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Prevalence and Pattern of RTA among Young Adult Tri-wheeler Drivers in a South-Western City, Lagos, Nigeria

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Motorcyclist cause lots of health problems mostly as RTA which are of high morbidity and mortality. (4) A commercial motorcycle popularly called 'Achaba'/'Okada' in Nigeria is a condition in which a driver conveys an individual or goods for a fee. (4) RTI due to motorcycle riding contributes to the burden of health and seems not properly researched or monitored in LMICs with no programs to tackle the menace. (5) They are ranked high among the risk factors of mortality and morbidity, the main victims being the driver, the person(s) being conveyed and the person walking on the road in the age group 15-29years. (5)

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PREVALENCEANDPATTERNOFRTAAMONGYOUNGADULTTRIWHEELERDRIVERSINASOUTHWESTERNCITYLAGOSNIGERIA

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Prevalence and Pattern of RTA among Young Adult Tri-wheeler Drivers in a South-Western City, Lagos, Nigeria

Dr. Okoro Austin Chigozie

I. Introduction

A Road Traffic Crash is an event or occurrence that cause morbidity, mortality or destruction of goods or property, due to movement of a vehicle and happened when the vehicle is in motion on the motorway or still moving after veering off the motorway. (1)The use of tri-wheeler as a means of transportation in Lagos commenced in recent times, especially in the high-brow cities of Lagos Island areas (2) As a vehicle for transportation, it had been involved frequently in road traffic accidents with variable degrees of resultants injuries. (2) The ban of commercial Motor Cycles called 'Okada' in some routes in Lagos (3) gave rise to the massive increase in the use of Tri-cyclist for transportation to to many residents in the state.

Motorcyclist cause lots of health problems mostly as RTA which are of high morbidity and mortality. (4) A commercial motorcycle popularly called 'Achaba'/'Okada' in Nigeria is a condition in which a driver conveys an individual or goods for a fee. (4) RTI due to motorcycle riding contributes to the burden of health and seems not properly researched or monitored in LMICs with no programs to tackle the menace. (5) They are ranked high among the risk factors of mortality and morbidity, the main victims being the driver, the person(s) being conveyed and the person walking on the road in the age group 15-29years. (5)There are strong findings that adolescent and young adult drivers are very vulnerable to increased mortality due to RTA because of youthful exuberance, alcoholism, substance use and abuse. (6) A chief means of conveying people and goods and very ubiquitous. (4) Unfortunately, the rise of 'Okada' has been associated with rise in misdemeanours, traffic offences, and poor driving judgements and RTAs resulting in strong criticisms with resultant laws preventing them from plying the roads in some parts of the urban centers.(4)

Tri-Wheelers are a form of IPT. (7) IPT refers to vehicles the occupy the space between personal transporters and government established transportations in urban centers. (7) It was first introduced in Lagos as a means of transportation by the former Administrator Military, Colonel Burba Marwa and it was called 'Keke Marwa' then.(8) It is called 'rickshaw' or 'tuk-tuk' in Asia,(7) and 'Raksha' in Sudan.(2) Worldwide, 'Keke Marwa' or 'Tuk-tuk' contributes to IPT. Keke Marwa is of less power when compared to Motorcycle or other motors with 2 or 4 stroke machines. (9) It has a metallic body covered by tarpaulin and with blinds on the sides. (10) 'Keke Marwa' has two compartments, the front and the rear compartments. (10) The driver's compartment in front houses the seat, handle bar with the shifting gear and clutch lever on the left and throttle on the right, and a single pedal for the brake. (10) The windscreen in from protects the driver from harsh weather conditions like rain, sun, winds, sandstorms and etc., thereby ensuring proper visibility. (10) The rear compartment has a space for keeping small good as well as seat for the passengers. (10) The recent increase in the number of three-wheelers popularly called "Keke NAPEP" or 'Keke Marwa' was as a result of its sheer size that allows closer movement to homes, and ability to move through and in-between vehicles, moves on even poor road conditions and very accessible. (11)

'RTC is an emergent problem of health worldwide and has now been seen and noted as a global phenomenon that was not given its due attention in research and funding thereby affecting every region in the world with its attendant consequences, mortalities, morbidities and disabilities. (1)It contributed 2.1% of the total mortalities in the world, as well as 21% of injuries worldwide, (1) and LMICs contribute about four-fifth of these mortalities. (1) 'RTAs are a recognized cause of trauma worldwide especially in Nigeria where one out every three Nigerian is at risk of being killed or getting injured in RTA'. (12)In the past 30 years in Nigeria, RTA has been very worrisome to the public health specialist and the world at large. (13)There was estimated 53,897 RTAs with 7,717 mortalities in 1976 alone. This number dropped to 5,114 RTAs in 1981 but with rise in mortalities to about 10, 236 with a mean RTA of 96 and nothing has improved to reduce these figures in the years after. (13) 'Mortality has been increasing as the death from RTA between 1990-2005 rose to 28,253.(13)

'RTIs are a huge source of morbidities, mortalities and disabilities worldwide.(14)More so, the WHO predicted that mortalities due to RTA will rise by over four-fifth from year 2000 to 2020.(14)Worldwide, RTI

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ranks 9th among top contributors to DALYs and this could rise to third by 2020. (14) Sadly, RTA contributes to about 96% of mortality in children. (14) The effect of RTA is rising faster in LMICS due to increase in numbers of vehicles and other determinants. (14) It specifically affects adolescents, young adults and adults of age range 15-44years as well as young male and female children in whom there are high mortalities. (14) The global figure is believed to be undervalued because of the paucity of accurate and organized information from regions with higher RTI deaths and disabilities. (14)

In a study by Ipingbemi and Adebayo(9), they found out that all the operators of three-wheeler were males, 73.4% (9) had no more than secondary education and only 35.4% (9) of the drivers had current operational documents. As the number three-wheelers on the roads rise, it comes with attendant RTA due to poor vehicle maintenance, poor road maintenance, non-adherence to traffic rules and regulations like speed limits, weather conditions causing visual disturbance and etc. (10) Effects due to characteristics of individual riders in RTA are determinants that affect the riders and other persons using the road and these include their socio-demographic characteristics, systemic, attitudinal, psychologic and environmental influences. (15) 'Poor vehicle maintenance including continual use of old vehicles have been identified in Ethiopia and Libya'. (15) 'The prevalence of drug abuse among Motorcycle drivers in a Northern Nigerian city was 19.3%'.(16)

a) Statement of the Research Problem

There has been some research on Tri-Wheelers in Nigeria but with very little evaluation of its contribution to data on RTA among tri-wheeler drivers. 'It is believed to be safer when compared to Motorcycles(9) even though is known to be involved in RTAs with attendant RTI, disability and death'.(2) In a study by Balami and Sambo on tricycle in a Northern city in Nigeria, there was a prevalence of 40% with less than 10% did not have organized schooling. (18.7%). (15) 31.7% of the participants had visual impairment. (15) The study was done in a metropolitan city with a population of 540,016 (15) in contrast to the estimated population of 21 million (17) in Lagos State with a population density of 6,871 persons per sq. Km (17,800 per sq. mile). (17) 'Lagos is the city with the highest human population in Africa with interconnecting roads and bridges'. (17)

Also, the pattern of injuries were not determined in the study and the association of age with RTA was not determined too. This study will estimate the prevalence of RTA among the tri-wheeler drivers in Victoria Island, Lagos a Southern City in Nigeria, the risk factors associated with the accidents among young drivers as they are more prone to risky behaviours (6) and also identify the type of injuries associated with tri-wheeler accidents. The African Youth Charter stipulates 15-34 years old as 'Youth' (18), hence this study will focus on this age group.

II. Literature Review

a) Global View

A WHO working committee defined accident as 'unforeseen conditions, situations or actions causing tangible or noticeable negative effect, damage or trauma while RTA refers to occurrence of such condition or event, with the involvement of one vehicle or more, on a motor way or in publicly accessed area resulting in the death or injury to one person or more while purposeful acts and non-man-made events are not included. (19) RTAs are one of the topmost factors that lead to mortality in younger age groups and young adults. (6) Socio-demographic and topographic conditions are determinants of mortality and morbidity as a driver, passenger, motorcycle driver, bicycle rider, or person walking on the road. (6) 'RTA fatality is defined as any death occurring following RTA or 30 days after a fatal accident'. (20) It is 25.3 per 10,000 vehicles. (20) 'In a study in Switzerland, 1620 Mortalities due to RTC were analyzed and there were 978 (60.4%) in motor drivers and passengers, 254 (15.7%) in motorcycle drivers, 107 (6.6%) in bicycle riders, and 259 (16.0%) in persons walking on the road. (6) RTA account for nearly 10% to 30% of the hospital registrations in India and it is ranked sixth among the causes of mortality in India'. (20) 'Majority of the victims are from rural background and includes adolescents, young adults and adults of age range 15 to 44 years. (20)

In October 2005, the UNGA called for the first 'Global Road Safety Week' with the Assembly Resolution A/60/5 to promote road safety worldwide. (21)The topic was titled "Young Road Users" –because of increased vulnerability of young people to RTA leading to mortality, morbidity and disability. (21). 'In the European region, RTI is one the leading causes of mortality from violence and unintentional injuries (127,000 deaths per year) among children'. (22) 'RTIs and injury in water bodies contribute about nearly 50% of Road traffic injuries and drowning together account for nearly half of all child mortalities due to unintentional injuries. (22) More so, many more children in numbers up millions undergo hospital admission for non-fatal injuries with many developing chronic and prolonged disabilities. (22) RTI tops the contributors to mortality among older children and adolescents of age 10-19years. (22) More than half of the death due to RTA worldwide involve adolescents, young adults and adults in the age range of 15-44 years. (22) This is a very active and productive age group.

There is a projection that by 2020, RTI will be the third leading cause of DALYs. (22) In developing countries, RTA cause 1.3 million mortalities and 50 million RTIsper year. (23) '85% of global crashes occur

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in LMICs. (23) India ranks topmost with 100,000 mortalities annually seconded by the Chinese with 87,000 deaths annually. (23) It is projected that by 2020,67% of the mortalities due to RTA will be accounted for in Asia.(24)'In East-Asian and South-East Asian countries, over 67% of affected persons are motorcycle riders.(24) Behavioural factors are the major determinants of RTA.(24)'In a study by Spoerri and colleagues, 82.1% drove vehicle without a license'. '75.7% did not know the side of the road to be used by pedestrians for walking'.(6) 'Only 15.7% could recognize all 5 traffic signals properly'.(6) 'Nearly 95.7% agree that helmets prevent accident, but only 37.5% use helmet/seat belt regularly'.(6) 'Human factor is the a major determinant of RTA and can contribute to about 80% to 98%.(24) Behaviour of a driver while on the road is a major contributor to rising number of RTAs and it exposes the weakness of the factors attributable to people.(24)Increasingly, more vehicles, bad roads, poor and corrupt enforcement, population increase, and weather conditions, contribute to RTA in LMICs.(25)'A study in Sri-Lanka found three factors were positively associated with RTA among for-hire three-wheeler crashes'.(26) 'They were as follows: Over-loading of passengers (> 3 in the seat), old and poorly maintained tricycles, and being convicted by law enforcement agents for offences bothering on road codes and regulations during the past 12 months'.(26)

In India, Transportation on road has been a major consumer of hydrocarbons in the form of premium motor spirit and gas with importation as a major means of meeting up with the energy demands.(27) 'Most of India's population prefers private and para-transit transportation and this has impacted on the economy leading to increased mobility share from 16.2% in 1990-1991 to 21.2% in 2000-2001, respectively, (27) with decline in the use of shared means of transportation like buses and railways in the same period.(27) Auto-rickshaws have a huge rise in per capita mobility of 130% in road transportation.(27)

b) Regional Perspective

'WHO estimated that 33% of all modes of transport in sub-Saharan Africa are motorcycles and three-wheelers'.(28)Worldwide, among adolescents and young adults aged 15-29years, RTIs, is the commonest cause of mortalities.(29) In the region, the number of RTI and mortalities have been increasing over the past 30years.(29)'According to the report on road safety published in 2015 for the second preceding year (2013), the region has the most cases of mortalities from RTI in the world with prevalence of 26.6 per 100 000 persons.(29) The use of motorcycles has increased greatly in Africa in recent years.(28) Motorcycles are often used commercially to convey people and goods for a fee.(28) 'Attempts for proper regulation of the activities of Motorcycle riders have largely failed, as the authorities could not keep pace with the massive influx of motorcycles into the continent and the high demand for their services by local populations'.(28) Similar issues apply to motorized three-wheelers, although their numbers are far fewer.(28)

Mortality on the road measured annually in South Africa showed that the rate is 43 per 100, 000 population and this is an inappropriate increase when compared to 22 deaths per 100,000 persons which is the mean for the world.(30)Effects of RTC in South Africa is shown to be on the rise with 13,802 Mortalities from RTCs in 2011.(31)The new mortalities due to RTC was then estimated to be 27.5 per 100,000 persons.(31)A study in Ghana showed a mortality rate of six per day due to RTA.(32) This study also showed that 25% of the pedestrian mortalities were children and identified over-speeding as a risk factor in 60% of RTAs.(32) In a study in South Africa with population size of 305, showed that 100 participants were admitted with 45 Mortalities due to RTC in the given period.(31) On admission, Pedestrians were 41 in number and 59 motor occupants.(31)Most involved (n=58) private vehicles.(31)Only 17% of motor occupants wore seat-belt while 8 were drunk or under the influence of alcoholism.(31)Air and rail transport are either prohibitive, unreliable or poorly maintained in the African region, hence road transportation becomes desirable and the only source of conveying people and goods from one point to the other. (29) But there has not been any corresponding increase in road infrastructures even as the population increases, thus more people are exposed to hazards on the road'. (29) RTCs already kill more young people aged 17-25 years than any other cause.(28)Findings from the 1999 Transport Research Laboratory report,(33) "Estimating Road Fatalities," revealed that South Africa and Nigeria accounted for more than 50% of mortalities due to RTA in the Africanregion.(33)

'Injuries sustained by motorcycle and three-wheeler riders tend to be more serious than those sustained by four-wheeled vehicle occupants, with common serious injuries including head injuries and injuries to the lower extremities including the pelvic region'.(28)The approval of motorcycles led to involvement of more individuals as motorcyclist in Tanzania with attendant increase mortalities due to RTA from 309 in 2008 to 1,098 in 2013'.(28) In Dar-es Salaam, there was an worsening rate of RTA of 4.3% between 1999 and 2000 and 2.7% during 2000 and 2001. 'The total number of traffic accidents was 16372 during these 3 years'.(34)'In a study conducted in Ethiopia to assess the risky driving behavior among drivers, the mean age of the respondents was 28.7years'.(35)'About 66.65 had risky behaviours.(35) 42.3% used phones while driving while 9.7% was under the influence of alcohol'.(35) A study to assess three-wheeler induced accidents in Khartoum, Sudan showed a prevalence of 52.7% with tricycle somersault and

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being hit by a vehicle as the most common type of RTA.(2) 'Majority had injury that affected many body parts while the commonest injury was soft tissue injuries.(2) Also driver-owners were less involved in accidents compared to driver-employees'.(2)'Delays in implementing road safety policies in LMICs has been adjudged as one of the factors contributing to RTCs and increase the DALYs'.(36)

c) Local Aspect

'RTAs cause huge economic losses to Nigeria and cast a significant burden on the health of the populace as well as the ability of the healthcare industry to tackle these problems and there are inefficient measures to curb RTAs and reduce its attendant morbidity and mortality.(37) According to the World Health Organization, LMICs make up for 92% of mortalities due to RTAs but only 53% of documented vehicles are in these countries as at 2011.(38) Morbidity and mortality due to RTA has continued to increase in Nigeria, and account for the huge proportion of deaths in the African region.(38) 'According to a study, mortality from RTA worsened from 38.2% to 60.2% from 1991-2001'.(37) According to available data, individuals are less safe from RTA in Lagos and Nigeria as a whole is described a s a high risk zone with cause-specific mortality due to RTA of 32 per 1,000 people.(37) This can be attributed to poor infrastructures like roads, traffic signs and lights, road designs, lack of enforcement with attendant corruption of the agencies, growth in population and increase in number of vehicles including cars, motorcycles and tricycles.(38) A study in South-south Nigeria found that the tri-cyclist commonly consume large portions of both approved and unapproved drugs, indulge in excessive alcoholism, smoke lots of cannabis, inhale cocaine and take heroin in different forms.(39) The tri-cyclist opined that the drugs assist to alleviate stress, due to the occupation as well improve physical fitness there by eliminating tiredness and fagging-out. They expressed understanding on the negative effects of drug abuse on their jobs which includes vision impairment, reduced reflexes and poor reactivity to emergency, poor thought process when driving and inability to coordinate when on steering and the increase tendency for RTA to occur. (39)

Between 1970 and 2001, Mortalities and morbidities from 726,383 RTAs in Nigeria was 208,665 and 596,425 respectively. This numbers are staggering.(37)'A study in a South-western city of Nigerian on the incidence and pattern of injury among Motorcycle drivers showed that 45.3% had been involved in RTA with 62.5% and 37.5% single and multiple accidents respectively.(40) 'Age (20-29 years; 30-39 years), alcohol use and visual impairment were associated risk factors'. (40) Mortalities, disabilities, and morbidities from road accidents predominantly affect the younger and the economically productive ages.(38) RTC among Motorcyclist caused about for 54% of all RTI in Nigeria.(41) 'The riders commenced driving without any formal training or pedigree in driving.(41) 'Riders believe it was not mandatory and not enforced to have a formal training or obtain a license prior to being a motorcyclist'.(41) 'A study by Odivwri to identify the rate of substance abuse by 'Keke' Riders in a northern state found myriads of reasons for indulging in substance abuse include improvement in sexual performance, relive anxious moments, and enhance physical work rate and induced courage.(42) The study also showed that tri-cyclist develop poor health, become less productive with attendant increase in RTA on major roads especially the trunk A roads.(42) 'There is significant relationship between age and substance abuse'.(42) A study in Jos, Nigeria 'to identify the pattern of alcoholism and drunk driving among tri-cyclist and occurrence of RTA found that all the one hundred and ninety-five tricycle drivers studied were males and all consume alcohol'.(43) 'Most of them (67.4%) drink and drive'. 'A hundred and seventeen (60%) of respondents have had an accident in the last year and 70% of the accidents occurred due to drunk driving'.(43)'There was no association between frequency of drinking and involvement in road traffic accident'.(43) Oginyi and Mbamin a 'study to determine psycho-active substance use as a predictor of reckless driving amongst 'Keke' drivers in South-east Nigeria showed that there was relationship between psychoactive substance use and reckless driving among 'Keke' riders'.(44)

Lagos State Government enacted a bill into law in august 2012, banning the use of two-wheelers (Motorcycles) for commercial purposes on major bridges and roads, mostly trunk A roads. (45) Motorcyclist below 18 years of age were also prohibited by law.(45) 75% mortality was recorded for Motorcycles in a study done in Lagos prior to enforcement of the ban and 25% following the ban'.(45)'The study attributed the reduction to the use of helmet but could not ascertain if age restriction played a role in reducing the prevalence of mortality'. 'There is a prevalence of 46% for RTA among Tricycle drivers in a Northern City in Nigeria'. (15) In the study, 'Psychoactive substance use was significantly associated with RTA'.(15) Age was not considered a factor in this study. Also, it did not describe the pattern of the injuries and mechanism of accidents unlike the study done in Khartoum, Sudan. (2) As such, the study did not explore the numerous risk factors that could contribute to RTA in tri-wheeler drivers.

d) Rationale of the Study

The only study found to have been done in Nigeria did not consider age of the participant as an important risk factor. It is known that youths are largely affected in RTA and it worsens the DALYs. This study will

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explore the various risk factors as well as the association of age with RTA among youth tri-wheeler drivers. This will promote safety on the roads and thereby reduce incidence and prevalence of RTA.

e) Aim

To reduce the prevalence of RTA among Tri-Wheeler drivers and improve the use of Tri-wheeler for commercial transportation in Victoria Island, Lagos.

f) Objectives

General

1. To calculate the prevalence of RTA among youth Tri-wheeler drivers in Victoria Island, Lagos.

Specific

1 To identify the associated factors of RTA among youth Tri-wheeler drivers in Victoria Island, Lagos.
2. To estimate the most common type of injury in RTA among youth Tri-wheeler drivers in Victoria Island, Lagos.
3. To identify the most common type of RTA among tri-wheeler drivers in Victoria Island, Lagos.

Hypothesis

1. Age is a determinant of RTA among tri-wheeler drivers in Victoria Island Lagos.
2. Marital Status is a determinant of RTA among tri-wheeler drivers in Victoria Island Lagos.
3. Duration as a driver is a risk factor for RTA among tri-wheeler drivers in Victoria Island Lagos.
4. Use of phone while driving is a risk factor for RTA among tri-wheeler drivers in Victoria Island Lagos.
5. Traffic Violation is a risk factor for RTA among tri-wheeler drivers in Victoria Island Lagos.

III. Methodology

a) Research Design

This is a Cross-Sectional Analytical Survey that examine RTA among youth Tri-wheeler drivers so as to determine the level of safety of Tri-wheelers when compared to Motor-cycles. This is with a view to also identify the risk factors associated with RTA among Tri-wheeler drivers and recommend possible measures to mitigate these risk factors.

b) Sample Size

Using a prevalence of 68% of RTA; (5) Confidence Interval of 95%; Level of Significance of 0.05. Sample Size = 335. To cater for likely rejections, 35(10%) participants were added, (46) there were approximately 370 participants. The study population was calculated using the formula: S= (Z2 × P (1-P)) /m2, where 'S' is Sample size; 'Z' represents 95% confidence level, and is valued at 1.96, 'p' = 0.68 based on a previously reported prevalence of 68% of RTA among Motor-cycle drivers in a Southern-City of Nigeria (5), 'and 'm' representing margin of error which is valued at 0.05.

A total of 370 participants were recruited. With the exclusion criteria, the sample size reduced to 316 participants as about 54 participants were beyond the acceptable age for the study.

c) Research Subjects

The research subjects were drivers of Tri-wheeler in Victoria Island, Lagos. Participants were drivers of Tri-wheeled vehicles selected from a list that made available from their Union Heads through the Headquarters Local Government Area.

Inclusion Criteria:

- Tri-wheeler Driver as at the time of the study or in the last 12 months.
- Age range 15-34years (Youth)(18)
- More than 6months as a driver.
- Registered Member of the Tri-wheelers Association. (15)

Exclusion Criteria:

- Not a primary driver/owner of the tri-wheeler.
- Inability to communicate in 'Pidgin'/English Language.

d) Sampling Technique

Sampling method employed was Systematic Random Sampling to select the 370 participants. The participants occurring in every 3rd were selected. The total number of the members was 1115 and this number was divided by 370, hence every third participant was issued a questionnaire. The questionnaires were numbered to capture the estimated sample size. The participants were allowed to discontinue with the research at any point in time during the period but none withdraw as they were properly counselled in local language (pidgin).

e) Research Setting

This study was done within Victoria Island, Lagos, Nigeria with an estimated total participant population of 370 respondents. Victoria Island (VI) is a high-brow city located between Lagos Island and the Lekki Peninsula.(47) It is the major business and financial exchange center of Lagos, Nigeria.(47)It is located on Latitude 6o25' 31.19" N and Longitude 3o 24' 34.19" E.(47)

f) Study Instruments

Structured Pre-tested Modified Motorcycle Rider Behaviour Questionnaire (MRBQ) (48) was adapted for the drivers. It was a Nigerian version that has been reworded and necessary modifications made to adapt the questionnaire items to a Nigerian socio cultural context. (48) The Questionnaire was pre-tested with about 30 drivers (49) in a South-south city called Benin City.

The questionnaire was a 25-item questionnaire which was updated and divided into two sections.

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Section 1 contained the socio-demographic information of the driver such as age, sex, level of education, marital status, number of years as a driver (in months), and no of accidents. Section 2 identified risk factors to RTA, severity of previous injuries incurred due to RTA the part of the body involved, condition of the road, persons affected in the accident, time/period of day the accident occurred. It was forward translated into a local language (Pidgin) and back translated. (49) by translators in the Department of Community Health, University of Benin. Inter-rater reliability was used and the kappa (k) = 0.75, that is, 'Good Agreement'.(49)An expert group in Department of Community Health, University of Benin Teaching Hospital, perused the questionnaire and ensured appropriate content domain in the items thereby assessing the content validity. Finally, the five-point rating scale (l - never, 2 - occasionally, 3 - frequently and 4 - nearly all the time) was changed to a five-point rating scale (1- Always, 2- Usually, 3 – Sometimes, 4- Rarely, 5- Never) so as to make it simple for the respondents.(48)

g) Collection of Data

Primary Data: Interviewer-administered questionnaire by Three-wheeler Drivers. From the four major parks, 370participants were selected., Lagos. 30 respondents' questionnaires were directly filled by the researcher as he rode with them from one point to the other. Data was collected at the close of work as the respondents demanded.

Secondary data could not be collected as neither the FRSC, The Nigerian Police nor the Local Government Headquarter had data on road traffic accidents involving tri-wheeled vehicles in Victoria Island. This confirms the notion assumed by many that tri-wheeled vehicles are safe because they have data on motorcycle accidents but none on tri-wheeled vehicles.

h) Technique

The questionnaire was administered by an interviewer and information collected from the respondents. This information includes: biodata, level of education, formal rider's training, possession of valid driver's license, occurrence of accidents in the past 12months, type of accident, injury, traffic offences, use of psychoactive substance, number of years as a driver, number of accidents, se and other characteristics. 30 Questionnaires were filled by the researcher via direct observation on riding the Tri-wheeler.

i) Study Duration

The duration of the study was fixed as 3 months. The research was completed keeping in view the given time frame.

j) Variables

i. *Independent Variables*

- Age
- Sex
- Marital Status
- Level of Educational
- Certification: Possession of Licence.
- Psychoactive Substance Use: Alcohol, Marijuana, Fuel, Gum, Heroine.
- Environmental Effects: Bad Roads, weather conditions, narrow roads.
- Traffic Laws: Over-speeding, Unnecessary over-taking, Over-loading, No brakes.
- Number of years as a driver (in months): 1-≤6months: >6-≤12months: >12-≤18months:>18-≤24months; >24months.
- Use of Mobile Phone while Driving.

ii. *Dependent Variables*

- Number of Accidents: 1;2;3;4;5
- Type of accident: Head-on collision; Side-hitting; Toppling; Hit-from-behind.
- Type of injury: Soft tissue injury; Head injury; Single fracture; Multiple injuries, Death.(50)
- Time accident occurred: Morning(12am-6am); Day(>6am-12pm); Afternoon(>12pm-6pm); Night (>6pm-12am)
- Person Affected: Driver; Passenger.

k) Data Analysis

The data collected on the questionnaires were extracted and stored using the SPSS software, Version 22. Data was presented in descriptive statistical tools like frequency tables, bar and pie charts.

Regression Model was used in analyzing the data to determine association between the variables like Marital Status and RTA. The level of significance is 0.05 and Confidence Interval of 95%. Data were analyzed for total of 316 participants which is 85.41% of the collected data samples.

l) Ethical Issues

Approval was given by the Internal Review Board, Health Services Academy. Participation was voluntary. The National Commercial Tricycle and Motorcycle Owners and Riders Association (NACTOMORAS) office in Victoria Island, Lagos gave approval for the enlistment of her members in the study.(15)Written Informed Consent(51) was issued in the participant's local language (Pidgin) and signed by the participant as approval and acceptance to be part of the research. The information volunteered by the participant was not shared with any third party. The Informed Consent Form is attached as Annex A. No physical or psychological harm was caused to the any of the participants.

m) Significance of the Study

1. It contributes to the body of knowledge as the prevalence is known.

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2. It raises awareness on the RTA among Three-wheeler drivers as it seems neglected.
3. It raises awareness on the need to screen drivers especially young adults.
4. It can influence the adoption of tri-wheelers as a means of commercial transport in other communities and cities.

IV. Results

a) Descriptive Statistics

The findings of the analysis done using SPSS version 22 are as shown below the various tables and figures listed.

i. *Prevalence of RTA among Young Tri-wheeler Drivers*

The prevalence of road traffic accident among the drivers is 51.6%. This shows that more than half of the respondents have had RTA. This can put in another form that in every two drivers, one had RTA. (table 1)

Table 1: Prevalence of RTA among Young Tri-Wheeler Drivers

		Frequency	Percent
HAVE YOU EVER HAD A ROAD TRAFFIC ACCIDENT	No	153	48.4
	Yes	163	51.6
	Total	316	100.0

ii. *Age of Participants*

Table 2 shows that 46% (146) of the respondents were between the age of 15-24 years while 53.8% (170) were between the ages of 25-34years.

Table 2: Age of Participants

		Frequency	Percent
	15-24	146	46.2
	25-34	170	53.8
	Total	316	100.0

iii. *Level of Education of Young Adult Drivers*

Figure 1 is a pie chart which shows the level of education of the drivers. Majority of them had primary (24%) and secondary (62%) education. Only a few had no formal education (5%) while a handful had tertiary education (9%). The drivers are seen as unskilled hence many graduates do not take up driving 'Keke' as a full-time job.

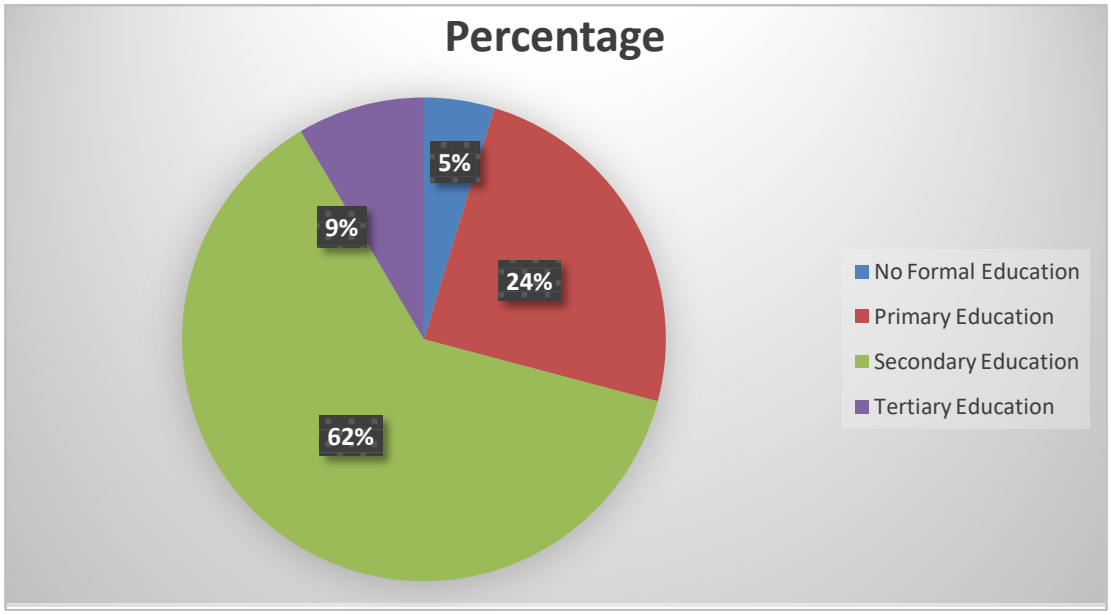


Figure 1: Level of Education of Young Adult Drivers

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iv. *Marital Status of Young Adult Drivers*

The table below (table 3) demonstrates the result of the marital status of the drivers. Majority of whom are single, that is never married (68.35%), some were married (31.33%) while very few were divorced/separated (0.316%). Most of the drivers are single as this study focused on the young drivers.

Table 3: Marital Status of Young Adult Drivers

		Frequency	Percent
	Single	216	68.4
	Married	99	31.3
	Separated/Divorced	1	.3
	Total	316	100.0

v. *Type of Injury in RTA among Young Adult Drivers*

Soft Tissue injuries were the most common (64.82%), followed by head injury (29.63%), single fracture (3.70%) and multiple injuries (1.85%). (figure 2).

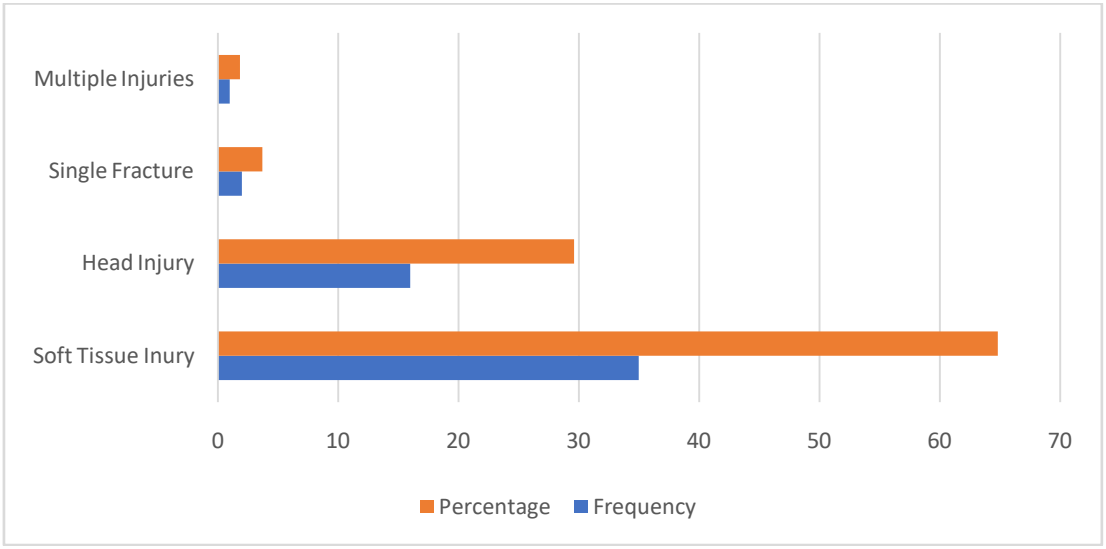


Figure 2: Type of Injury in RTA among Young Afult Drivers

vi. *Who was affected in the RTA*

Majority of the accidents, 109 respondents, did not affect any individual (66.87%), the driver was affected in 40 (24.54%) accidents while 6 and 8 passengers at the front (3.68%) and back (4.91%) respectively were evenly affected. (figure 3)

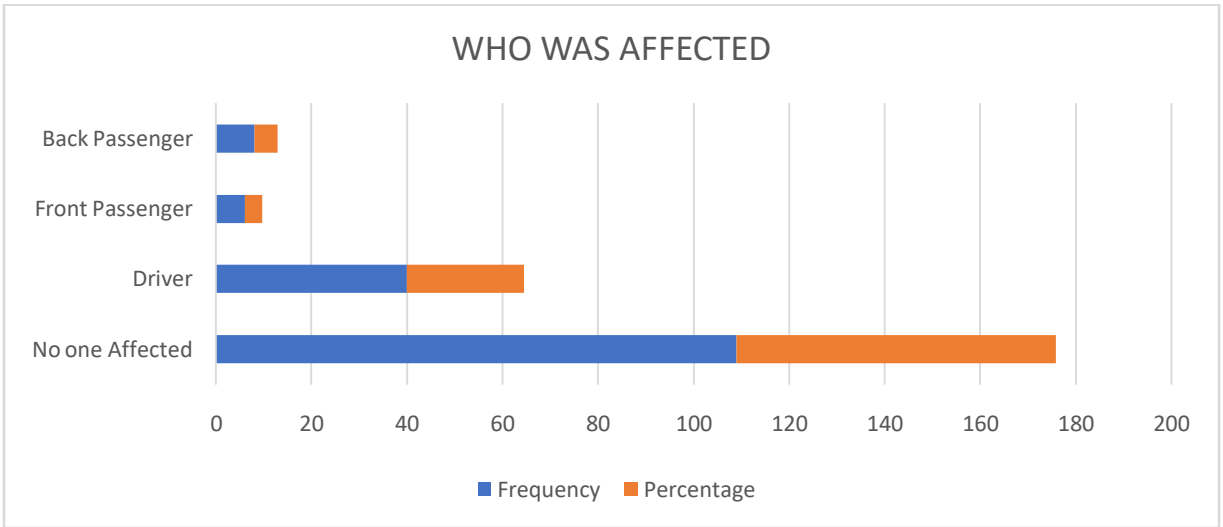


Figure 3: Who was affected

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vii. *Mobile Phone use While Driving*

Figure 4 shows the use of phone by drivers while riding. 149 respondents said agreed to have 'never' driven while on the phone (47.2%), 80 respondents (25.3%), agreed they 'rarely' do so. 67 respondents (21.2%) 'sometimes' do so while 20 respondents (6.3%) accepted that they 'always' use mobile phone.

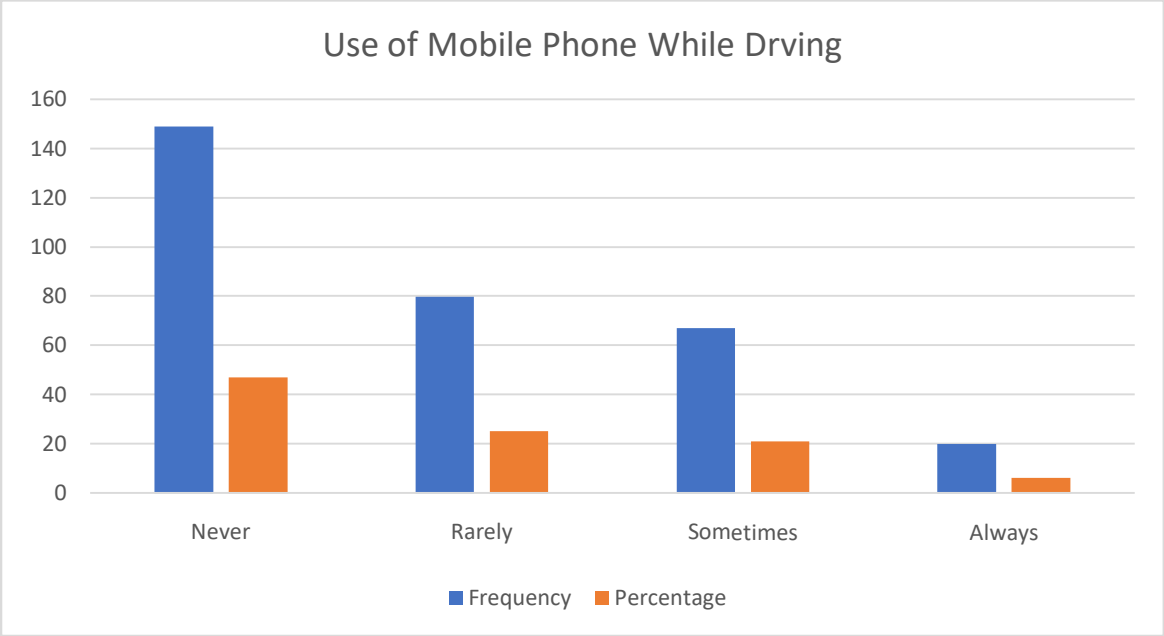


Figure 4: Mobile Phone Use While Driving

viii. *Traffic Violation*

Table 4 shows response to traffic violations and 223 respondents (71%) agreed to have violated traffic regulations in one way or the other.

Table 4: Traffic Violation

Response	Frequency	Percentage
Yes	223	70.6
No	93	29.4
Total	316	100

ix. *Type of Traffic Violation*

Types of traffic offences committed by these drivers. 126 respondents (56.50%) had wrong parking, 51 (22.87%) respondents had wrong turn, 23 respondents (10.31%) had red-light violation, 21 respondents (9.42%) had over-loading and 2 (0.90%) were involved in over-speeding. (Figure 5)

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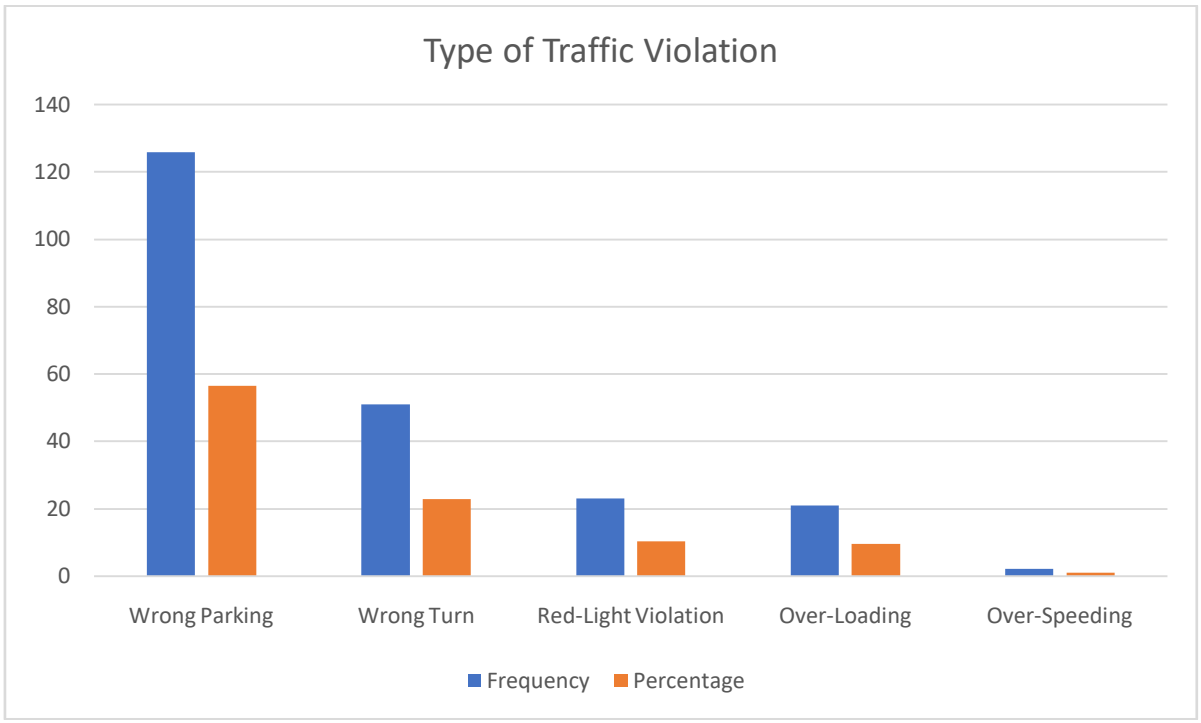


Figure 5: Type of Traffic Violation

x. *Duration as a Driver*

19 respondents (6%) have been drivers for less than 1year, 75 respondents (23.7%) have been drivers for 1-2years, 84 (26.6%) have been drivers for 2-3years, 62 (19.6%) had been drivers for 3-4years, 45 (14.2%) had been drivers for 4-5years and 31 (9.8%) had been drivers for 5years and above. (Figure 6)

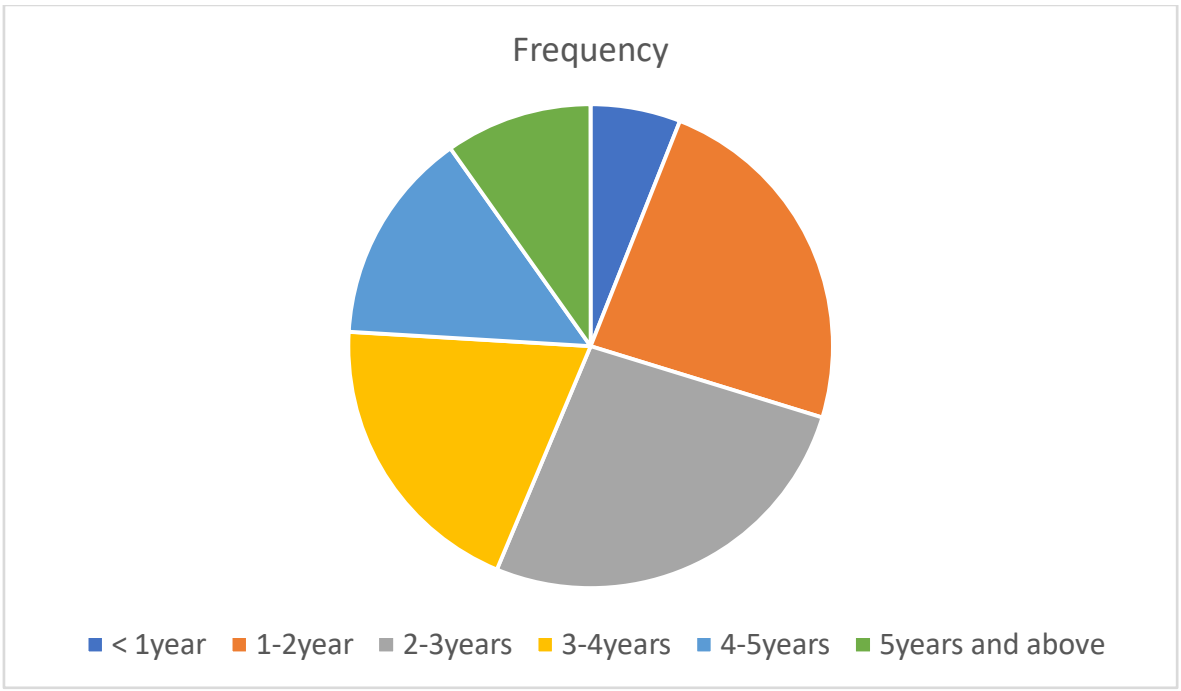


Figure 6: Duration as Driver

xi. *Type of Accident*

Table 5 shows that the most common RTA among the drivers is side-hit with 51.53% followed by front-hit with 15.34%.

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Table 5: Type of Accident

		Frequency	Percent
WHAT TYPE OF ACCIDENT	No Response	31	19.02
	Side Hit	84	51.53
	Head On collision	1	0.60
	Front Hit	25	15.34
	Topple over	9	5.52
	Hit immobile object	12	7.36
	head-on-collision	1	0.60
	Total	163	100.0

xii. *Possession of Licence and Number of Months of FRT*

272 respondents who had licences had no formal training while only 11 had formal rider's training and license. 31 respondents had no formal training and no license while 13 had formal training but no license. This shows poor supervision and monitoring by the regulatory agencies.

Table 6: Possession of Licence and Months of FRT

Variable	Number of months of FRT	
	No Formal Training	1-3 months of Training
Do you have license? Yes	272	11
No	31	13

b) Inferential Statistics

i. *Age and RTA*

Table 7 shows there is no association between driver's age and the occurrence of RTA because the computed p-value is 0.61 hence we fail to reject the null hypothesis.

Table 7: Age and RTA

Variables	RTA			
	R Square	Y^2	df	p-value
Age	.011	.879	1	.061

ii. *Marital Status and RTA*

Table 8 shows there is association between marital status and occurrence of RTA as the computed p-value is 0.009 which is lower than p-value of 0.05, hence we reject the null hypothesis. Marital status is a risk factor for RTA among tri-wheeler drivers.

Table 8: Marital Status and RTA

Variables	RTA			
	R Square	Y^2	df	p-value
Marital Status	.021	1.681	1	.009

iii. *RTA and Duration as a Driver*

Table 9 shows there is association between RTA and duration as driver as the computed p-value is .002 lower than p-value of 0.05. Duration as a driver is a risk factor for RTA.

Table 9: RTA and Duration as a Driver

Variables	RTA			
	R Square	Y^2	df	p-value
Duration as a Driver	.030	2.330	1	.002

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iv. *RTA and Use of Mobile Phone*

Table 10 shows that driving while using the phone is a risk factor for RTA as the computed p-value is .000 hence we reject the null hypothesis.

Table 10: RTA and Use of Mobile Phone while Driving

Variables	RTA			
	R Square	Y^2	df	p-value
Use of Mobile Phone	.049	3.902	1	.000

v. *Type of injury and Type of accident*

There is a correlation between the kind of injury sustained and the mechanism of RTA as the computed p-value is 0.003, hence we reject the null hypothesis, the type of accident maybe a determining factor for the kind of injury.

Table 11: Type of Injury and Type of Accident

Variables	Kind of Injury			
	R Square	Y^2	df	p-value
Type of Accident	.185	3.984	1	.003

vi. *Level of Education and RTA*

Table 12 shows that level of education affects the occurrence of RTA as the computed p-value is 0.04, hence we reject the null hypothesis.

Table 12: RTA and Level of Education

Variables	RTA			
	R Square	Y^2	df	p-value
Level of Education	.013	1.047	1	.041

vii. *Level of Education and Type of Accident*

Table 13 shows there is no correlations between attainment of education and RTA. The level of education does not determine the kind of accident.

Table 13: Level of Education and Type of Accident

Variables	Type of Accident			
	R Square	Y^2	df	p-value
Level of Education	.010	2.417	1	.267

viii. *Traffic Violation and RTA*

Table 14 shows that Traffic violation is a risk factor for RTA among motorcycle drivers. The computed p-value was .000.

Table 14: RTA and Traffic Violation

Variables	RTA			
	R Square	Y^2	df	p-value
Traffic Violation	.111	2.417	1	.000

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ix. *Formal Rider's Training and RTA*

Table 15 shows there is no correlation between Formal rider's training and RTA as the computed p-value is .465.

Table 15: RTA and Formal Rider's Training

Variables	RTA			
	R Square	Y^2	df	p-value
Formal Rider's Training	.002	.134	1	.465

x. *Valid driver's License and RTA*

The table below shows no correlation between possession of valid licence and RTA.

Table 16: RTA and Valid Driver's Licence

Variables	RTA			
	R Square	Y^2	df	p-value
Valid Driver's License	.011	.863	1	.063

V. Discussion

This research was conducted to estimate the prevalence of RTA and its determinants among tri-wheeler drivers in a city of Victoria Island in the South-western State of Lagos, Nigeria. Victoria Island (VI) is an affluent town that encompasses a former island of the same name that sits between Lagos Island and the Lekki Peninsula in the Lagos Lagoon.(47) It is the main business and financial center of Lagos, Nigeria.(47) It is located on Latitude 6o 25' 31.19" N and Longitude 3o 24' 34.19" E.(47). With ban of Motorcycles (3), use of commercial tricycles has been of the rise and has been associated with accidents as the study discovered.

The prevalence of RTA in this study was 51.6%. A similar study on tricycles done in the North-eastern part of Nigeria had a prevalence of 46%.(15) A study done in Khartoum had a prevalence of 28.8%(2). A study by Ofonime and Effiong to estimate RTA among Motorcycle drivers in Uyo, Nigeria showed a prevalence of 68%.(5) A study by Morenike and Umaru in North-Central part of Nigeria on Motorcyclist found RTA prevalence of 54.2%.(52). The prevalence of RTA among Motorcycle drivers in these quoted studies are higher when compared to that of tri-wheelers. That could mean that tri-wheelers maybe safer than Motorcycles, although more studies need to be done to determine this hypothesis.

Forty-six percent (146) was of age range of 15-24 years while 53.8% (170) were between the ages of 25-34years. The study focused on the younger age group. Majority had education up to secondary level (62%) while a handful had primary level education (24%). Only a few had no formal education (4.7%) while a small percentage had tertiary education (8.5%). The drivers are seen as unskilled hence many graduates do not take up driving 'Keke' as a full-time job. Majority of the drivers are single, that is never married (68.35%), some were married (31.33%) while very few were divorced/separated (0.316%). Most of the drivers are single as this study focused on the young drivers.

Soft Tissue Injuries were the most common (64.82%), followed by head injury (29.63%), single fracture (3.70%) and multiple injuries (1.85%). This was corroborated by the study in Khartoum which showed that majority, 146 patients (70.5%), had soft tissue injuries. (2) No mortality was recorded in this study. In a study by Emiogun and co., there were 128 motorcycle death autopsies recorded during the period of study with 96 cases (75%) before the law and 32 cases (25%) after the law.(45) The frequency of head injury was 39.8% before the law and 43.6% after the law.(45) This also buttresses the point that tri-cycle maybe safer than motorcycle.

Majority of the accidents, 109 respondents, did not affect any individual (66.87%), the driver was affected in 40 (24.54%) accidents while 6 and 8 passengers at the front (3.68%) and back (4.91%) respectively were evenly affected. A study by Alkabli in Khartoum found that the most affected group were passengers, 109 patients (52.7%)(2), drivers were 59 patients (28.5%) and pedestrians 39 patients (18.8%).(2) A total of 149 respondents said they 'never' drove while on the phone (47.2%), 80 respondents (25.3%), agreed they 'rarely' do so. 67 respondents (21.2%) 'sometimes' do so while 20 respondents (6.3%) accepted that they 'always' use mobile phone. Figure 5 shows response to traffic violations and 223 respondents (71%) agreed to have violated traffic regulations in one way or the other. Types of traffic offences committed by these drivers. 126 respondents (56.50%) had wrong parking, 51 (22.87%) respondents had wrong turn, 23 respondents (10.31%) had red-light violation, 21 respondents (9.42%)

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had over-loading and 2 (0.90%) were involved in over-speeding.

About 19 respondents (6%) have been drivers for less than 1year, 75 respondents (23.7%) have been drivers for 1-2years, 84 (26.6%) have been drivers for 2-3years, 62 (19.6%) had been drivers for 3-4years, 45 (14.2%) had been drivers for 4-5years and 31 (9.8%) had been drivers for 5years and above. The most common RTA among the drivers is side-hit with 51.53% followed by front-hit with 15.34%. A study done in Khartoum showed that the commonest form of RTA was toppling of the tri-wheeler. (2) topple over was found to be 5.52% in this study. 272 respondents who had licences had no formal training while only 11 had formal rider's training and license. 31 respondents had no formal training and no license while 13 had formal training but no license. This shows poor supervision and monitoring by the regulatory agencies.

The study showed no association between driver's age and RTA because the computed p-value is 0.61 hence we fail to reject the null hypothesis. A study by Asuzu AL and co, showed that fatal injuries are commoner in younger drivers (<30 years of age) compared to older motorcyclist(30years or >30 years of age)(53)This survey shows that marital status is a determinant of RTA as the computed p-value is 0.009 which is lower than p-value of 0.05. Marital status is a risk factor/determinant for RTA among tri-wheeler drivers. It contributes about 2%.There is association between RTA and duration as driver as the computed p-value is .002 lower than p-value of 0.05. Duration as a driver may be a risk factor/determinant for RTA. About 3% of the accident that occurred can be attributed to duration as a driver.

Driving while on the phone is a risk factor for RTA as the computed p-value is .000 hence we reject the null hypothesis. 5% of the accident can be attributed to this risk factor. In a similar study by Balami and Gambo, they found that use of phone while driving was not associated with RTA.(15) A study by Audu et al in Benue, North-central Nigeria found majority (72.5 %) of the respondents who had experienced auto crash, had it driving while on the phone. The association was established in the study.(54)A study by Khan and Tehreem in Pakistan found that driving while on the phone was one of the causes of RTA.(55)

There is association between the kind of injury sustained and the type of accident that occurred as the computed p-value is 0.003, which is lower than the p-value of 0.05. The type of accident maybe a determining factor for the kind of injury. 20% of the kind of injury can be attributed to type of accident. Level of education affects the occurrence of RTA as the computed p-value is 0.04. Only 1% of the accident can be determined by the level of education. There is no correlations between level of educational attainment and mechanism of RTA. The level of education may not be a determinant of the kind of accident.

Traffic violation is a risk factor for RTA among tri-wheeler drivers. The computed p-value was .000. 11% of accident can be attributed to traffic violations. 'A study Achala .U.J and co, in Sri-Lanka found that traffic offences in the past 12 months contributed to RTA.'(26)'A study in China to determine factor and injury severity established that (56) enhanced control of traffic offences led to reduced rate of serious morbidities and mortalities. (56)

There is no correlation between Formal Rider's Training and RTA as the computed p-value is .465. This study also discovered that there is no correlation between possession of valid licence and RTA. A Meta analysis by Jose I.C-M. And Mercedes C-Non possession of valid driver's licences showed 'Improvement in behavior with an average reduction of 30% in traffic offences, an average reduction of over 50% in cold and emergency cases admissions and reductions of 15-20% in morbidities and mortalities. (57)

VI. Conclusion

Tri-wheelers have become a major mode of transport in Nigeria as the study has discovered.(3) Albeit its relative safety (prevalence of RTA 46%(15) and 51.6% (Figure 4) from tri-wheeler against 68%(5) and 54% (52) for motorcycle), it is accident-prone as a vehicle. However, no death was recorded in this research as against the 75% (45) mortality found in a study for Motorcycles.

The predictors of RTA discovered in the study include driving while on the phone, marital status, duration as a driver and traffic violation because they had computed p-values of 0.000, 0.009,0.002 and 0.000 respectively. Education of the drivers on these key determinants will go a long way in ensuring and improving safety of the tri-wheelers as most commercial cities in Nigeria ban Motorcycles to adopt tri-wheelers as a means of transport.

VII. Limitations of the Survey

1. The lack of secondary data from the FRSC, the |Nigerian Police Force and the Headquarter of Iru/Victoria Island LGA made impossible to ascertain the proportion of RTA due to tri-wheelers.
2. The proportion not being determined affected the possible comparison between tri-wheelers and motorcycles to determine which is safer as a means of intra-city transportation.
3. The drivers were only willing to cooperate after the day's job as they are very concerned with the time spent in answering questions and filling the questionnaire. This made it difficult for the interviewers as they had to wait on the drivers most times, hence this prolonged the data collection

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beyond the allotted duration of 4weeks to about 6weeks.

4. All the respondents were males; hence no comparison could be made on the basis of gender or sex.
5. All respondents denied substance abuse even though anecdotal evidence points to the contrary.

VIII. Recommendations

1. Paucity of data should be addressed to enhance the quality of researches in this field. Records of accidents should be documented by the relevant agencies to enhance planning and policy-making.
2. Tri-wheeler can be introduced in most cities and motorcycles phased out over time so as to improve safety and eliminate mortality due to motorcycles thereby improving lives.
3. Tri-wheeler drivers should be properly trained prior to induction as drivers so as to reduce the prevalence of RTA.
4. The four determinants of RTA among tri-wheeler drivers should be printed in fliers and circulated among them to educate them of how to avoid the pitfalls.

IX. Recommendations for Further Studies

1. Severity of the injuries due to RTA by tri-wheelers need to be studied so as to determine the impact on the economy.
2. Research on the information available to tri-wheeler drivers on traffic codes and rules need to be determined to enhance safety.
3. The contribution of the status and functionalities of the tri-wheeled vehicles to RTA need to be determined so as to enhance productivity and reduce the hazards on the roads.

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