to identify more effective preventive strategies and synergies to reduce the physical and socio-economic burdens of children's involvement in RTAs in our country. The study findings shall be shared with your office and even other government departments for more effective cooperation on protection our children from being victims of road traffic crashes.

This study is under the supervision of Associate Professor Dr. M. Mbeba from the Medical-Surgical Department of Kamuzu College of Nursing, Blantyre Campus.

I intend to interview ten guardians of children with TBI due to RTAs. I will adhere to all ethical principles of research. Permission to conduct the study has been granted by College of Medicine Research Ethics Committee (COMREC); please, kindly see the attached copy.

My contact details, as well as my supervisor's, are as written above.

Yours faithfully,



Cosmas Kapuyanyika

If your office authorizes it,
I expect to start the data collection
on 27th February, 2017, here at QECH
Paediatric Apt. Ckapuya.

Appendix 5a: Semi-structured interview guide for caregivers – English

PART ONE: Socio-demographic data for caregivers Number:

1. Can you tell me how old are you? (Age in years)

2. Can you tell me your gender?

3. Can you tell me your tribe?

4. Can you tell me your religion?

5. Can you tell me your occupation?

6. Can you tell me your highest level of education?
 - a. Standard 1 to 7
 - b. Standard 8 to Form 1.
 - c. Form 2 to 4.
 - d. Tertiary level.

7. Can you tell me your marital status?
 - a. Single
 - b. Separated
 - c. Divorced.
 - d. Widowed.

8. Can you tell me your relationship with the child you are caring for in the hospital?

9. Can you tell me how many members does your family have?

PART TWO: Perceived risks associated with childhood road traffic injuries

1. Can you state the age of your child when he/she sustained the road traffic related injury?

2. Can you mention the gender of the child
 - a. Male
 - b. Female

3. Where were you and your child staying when he/she sustained the road traffic related injury?
 - a. High density area
 - b. Low density area.
 - c. Peri-urban area.
 - d. Others (specify).....

PART TWO: Perceived risks for childhood road traffic injuries

1. Can you tell me the age of your child, in years?

2. Can you tell me the gender of your child?
 - a. Male
 - b. Female

3. Can you tell me your residential place?
 - a. High density suburb
 - b. Low density suburb
 - c. Peril-urban area
 - d. Other residential place.....

4. Can you describe the specific factors you think subjected your child in being involved in the road traffic accident?

PART THREE: Perceived preventive strategies for childhood road traffic injuries

1. Can you tell me the extent to which you have taught your child on road safety issues?

- a. Not applicable because child still very young
 - b. Not at all from family members including myself
 - c. Taught only too little to expect any positive impact
 - d. Taught much enough to expect positive impact
2. Can you specify any more information on your role to teach your child on road safety?
 3. Can you describe how you intend to do things differently in an effort to prevent your children from being involved in road traffic accidents in your city?
 4. Can you describe whom you intend to collaborate with, for the first time, in an effort to prevent childhood road traffic injuries in your city?
 5. Can you tell me any other opinions that you think are very crucial in prevention of children's involvement in road traffic accidents in your city?

Thank you very much for participating in the study.

Appendix 5b: Semi-structured interview guide for caregivers – Chichewa language

Mulozo wa zokambirana ndi makolo

Nambala:

GAWU LOYAMBA: Mafunso okhuza moyo wanu ngati makolo

1. Kodi mungandiuzeko zaka zanu zobadwa?
2. Kodi mungandiuzeko kuti ndinu amuna kapena a akazi?
 - a. Mwamuna
 - b. Mkazi
3. Kodi mungandiuzeko chikhulupiriro chanu?
 - a. Chi Khristu
 - b. Chi Silamu
 - c. Lembani china.....
4. Kodi mungandiuzeko mtundu wanu m'Malawi muno?
 - a. MuLomwe
 - b. MuYao
 - c. MuChewa
 - d. Lembani mtundu wina.....
5. Kodi mungandiuzeko kuti munaphunzira kufika pati?
 - a. Pakati pa Sitandade 1 ndi 7
 - b. Pakati pa Sitandade 8 ndi Fomu 1
 - c. Pakati pa Fomu 2 ndi Fomu 4
 - d. Sukulu ya ukachenjede
6. Kodi mungandiuzeko kuti mumagwira ntchito yanji pa moyo wanu?
7. Kodi mungandiuzeko kuti muli pabanja?

- a. Ndine osakwatila
 - b. Ndife olekana kaye
 - c. Banja linatha
 - d. Ndine namfedwa.
8. Kodi mungandiuzeke kuti pali ubale wanji pakati pa inu ndi mwanayu?
9. Kodi mungandiuzeke kuti m'banja mwanu muli anthu angati?

GAWU LA CHIWILI: Zifukwa, mwamaganizo anu, zomwe zimaphangitsa kuti ana agwere mu ngozi ya pamsewu ndi kuvulara

1. Kodi mwana wanu anali ndi zaka zingati zobadwa pamene anavulara chifukwa cha ngozi yapamsewu imene inamuchitikira?
2. Mwanayu ndi wa mamuna kapena wa mkazi?
 - a. Mwamuna
 - b. Mkazi
3. Kodi mungandiuzeke kuti inu ndi mwanayu mumakhala kuti?
 - a. Kumapoloti
 - b. Kumayadi
 - c. Malo ali mumalire ndi mzinda wathu
 - d. Lembani malo ena ngati alipo.....
4. Kodi mungafotokozeko zeni zeni zinaphangitsa kuti mwanayu agwere mu ngozi ya pamsewu ndi kuvulara?

GAWU LA CHITATU: Masomphenya anu a mmene tingaphewere ngozi za pamsewu zokhuza ana

1. Kodi mwanayu munamuphunzitsako zakaphewedwe ka ngozi za pamsewu?

- a. Sindinayambe kumuphunzitsa chifukwa adakali wa ng'ono
 - b. Palibe anamuphunzitsako mu banja lathu
 - c. Ndinangoyambako pang'ono pokha posathandizanso
 - d. Ndinayesetsa kwambiri
2. Kodi mungafotokoze zina zili zonse zokhuzana ndi udindo wanu polimbikitsa mwanayu pa kaphewedwe ka ngozi za pamsewu?
 3. Kodi mungafotokoze mmene mukuganizira mwatsopano za kaphewedwe ka ngozi za pamsewu zomwe zingathe kukhuza ana anu mmzinda mwanu?
 4. Kodi mungachuleko omwe mukuyembekezera kuti mudzagwirane nawo manja mwatsopano kuti ngozi za pamsewu zomwe zingathe kukhuza ana anu zipheweke mwa mphamvu?
 5. Kodi mungafotokoze njira zina mwa masomphenya anu zimene zili zofunikira kwambiri pothandizira kuphewa ngozi za pamsewu zokhuza ana mmzinda mwanu?

Zikomo kwambiri potenga nawo mbali mukafukufukuyu.

Appendix 5c: Semi-structured interview guide for traffic police officers

Socio-demographic data

Number:

1. Can you tell me how old are you? (Age in years)
2. Can you tell me your gender?
3. Can you tell me your tribe?
4. Can you tell me your religion?
5. Can you tell me how long you have worked as a traffic police officer?
 1. 3 to 5years
 2. Over 5years
6. From your work experience, can you tell me the average number of road traffic accidents involving child victims that you have attended in person per year?

PART TWO: Perceived risks associated with childhood road traffic injuries

1. From your work experience, can you tell me the commonest ages of the child victims with road traffic injuries?
 - a. 1 to 3 years
 - b. 4 to 9 years
 - c. 10 to14 years
 - d. Others (Specify).....
2. From your experience, can you tell me which gender of the children was most involved in road traffic accidents?

3. Can you explain why you think the gender you mentioned above was more vulnerable to childhood road traffic injuries?
4. Can you describe what you think were the top major factors that mostly subjected children to road traffic injuries?

Probes: a. Time of day

b. Area of residence such as high density, peri-urban

PART THREE: Perceived preventive strategies for childhood road traffic injuries

1. Can you tell me specific programmes on road safety that you are doing for children that help to protect them from road traffic accidents?

Probes: a. Age to start teaching on road safety tips

b. Age of leaving a child to safely walk, or cycle on the road on his/her own

2. Having seen a lot of children being involved in road traffic accidents, what do you propose to be more effective preventive measures in your city?
3. Can you tell me who you intend to practically collaborate with, for the first time, in an effort to prevent childhood road traffic injuries?
4. Can you tell me any other opinions that you think are very crucial in prevention of children's involvement in road traffic accidents in your city?

Thank you very much for participating in the study.

Appendix 6a: Risks for childhood RTIs according to caregivers

Participant	Perceived risks for childhood RTIs
Caregiver #1	Lack of adult supervision. Lack of road infrastructure.
Caregiver #2	Lack of adult supervision. Drunken driving
Caregiver #3	Lack of adult supervision.
Caregiver #4	Lack of adult supervision. Drunken driving
Caregiver #5	Non-compliance with road safety rules and regulations
Caregiver #6	Lack of adult supervision. Drunken driving
Caregiver #7	Lack of adult supervision. Drunken driving
Caregiver #8	Lack of adult supervision. Drunken driving
Caregiver #9	Lack of adult supervision.
Caregiver #10	Lack of adult supervision. Drunken driving
Caregiver #11	Lack of road infrastructure. Drunken driving
Caregiver #12	Lack of adult supervision.
Caregiver #13	Lack of adult supervision. Drunken driving
Caregiver #14	Permanent buildings within road reserve. Lack of adult supervision. Drunken driving
Caregiver #15	Lack of road infrastructure. Lack of adult supervision. Drunken driving
Caregiver #16	Lack of adult supervision. Drunken driving
Caregiver #17	Lack of adult supervision.
Caregiver #18	Lack of adult supervision. Drunken driving
Caregiver #19	Lack of adult supervision. Drunken driving
Caregiver #20	Lack of adult supervision.

Appendix 6b: Risks for childhood RTIs according to traffic police officers

Participant Perceived risks for childhood RTIs

Police #1	Lack of road infrastructure. Lack of adult supervision. Drunken driving. Permanent buildings within road reserve.
Police #2	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #3	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #4	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #5	Lack of road infrastructure. Lack of adult supervision. Drunken driving. Permanent buildings within road reserve.
Police #6	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #7	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #8	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #9	Lack of road infrastructure. Lack of adult supervision. Drunken driving.
Police #10	Lack of road infrastructure. Drunken driving.
Police #11	Lack of adult supervision. Drunken driving.
Police #12	Lack of road infrastructure. Lack of adult supervision. Drunken driving. Permanent buildings within road reserve.

Appendix 6c: Prevention strategies for childhood RTIs according to caregivers

Participant	Perceived prevention strategies for childhood RTIs
Caregiver #1	Adult supervision. Road infrastructure improvement. Collaboration in road safety.
Caregiver #2	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Caregiver #3	Adult supervision. Road infrastructure improvement.
Caregiver #4	Adult supervision. Collaboration in road safety.
Caregiver #5	Adult supervision. Collaboration in road safety.
Caregiver #6	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Caregiver #7	Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement.
Caregiver #8	Compliance with road safety rules and regulations. Collaboration in road safety.
Caregiver #9	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Collaboration in road safety.
Caregiver #10	Adult supervision. Compliance with road safety rules and regulations. Collaboration in road safety.
Caregiver #11	Compliance with road safety rules and regulations. Road infrastructure improvement. Collaboration in road safety.
Caregiver #12	Adult supervision. Compliance with road safety rules and regulations. Save the road reserve. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Caregiver #13	Adult supervision. Compliance with road safety rules and regulations. Save the road reserve. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Caregiver #14	Adult supervision. Compliance with road safety rules and regulations. Save the road reserve. Road infrastructure improvement. Collaboration in road safety.
Caregiver #15	Compliance with road safety rules and regulations. Road infrastructure improvement. Collaboration in road safety.
Caregiver #16	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Collaboration in road safety.
Caregiver #17	Adult supervision. Teaching on road safety. Road infrastructure improvement.
Caregiver #18	Adult supervision. Teaching on road safety. Compliance with road safety rules and regulations. Collaboration in road safety.
Caregiver #19	Adult supervision. Compliance with road safety rules and regulations. Road infrastructure improvement. Collaboration in road safety.
Caregiver #20	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Collaboration in road safety.

Appendix 6d: Prevention strategies for childhood RTIs according to traffic police officers

Participant Perceived prevention strategies for childhood RTIs

Police #1	Adult supervision. Compliance with road safety rules and regulations. Save the road reserve. Teaching on road safety. Collaboration in road safety.
Police #2	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Police #3	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Police #4	Compliance with road safety rules and regulations. Teaching on road safety. Collaboration in road safety.
Police #5	Compliance with road safety rules and regulations. Road infrastructure improvement. Save the road reserve. Adult supervision. Teaching on road safety. Collaboration in road safety.
Police #6	Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement.
Police #7	Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Police #8	Compliance with road safety rules and regulations. Teaching on road safety. Tougher penalties. Road infrastructure improvement. Collaboration in road safety.
Police #9	Compliance with road safety rules and regulations. Teaching on road safety. Road infrastructure improvement. Collaboration in road safety.
Police #10	Compliance with road safety rules and regulations. Teaching on road safety. Tougher penalties. Road infrastructure improvement. Collaboration in road safety.
Police #11	Adult supervision. Compliance with road safety rules and regulations. Teaching on road safety. Tougher penalties. Road infrastructure improvement. Collaboration in road safety.
Police #12	Adult supervision. Compliance with road safety rules and regulations. Road infrastructure improvement. Save the road reserve. Collaboration in road safety. Teaching on road safety.

Appendix 7a: Informed consent: English language

PLEASE READ AND SIGN THE FORM IF YOU ARE INTERESTED IN TAKING PART IN THE STUDY.

Study title: **Risk and prevention of road traffic injuries in children in urban Malawi: Perspectives of caregivers and traffic police officers**

1. The Principal Investigator: Cosmas Kapuyanyika

Address: C/O Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre.

Cell phone: 0999110183.

Email: cosmaskapuyah@gmail.com

2. Research supervisor: Associate Professor Dr. Mary Miston Kachingwe-Sisya Mbeba

Contact address : C/o Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre.
Tel : 0888895764 ; Email : marymbeba@kcn.unima.mw

The study has been described to me in a language that I understand and I freely and voluntarily agree to participate. I have been given an opportunity to ask questions about the study and my questions have been answered.

I have read and understood the participant information sheet. In signing this consent form, I confirm that I understand:

1. The purpose of the study and my involvement in it.
2. My participation in the study is entirely voluntary; I am free to withdraw from the study at any time without giving reasons.
3. The study will not in any way affect me negatively.
4. The data collected will be research purpose only.
5. All the data is confidential and anonymous; all the recorded structured interview guides will be destroyed after two years from completion of the study.
6. Extracts from the semi-structured interviews may be anonymously quoted in any research report or publication arising from this research.

I voluntarily **agree/do not agree** to participate in the study.

Participant

Name.....Signature.....Date.....

Researcher obtaining consent

Name.....Signature.....Date.....

3. For further inquiries, you may contact: The COMREC Secretariat, Private Bag 360, Chichiri, Blantyre 3. Tel : 01877245 or 01989766

Appendix 7b: Informed consent: Chichewa language

CHONDE WERENGANI NDIKUTSINDIKIZA DZINA LANU PA MALO OMWE APEREKEDWAWO NGATI MULI OMASUKA MWA UFULU WANU KUTI MUTENGE NAWO MBALI MUKAFUFUKUYU.

Mutu wa kafukufuku: **Zomwe zikuphangitsa kuti ana agwere mungozi zapamsewu ndi kuvulara komatsu kapewedwe ka ngozi zi mu mizinda ya muMalawi: Ndemanga za osamalira ana komanso a Polisi oyang'anira za pamsewu.**

Ndafotokozeredwa mchiyankhulo chomveka bwino zakafukufukuyu, ndipo mosakakamizidwa ndikuvomera mwa ufulu wanga kutenga nawo mbali mu kafukufukuyu. Ndapatsidwa mwayi wofunsa mafunso ndikuyankhidwa mwatsatanetsatane. Ndawerenga ndikumvetsetsa zomwe zili mukalata yokhuza ofuna kutenga nawo mbali mukafukufukuyu. Tsopano, potsindikiza dzina langa pamalo aperekedwawa, ndikutsimikiza kuti ndamvetsanso zolinga za kafukufukuyu komanso udindo wanga mukafukufukuyu:

1. Kutenga kwanga mbali sikokakamizidwa, komanso nditha kusiya kutengapo mbali nthawi ina ili yonse popanda kupereka zifukwa.
2. Palibe kuopsya kwina kuli konse kumene kungandipeze chifukwa chotengapo mbali mukafukufukuyu.
3. Uthenga ndi ndemanga zomwe ndipereke zizangogwiritsidwa nchito ya kafukufukuyu basi.
4. Uthenga ndi ndemanga zomwe ndipereke zizasungidwa mwa chinsinsi, ndipo udzawotchedwa kukatha zaka ziwiri chimalizireni kafukufukuyu.
5. Wina mwa uthenga ndi ndemanga zomwe ndipereke zingathe kugwiritsidwa nchito mosachula dzina langa mumakafukufuku ena.

Ndamvetsa kuti sindizapeza vuto lina lililonse pa chifukwa chotenga nawo mbali mu kafukufukuyu, ndipo mwakusangalatsidwa kwanga **ndavomera/sindinavomere** kutenga nawo mbali mu kafukufukuyu.

Otengambali

Dzina.....Sayinani dzina lanu apa.....Tsiku.....

Wakafukufuku

Dzina.....Sayinani dzina lanu apa.....Tsiku.....

Ngati pangakhale nkhwawa, kapena mafunso ena ali onse okhuza kafukufukuyu, muli omasuka kulemba kapena kuyimbila lamya kwa:

1. Oyendetsa kafukufuku wamkulu: Cosmas Kapuyanyika

Keyala: C/O Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre.

Tenifolo: 0999110183.

Email: cosmaskapuyah@gmail.com

2. Oyendetsa ndi kuyang'anira kafukufukuyu: Associate Professor Dr. Mary Miston Kachingwe-Sisya Mbeba

Keyala : C/o Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre.

Tenifolo : 0888895764 ; Email : marymbeba@kcn.unima.mw

3. The Secretariat, College of Medicine Research and Ethics Committee, Private Bag 360, Chichiri, Blantyre 3. Tenifolo : 01877245 or 01989766

Zikomo kwambiri potenga nthawi kuwerenga ndi kumvesetsa kalata ino

Appendix 8a: Participant information sheet – English language

Dear Participant,

I am Cosmas Kapuyanyika, a Master of Science in Child Health Nursing student at Kamuzu College of Nursing. As a requirement of my Masters programme, I am conducting a research study titled: **“Risk and prevention of road traffic injuries in children in urban Malawi: Perspectives of caregivers and traffic police officers”**. I would like to invite you to take part in this study. The study will involve you completing the structured interview guide that will be provided after you voluntarily agree to participate. This information sheet tells you the purpose of the study and your role in the study. Feel free to ask for any clarification as you may need.

Purpose of the study

The purpose of the study is: “to explore factors influencing road traffic accidents and the consequent traumatic brain injuries in children in Blantyre and Lilongwe”. This will help to know the root reasons why children are being involved in road traffic accidents. The study will further seek to establish preventive approaches that are applicable to our setting in Blantyre and Lilongwe so that children stay protected from being victims of road traffic accidents. The study will run for almost one month.

Reason for choosing you to take part in the study

You have been chosen because you are deemed to have a wealth of first hand information on reasons why children are being involved in road traffic accidents (RTAs), challenges on RTA prevention, and suggestions of feasible solutions to avert RTAs and consequent brain injuries and other losses.

Do you have to take part?

Your input is cornerstone to the study because you are deemed to have very important ideas from your first hand experiences with child RTA victims, hence your opinions will be a building block for how we can prevent childhood head trauma due to RTAs.

Your ideas can become a powerful voice of evidence to save multitudes of children’s lives in Malawi. Therefore, feel free to give your best of ideas from your experience.

Willingness to participate in the study

Participation in the study is based on your willingness to do so freely, and you can withdraw from taking part at any time as you may wish. There is no any punishment for your decision to withdraw your participation at any time. If you voluntarily wish to participate, it takes only 30 to 45 minutes to complete the structured interview guides that will be given to you.

Benefits of taking part in the study

There are no financial benefits to be given to you because of your participation. It is just an academic research that is highly dependent on your participation to possibly yield very useful strategies in the

reduction of RTAs involving children in Lilongwe and Blantyre, thereby reducing the disease burden in the child population in Malawi. Because of its potential benefits to our child population in Malawi, this study has been approved by College of Medicine Research and Ethics Committee, Office of the Inspector General of Malawi Police, Directors of Kamuzu and Queen Elizabeth Central Hospitals.

Risks of taking part in the study

There are no known risks associated with your participation in the study.

Privacy, anonymity and confidentiality

All the information taken will be kept private, confidential and anonymous. We will use just numbers instead of your name. The collected data will be kept under lock and key in the researcher's office and can only be accessed by the researcher and the study supervisor. All the structured interview guides will be destroyed after two years from completion of the study. The structured interview guides, consent forms, field notes and recorded tapes will bear codes and not names of participants, dated, according to sites and will be kept under lock and key in the investigator's office and will be accessed by the investigator and the study supervisors only. The codes help to avoid attaching information to specific individuals thereby maintaining confidentiality.

What will happen to the results?

The results will be disseminated to you if you need them, and you are free to contact the researcher on the given contacts on the same. The results shall be disseminated to the Directors of Kamuzu Central and Queen Elizabeth Central Hospitals, the Central and Southern Region traffic offices through the office of the Inspector General of Police so that our communities can be educated by both traffic officers and health care workers on the identified preventive strategies for RTAs that involve children.

Who can you contact if you have any questions about the study?

For any questions or further clarifications, please feel free to contact:

1. The Principal Investigator: Cosmas Kapuyanyika

Address: C/O Kamuzu College of Nursing, Blantyre Campus, P.O. Box 415, Blantyre.

Cell phone: 0999110183.

Email: cosmaskapuyah@gmail.com

2. Research supervisor: Associate Professor Dr. Mary Miston Kachingwe-Sisya Mbeba

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Thank you very much for taking time to read and understand this information sheet

Appendix 8b: Participant information sheet – Chichewa language

8b Kalata yofotokoza za kafukufukuyu

Wokonedwa wotenga nawo mbali mukafukufukuyu,

Ine ndine Cosmas Kapuyanyika, mmodzi mwa ophunzira pa sukulu ya ukachenjede yosula anamwino ya Kamuzu koleji. Ndiri kupanga maphunziro apamwamba osamalira ana. Padakali pano, ndikupanga kafukufuku wofuna kudziwa **zifukwa zomwe zikupangitsa kuti ana avulare mitu ndi ubongo pogwera mungozi zapamsewu mmzinda umene mumakhala.** Kalata ino ikufotokozerani zolinga za kafukufukuyu mwatsatanetsatane. Chonde werengani ndi kumvesetsa, komanso khalani omasuka kufunsa mafunso anu. Ndikukupemphani kuti mutenge nawo mbali, mwa ufulu wanu, mukafukufukuyu polemba mayankho anu anu potsatira mulozo wa zokambirana.

Cholinga cha kafukufukuyu

Cholinga cha kafukufukuyu ndikufuna kudziwa kudziwa **zifukwa zomwe zikupangitsa kuti ana avulare mitu ndi ubongo pogwera mungozi zapamsewu mmzinda umene mumakhala.** Ndikukupemphani kuti mupereke chifukwa cheni cheni chimene chinapangitsa kuti mwana wanu agwere mungozi ya pamsewu imene ina muvulaza mutu. Zifukwa zimenezi zikhala maziko anjira zopewela ngozi zapamsewu zokhuza ana mumzinda mmene mumakhala. Ana akatetezeka ku ngozizi, ikhala mbali yaikulu popititsa patsogolo umoyo wa thazi wa ana mudziko lathu la Malawi. Kafukufukuyu adzatenga mwezi umodzi kuti amalizike.

Nchifukwa chiyani mwasankhidwa kuti mutenge nawo mbali mukafukufukuyu?

Mwasankhidwa chifukwa mutha kuzindikira bwino lomwe zifukwa zeni zeni zomwe zimaphangitsa kuti ana agwere mungozi ya pamsewu zimene zitha kuwavulaza mitu popeza inuyo munawaona ndi kuwasamalira ana amene analowa mungozizi. Pozindikira zomwe zinawaphangitsa anawa kulowa mungozizi, mutha kukhala ndi kuthekela koti mupereke ndemanga za momwe tingapewe ngozizi mumuzinda mwathu ngati njira yaikulu yopititsa patsogolo umoyo wa thazi wa ana mudziko lathu la Malawi.

Kodi mukuyeneradi kutenga nawo mbali mukafukufukuyu?

Ndemanga zanu zomwe mupereke potsatira zomwe mufunsidwe mumulozo wa zokambirana, ndizofunikila kwambiri chifukwa zitha kukhala maziko a momwe tingapewe ngozi zapamsewu zimene zimavulaza ana athu. Choncho, mwaufulu wanu komanso mosakakamizidwa, masukani kuti mutenge nawo mbali mukafukufukuyu kuti tipulumutse miyoyo ya ana ambiri mumuzinda mwathu komanso mudziko lathu.

Muli ndi ufulu kutenga kapena kusatenga nawo mbali mukafukufuku popanda chilango china chili chonse.

Kutenga kwanu mbali mukafukufukuyu kutengela kufuna kochokela mmtima wanu, mosakakamizidwa, komanso mwa ufulu wanu. Ndinu ovemeredwa kusiya kutengapo mbali nthawi ina ili yonse popanda kupereka zifukwa; ndipo palibe chilango chili chonse chomwe inu kapena

mwana wanu angapeze. Mukavomera kutenga mbali mukafukufukuyu, mumatenga mphindi 30 kufikira 45 kuti mumalize kuyankha mafunso ali mumulozo wa zokambirana.

Pali cholowa mukatenga nawo mbali mukafukufukuyu?

Palibe ndalama imene mupatsidwe potenga nawo mbali, koma mudzathandizila kwambiri kuti tonse tipewe ngozi zapamsewu zimene zimavulaza monga mitu ya ana.

Pali kuopsya kwina kuli konse mukatenga nawo mbali mukafukufukuyu?

Palibe kuopsya kwina kuli konse mukatenga nawo mbali mukafukufukuyu. Chifukwa cholinga cha kufukufukuyu ndi kupewa kuvulara mitu kwa ana chifukwa chogwera mungozi zapamsewu, kafukufukuyu anavomerezedwa ndi akadaulo owunika za kafukufuku a College of Medicine, Akulu akulu oyendetsa zipatala za Kamuzu ndi Queen Elizabeth, komanso Mukulu wa a Polisi mudziko lathu.

Kusungilidwa chinsinsi chanu

Uthenga wonse womwe mupereke udzasungidwa mwachinsinsi mu ofesi yokiyidwa imene adzalowedwa ndi oyendetsa kafukufuku okha. Palibe mayina a wina aliyense otenga mbali amene adzalembedwe ma makalata kapena matepi. Zonsezi zidzadziwika ndi ma nambala okha, choncho sizidzadziwika kuti ndi ndani amene ananea chiyani. Uthenga wonse womwe mulembe udzawotchedwa pakadzadutsa zaka ziwiri chimalizireni kafukufukuyu.

Nchiyani chomwe chizachitike pa zotsatira za kafukufuku?

Mukazifuna zotsatirazi, masukani kulembera kapena kulankhulana ndi woyendetsa kafukufukuyu amene alembedwa pamusipa. Zotsatirazi dzizapatsidwa Akulu akulu oyendetsa zipatala za Kamuzu ndi Queen Elizabeth, komanso Mkuu wa a Polisi mudziko lathu, kuti a zaumoyo agwirane manja ndi a polisi oyang'anira zopewa ngozi zapamsewu pophunzitsa aMalawi momwe tingakhwimitsire chitetezo cha wana ku ngozi zapamsewu zomwe zimawavulaza kapena kuwapha. Kupewa ngozizi kuthandizila kupitisa chitsogolo miyoyo ya thazi ya ana mudziko lathu.

Ngati pangakhale nkhawa, kapena mafunso ena ali onse okhudza za kafukufukuyu, muli omasuka kulembera kapena kuyimbila lamya kwa:

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Zikomo kwambiri potenga nthawi kuwerenga ndi kumvesetsa kalata iyi