PERCEPTIONS AND USE OF CRASH HELMETS AMONG COMMERCIAL MOTORCYCLE RIDERS IN IDO LOCAL GOVERNMENT AREA, OYO STATE NIGERIA

By

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DEDICATION

My profound gratitude goes to God Almighty for giving me the grace to start and complete this study. I dedicate this work to all my family members, most especially my parents, Mr. and Mrs. Abokede and my husband, Mr. Obinna U. Obinna for being there for me.

ABSTRACT

There is an increasing prevalence of head injuries arising from motorcycle accidents in Nigeria. The wearing of crash helmet is aimed at reducing the impact of such injuries. Few studies exist on the perceptions and use of crash helmet among commercial motorcyclists in Nigeria. This study was designed to assess the perceptions and use of crash helmets among commercial motorcyclists in Ido Local Government Area of Oyo State, Nigeria.

A descriptive cross-sectional design was adopted. Ten Focus Group Discussions (FGDs) were conducted. Four hundred commercial motorcyclists were observed while riding in the morning, afternoon and evening at three major locations using an observation check list. Systematic random sampling technique was used to select 500 motorcyclists who were interviewed using a validated semi-structured questionnaire. The FGD data were recorded on audio tapes, transcribed, and analyzed using the thematic approach. Data from the check-list and questionnaires were analyzed using descriptive, Chi-square, t-test and F-test statistics.

Participants' mean age was 28.9±7.1 years. All the participants were males and predominantly of Yoruba ethinicity (93.8%). Of the 400 motorcyclists observed, only 6.8% wore their helmets in the morning, 5.8% in the afternoon and 4.3% in the evening respectively. Many of the participants (67.6%) claimed to own a helmet. About half (49.8%) of the participants within the 25-34 years age group claimed to use helmet. Participants with secondary education claimed to use helmet more (57.5%) than those with non-formal schooling (2.2%), primary (19.3%) and tertiary education (21.1%) ($p>0.05$). The participants' overall mean knowledge score relating to the components of the helmet was 7.1±2.1 out of 12 points. Sixty-seven percent reported they had ever used a helmet. Of these, 17.5% reported that they used it 'sometimes' while 33.4% used it 'always'. Helmet was used by 2.4% only when law enforcement officers patrolled the highway. The top three reasons given for non-use of the helmet were discomfort (46.7%), sight obstruction (17.4%) and perceived lack of protection (16.5%). Of the 162 who had no helmet, 66.7% had no intention of procuring one. The top five complaints for non use of helmet were, sweating (81.2%),

headache and neck pain each (67.4%), vision reduction (48.4%), hearing impairment (64%) and tiredness (45.4%). Slightly more than half (57.4%) were of the opinion that the law which prescribes helmet use should not be enforced for commercial motorcyclists. Overall, 65.4% reported ever having had a motorcycle accident, while 40.4% had at least one motorcycle accident within the year preceding the study. Of these, 13.4% wore crash helmet at the time of the accident while 86.6% did not. Majority of the FGD participants were able to list the main components of a good helmet. However, there was unanimity of opinion among them that helmet was not effective for preventing head injury.

Despite the high level of awareness about the importance of using crash helmet among motorcyclists, the observed use was low. Health education strategies such as training, advocacy and social marketing are needed to promote the use of the crash helmet among motorcyclists.

Key words: Commercial motorcyclists, Crash helmet, Perceptions, Road traffic accidents.

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Damilola Yetunde Abokede

CERTIFICATION

I certify that this study was conducted by Miss Damilola Yetunde ABOKEDE in the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan, Ibadan, Nigeria, under my supervision.

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CHAPTER ONE

INTRODUCTION

Background

Countries experiencing the epidemiological transition involving a decline in mortality and morbidity from infectious diseases tend to witness an increase in non-communicable health problems including those related to life-style and road traffic accidents (Dixey, 1999). Most Road Traffic Accidents (RTA) are unintentional and they are among the factors that result in unintentional injuries. The prevalence of unintentional injuries is on the increase in the developing world (Bradley, Stephens, Harpharm and Cairncross 1992; Zwi, 1993; Murray and Lopez, 1994). Injuries from RTAs are sometimes described as diseases of development (Wintemute, 1985). Road Traffic Injuries (RTI) are major causes of misery and health problems including disability, with the developing countries bearing a disproportionately larger share of the associated burden (Kemp and Sibert, 1997; & Nantulya and Reich, 2002).

In 2002, an estimated 1.2 million people were killed and 50 million were injured in road traffic accidents worldwide. This cost the global community about US$518 billion (Peden, Scurfield and Sleet, 2004). The International Federation of Red Cross and Red Crescent Societies has described the situation as a "worsening global disaster destroying lives and livelihoods, hampering development and leaving millions in greater vulnerability" (Cater and Walker, 1998). It has been stated that without appropriate action RTI would escalate from being the ninth leading contribution to the global burden of diseases in 1990 to being the third by 2020 (Kopits and Cropper, 2003; & Murray and Lopez, 1996). Cases of RTIs ranked as the 11th leading cause of death in the world in 2002, with developing countries bearing a large share of the burden, accounting for 85% of annual deaths and 90% of the disability-adjusted life years (DALYS) lost because of road traffic injury (WHO and World Bank, 2006).

Traumatic brain injury (TBI) which often results from motorcycle accidents is one of the major causes of mortality and neuromotor, cognitive and social disability in the world (Servadei, Begliomini, Gardini, Giustinin, Taggi and Kraus, 2003). Statistics from India show that head injury is the sixth commonest cause of death (Ganapathy, 2001). Reports from Asia, The South Pacific, Africa, Europe, Italy, and North America have shown the immense impact

of motorcycle accidents on neurotrauma and associated disability (Sood, 1988; Wang, P'eng and Yang 1995; Begg, Langley and Reeder, 1994; Dall, 1983; Falope, 1991; Bjonsteg, Bylund, and Lekander, 1985; Plasencia, Borrell, and Anto, 1995; Taggi, 1988; Sosin, Sacks & Holmgren, 1990; & Shankar, Ramzy and Soderstorm, 1992). Many risk factors for accidents have been identified; these include alcohol use, over speeding and vehicle design, but there has been no reported success in reducing motorcycle related accident rates (Holubowyze and McLean, 1995).

The use of motorcycles leads to many more fatal road crashes than other vehicles world wide (Bergman, Rivera and Richards, 1990). Nigeria, has witnessed at least a five-fold rise in recorded traffic-related fatalities within the last three decades (Asogwa, 1999). The increasing use of motorcycles particularly for commercial commuter service is a contributing factor in this regard (Asogwa, 1990, 1999; Odero, Garner and Zwi, 1997; Adesunkanmi, Oginni, Oyelami and Badru, 2000; Oluwadiya, 2001). Motorcyclists and their passengers are prone to poor visibility when they are moving at high speed and under inclement weather. This situation, coupled with non-use of safety helmet or other protective devices puts riders and passengers at risk of RTI. Motorcyclists and their passengers as well as pedestrians are at far greater risk than drivers and passengers of cars and large motor vehicles. Road safety-experts thus refer to them as 'vulnerable road users' (WHO, 2004).

The advocated primary preventive measures for reducing the severity of head injuries among motorcyclists and their passengers is the use of the crash helmet (Ganapathy, 2001). According to Ganapathy (2001), this safety measure provides additional protection to the head, and reduces the severity of injury to the brain. In Nigeria sporadic futile efforts have been made to make motorcyclists adopt the use of the crash helmet. As at today, not much is known about the use of crash helmet among motorcyclist, in spite of the anecdotal reports which have revealed that the prevalence of RTA involving commercial motorcyclists is on the increase at an astronomical rate.

Perceptions are among the predisposing factors (Green and Kreuter, 1991) which influence the adoption or rejection of innovations. Motorcyclists' perceptions relating to the crash helmet have not been well documented. Information relating to the prevalence of helmet use and perception of the piece of technology is needed for the design of appropriate educational interventions. This study therefore focused on the perceptions and pattern of use of the crash

helmet among commercial motorcyclists in Ido Local Government Area (LGA) which is one of the six peri-urban LGAs in Ibadan land.

Statement of the Problem

There is an upsurge in the use of motorcycles as a form of public transport in both urban and rural areas of Nigeria. Many factors are responsible for this. They include unemployment, break down in transport system, and economic depression. Commercial motorcyclists are often described by some people as constituting a menace to safe driving on Nigerian roads and are harbingers of most road accidents in the country. Motorcycle accidents account for the highest proportion of accidents in Nigeria, they are said to account for 54% of RTA in Nigeria (The Punch, 2007). Male riders aged 15-44 years are mostly affected by motorcycle accidents (Worley, 2006). The RTA-related morbidity and mortality involving this segment of the population is an economic loss. This is so because the vulnerable population constitutes the most productive segment of the community (Worley, 2006)

The use of the crash helmet is very beneficial. The crash helmet, if well used, is known to reduce or mitigate the physical impact of accidents among motorcyclists. Many prospectively conducted studies on motorcycle injuries have shown high cost of treatment, high incidence of head and cervical injuries as well as mortality in patients who had no crash helmet on when accidents occurred (Ayorinde, Solagberu, Adekanya and Ofoegbe 2005). Studies on motorcycle injuries in Nigeria have revealed non-use of protective helmet by all injured accident victims (Ayorinde, et al, 2005; Amoran, Owoaje, Giwa and Gbolahan, 2005). Casual observations have revealed that few commercial motorcyclists in Ido LGA use crash helmet. There is dearth of information about commercial motorcyclist perceptions and use of crash helmet in Ido LGA where commercial motorcycles constitute the major means of transportation. This study therefore focused on the determination of the perceptions and use of crash helmets among commercial motorcyclists in Ido LGA.

Justification for the study

People's perceptions are known to influence their health related behaviours. They are important predisposing factors (Green and Kreuter, 1991). Therefore knowledge of commercial motorcyclists' perceptions relating to the use of crash helmet will constitute

reliable data bank needed to institute appropriate health education interventions aimed at promoting universal adoption of helmet use among commercial motorcyclists and their passengers in the study area and elsewhere in Nigeria where use of motorcycle for transport is common. The results are useful for the formulation of appropriate policies regarding safe commercial motorcycling.

Research Questions

A number of research questions were framed to guide the design and conduct of this study they were as follow:

1. How knowledgeable are commercial motorcyclists about the crash helmet?
2. What are the perceptions of commercial motorcyclists about the use of helmet?
3. What is the pattern of use of the crash helmet among commercial motorcyclists?
4. What factors influence the use/nonuse of crash helmet among commercial motorcyclists?
5. What is the prevalence of accidents and injuries among commercial motorcyclists in Ido LGA?

Broad Objective

The broad objective of the study was to determine commercial motorcyclists' perceptions and use of the crash helmet in Ido LGA, Oyo State.

Specific Objectives: The specific objectives of the study were to:

1. Assess the knowledge of commercial motorcyclists about the crash helmet.
2. Document the perceptions of commercial motorcyclists relating to the use of crash helmet in terms of associated beliefs, opinions and attitudes.
3. Determine the pattern of use of the crash helmet among commercial motorcyclists.
4. Identify the factors which influence the use/non use of the crash helmet among commercial motorcyclists.
5. Determine the prevalence of accidents and the injuries sustained among commercial motorcyclists in Ido LGA.

CHAPTER TWO

LITERATURE REVIEW

The literature review is organized under the following sub-headings or sections:

i. Motorcycle as a means of transportation in Nigeria

ii. Risk and burden associated with the commercial motorcycling business

iii. Factors that Influence Use of the Crash Helmet

iv. Pattern of Use of Crash Helmet (ever used, currently using and intending to use)

v. The Crash Helmet and Rationale for Its Use

The literature review ends with the review and application of the theoretical frameworks adopted to guide the design of the study.

2.0 Motorcycle As a Means of Transportation in Nigeria

The motorcycle is one of the major means of transportation in Nigeria today and, by far, the most common form of informal transport system in the country. Its' use cuts across the length and breathe of Nigeria. This means of transportation is called by many different names in many parts of Nigeria. '*Okada*' is the most popular name and it named after Okada Town near Benin, Edo State where motorcycles are used for shuttle services between Benin City and Okada village. The shuttle services became common following the establishment of the Wonderland Recreation Centre and the World Lawn Tennis Tournaments in the community. In Ido LGA where this research was carried out, a commercial motorcycle is called '*Okada*'. According to Kanayo, (2008), commercial motorcycle riders are known by different names in Nigeria. In Calabar and Uyo, they are fondly called '*Akanke*', while in Enugu and Aba they are called '*Ina-aga*'. They are called '*Achaba*' in Kano, Sokoto, Yola and Maiduguri, while it is called '*Okada*' in Lagos, Abuja and Asaba (Kanayo, 2008). The popularity and widespread acceptance of motorcycle has rapidly risen in recent years. In Nigeria, motorcycles have for a long time been part of private means of transport available to individuals or households to meet their traveling needs (Adesanya, 1998). The use of motorcycles for commercial purposes began sometimes in the mid 1970's, and its widespread use for this purpose is increasing. The motorcycle is regarded as an indispensable means of transportation in some areas, even in urban settings. To the fast businessman, it is most reliable means of avoiding the traffic 'jam' and a way of enjoying the thrill of a motorcycle ride by the adventurous. The

distribution of motorcycle in the total number of trips made in most of the urban centres in the world is quiet substantial, particularly for low income countries (Gbadamosi, 2006). Rietvied (2001) identified the following as major factors that have attracted the use of motorcycle as means of public transport in many locations:

- Provision of poor door-to-door transportation
- Biking and walking infrastructure have usually has a very high spatial penetration
- Cycling does not need waiting at public transport stops
- Cycling has encouraged environmental performance
- Motorcycles are cheap transport modes
- They complement the concept of multimodal transport chain

Globally, there is an upward trend in the number and use of motorcycles both for transport and recreational purposes (WHO, 2006). Indeed, most of the growth in the number of vehicles on the world's road is as a result of an increasing use of motorcycles. In the United States of America, the number of registered motorcycle increased from 600,000 units in 1961 to 3.3 million in 1971, a 450% increase within a decade (Adegbehingbe, Oluwadiya and Adegbehingbe, 2004). In India, 69% of the total number of motor vehicles consists of motorcycles, considerable higher than in high-income countries (Mohan, 2002). Asian countries have experienced a considerable rise in the number of motorcycles on their roads (WHO, 2006). This pattern was also recognized in Nigeria. Many towns and cities in Nigeria are experiencing similar surge in the use and demand for commercial motorcycle as a means of public transportation. Archibong, Ikpi, Ikpeme, Asuquo, Umoh, and Akpan, (2003) confirmed that, motorcycles popularly known in Nigeria as "Okada" have become the popular means of intra-city commercial transportation in almost every community in Nigeria. According to Adegbehingbe et al (2004) the number of motorcycle increased from 144,480 to 284,124 between 1976 and 1981, an increase of almost 200% within 5 years.

Available record from the Federal Road Safety Commission (FRSC), the agency responsible for the issuance of plate numbers and registration of motor vehicles in Nigeria shows that 1,016, 514 (One million, Sixteen thousand, Five hundred and Fourteen) motorcycles were registered in Nigeria from year 2001 to 2004. This gives an annual average of 169,419 motorcycle registration in the country (Gbadamosi, 2006).

The appendix I reflects a significant variation in the magnitude of motorcycle registration among the states of the federation including the Federal Capital. Anambra state recorded the highest level with 137,584 (13.5%) followed by Lagos with 101,373 (9.9%) and Kano with 74,508 (7.3%). The states with lower registration figures are Abia 10929 (1%), Kogi 10739 (1 %), Kwara 11192 (1%), Oyo 29566 (0.9%), Balyesa 3820 (0.3%) and Ebonyi 3812 (0.3%). It is important to note that the registration of motorcycles in various states does not reflect the actual number of motorcycles in operation but to a large extent could serve as a yardstick for arriving at the level of motorcycles in operation. This is because some motorcycles operating in cities are not registered officially. The pattern of registration of motorcycle operation reflects the magnitude of urbanization at various locations in the country. States with high level of motorcycle registration coincides with those with high urban population.

Gbadamosi (2006) noted that the differences in the level of motorcycle operation in the country could also be explained with variation in the magnitude of urban transportation problems coupled with the level of demand. Lower registration of motorcycle operators in some states can be explained by the presence of effective private public buses and taxi operation (Gbadamosi, 2006). Areas in the country which have continued to witness increase in the level of motorcycle operation have also had to contend with its attendant problems in terms of high risk exposure of urban commuters to traffic accidents due to the excesses of motorcycle riders. The situation is worsened by the uncoordinated nature of their operation and the operators' flagrant disregard for traffic rules. Their dangerous operational attitude has increased the unenviable record of road traffic accident fatalities recoded in Nigeria (Gbadamosi, 2006). The rapid growth in the use of motorcycles in many low and middle-income countries is being accompanied by a considerable increase in the number of head injuries and fatalities that will continue to increase if the trend is unchecked (WHO, 2006).

According to Cervero (2005), commercial motorcycle riding has been described as "a unique experience" by regular passengers and tourists. In the major cities like Lagos, where traffic congestions leading to inevitably delays represent an ever-present threat to businessmen, government workers, students of various schools and colleges (Gbadamosi (2006)). Gbadamosi (2006) noted that the contribution of motorcycle to total kilometer travelled has increased over the years in Nigeria. By coincidence, the level of dangers associated with its usage is also quite enormous judging from the wave of losses suffered as a result of accidents

arising from the conflict between motor vehicles and motorcycles in most urban centres in the country.

A study carried out by Ogunsanya and Galtima (1993) in Yola, a medium-sized city in the north-eastern state of Adamawa, Nigeria, provides additional insight into the nature of the commercial motorcycle business. Their study showed that about 88% of the commercial motorcycle riders were aged between 18 and 30 years and only 47% have formal education of any form. The 1993 survey by Ogunsanya and Galtima also elicited information from 106 motorcycle users. Majority (65%) of the customers were males. Fifty-seven percent were young adults between 18 and 30 years of age. Large proportions (59%) were unemployed while slightly below average (45%) were in the low-to-moderate income levels. Commercial motorcycling was reported to be valued mainly because they were fast and readily available. About two- third of respondent noted that customers disliked them because they were considered to be unsafe and because they were expensive (Ogunsanya and Galtima, 1993).

A survey which examined the perceptions of risk associated with the use of motorcycle as public transport among commuters in three cities (Ado-Ekiti, Ile-Ife and Ondo) of the southern western Nigeria revealed that 40% of the respondents felt that commuting within the cities on motorcycle is unsafe (Olawole, Ajala and Aloba, 2010).

2.1 Risks and Burden Associated with the Commercial Motorcycling Business

Road Traffic Injuries (RTIs) are major public health problems and they constitute the leading cause of death and injury globally (Worley, 2006). Everyday about 3000 people die and 30,000 people are seriously injured on the world's roads (Murray & Lopez, 1991). Since 1972, the overseas, unit of the United Kingdom Transport and Road Research Laboratory (TRRL) has been engaged in a programme of research on road accident in the developing countries. Results indicate that fatality rates are higher in comparison with those in developed countries (Ameratunga, Hijar, and Norton, 2006). Many developing countries have experienced a worsening situation, particularly over the last five years.

Motorcycles have a higher rate of fatal accidents than motor vehicles (National Highway Traffic Safety Administration (NHTSA), (2007). United States Department of Transportation data for 2005 from the Fatality Analysis Reporting System show that for passenger cars, 18.62 fatal accidents occur per 100,000 registered vehicles. For motorcycles this figure was

higher at 75.19 fatal accidents per 100,000 registered vehicles (four times higher than for cars) (United States Department of Transportation, 2006). The same data show that 1.56 fatalities occur per 100 million miles travelled for passenger cars, whereas for motorcycles the figure was 43.47 (28 times higher than for cars). Motorcycles accident rates have increased significantly since the end of the 1990s, while the rates have reduced for passenger cars. On average these risks are much higher for motorcycle than for vehicle travel. In 2006, motorcyclists are about 35 times more likely to die in a traffic crash than motor vehicle drivers and eight times more likely to be injured (NHTSA, 2007). According to WHO (2004), in other low-income and middle-income countries, a lack of high quality road safety data means that precise levels of motorcycle rider fatalities are still not known.

Statistics associated with motorcycle injuries are getting worse. The National Highway Traffic Safety Administration's 2002 report on motorcycles shows that the number of fatal motorcycle accidents was on the rise. In recent years both fatality and injury rates have steadily increased. In 2002, 3244 motorcyclists were killed and an additional 65,000 were injured in motorcycle accidents in the United States – 1 percent more than the 3,197 motorcyclist fatalities in 2001 and 7 percent more than the 60,000 motorcyclists injuries reported in 2001 (NHTSA, 2004). Fatality rate for motorcyclists dramatically increased from 1992-2002 in the United States (Cahn and LLP, 2010). Preusser, Williams and Ulmer (1995) observed that there were 2,074 RTA to motorcycle drivers in the United States during 1992. In most high-income countries, motorcycle fatalities typically comprise around 5% to 18% of the overall traffic fatalities (Mohan, 2002). This proportion reflects the combined effects of several important factors that include the relatively low ownership and use of motorcycle in many developed countries, and the relatively high risk of these motorcycles being involved in fatal accidents. This risk is much higher for motorcycle than for vehicle travel (NHTSA, 2004).

Studies in Asia suggest that motorcyclists have high rates of injury in countries such as Korea, China, and Thailand, accounting for a high proportion of seriously injured road users (Dandona and Mishra, 2004 & Zhang, Norton, Tang, Lo, Zhuo, and Geng 2005). Motorcycle related deaths in China are 16 per 1,000,000 annually (Hyder and Peden, 2003). In Colorado, USA Gabella, Reiner, Hoffman, Cook and Stallones (1995) in a case control study noted that motorcycles were involved in 64% of all traffic injuries, comprising 33% of trauma patients presenting to emergency departments. In India, 27% of road deaths were among users of

motorcycles (Mohan, 2002; Suriyawongpaisal, and Kanchanusur, 2003 & Umar, 2002) Hospital records in Thailand revealed that 75-80% of RTI and between 70-90% of road traffic mortality were among motorcyclists. Similarly, motorcycle accidents account for 60% of RTI in Malaysia (Mohan, 2002; Suriyawongpaisal, and Kanchanusur, 2003 & Umar, 2002). In China, motorcycle ownership between 1987 and 2001 grew rapidly from 23% to 63%, with a corresponding increase in the proportion of traffic fatalities sustained by motorcyclists rising from 7.5% to 19%, with a population based death rate of 16 per million per year from motorcycle injuries (Zhang, Norton, Tang, Lo, Zhuo, and Geng 2005).

In many low-income and middle-income countries, where motorcycles and bicycles are increasingly becoming a common means of transportation, vulnerable road users make up a large proportion of those injured or killed on the roads (Nantulya & Reich, 2002; WHO, 2004). It is to be noted that vulnerable road users consist of pedestrians, cyclists, moped and motorcycle riders (Worley, 2006). Substantially published work shows the tendency of some road-user groups, particularly pedestrians and motorcyclists to be vastly represented among accident victims at a global level (Nantulya & Reich, 2003) and this group are at high risk of crash-related disability (Mayou & Bryant, 2003).

In Nigeria, like most developing countries, mortality and morbidity following road accidents have been on the increase (Solagberu, Ouze, Ofoegbu, Adekanye and Odelowo, 2000). In a study conducted at the accident and emergency unit of Obafemi Awolowo University Teaching Hospital, Ile-Ife, Osun State, Nigeria on motorcycle associated ocular injuries, RTIs constitute 31.6% of all accident and emergency attendance and out of these, 12.5% were injured patients of motorcycle crashes (Adegbehingbe, Oluwadiya and Adegbeyingbe , 2004). Adegbehingbe et al (2004) also noted that the proportion of RTI victims made up of motorcycle crashes published in literature ranges from 9.4% to 35%. In another study carried out by Umebese and Okukpo (2001) on motorcycle accidents in Benin, motorcycle injuries constituted 14.4% of the total number of RTAs. Majority of the injuries sustained in motorcycle accidents involved the extremities (67%), especially the lower limbs (Asogwa, 1999). Children and young people within ages 5 and 25 are highly vulnerable to RTAs (The Punch, 2007). Injuries sustained by the rider or passenger of a motorcycle as a result of accidents are the second most common types of morbidity and mortality in RTI (Adegbehingbe et al, 2004). Pedestrians could also sustain such injuries when they are crashed into by motorcycles (Adegbehingbe et al. 2004).

In a study conducted in Osun State Nigeria, higher rate of road traffic injuries (RTI) was observed in the study when compared with what was documented from the same centre about a decade earlier (Adesunkanmi, Oginni, Oyelami and Badru, 2000). Most of the reported injuries were sustained on busy intercity and intra-city roads where the motorcycles share the risks and hazard of busy traffic with motor vehicles. In a two year prospective study of injuries sustained from motor-cycle accidents (MCA) conducted at the University of Ilorin Teaching Hospital, MCA patients constituted 10.3% of 715 RTA patients with a male: female ratio of 5.7:1 (Odelowo, 1994). The predominance of males in road-injury statistics is a common finding globally (Peden, Scurfield and Sleet, 2004; Nantulya & Reich, 2003). This results in 70% of the potential years of life lost in many countries (Krug, Sharma and Lozano, 2000, Hyder, Amarch, Garg, and Labinjo, 2005).

Oginni, Ugboko, Ogundipe and Adegbehingbe (2006), in a study on motorcycle-related maxillofacial injuries among Nigerian intra-city road users, reported gender differentials in risk-taking, exposure to risk, economic opportunities and types of employment. Most importantly, these data highlighted the effect of road crashes on people in their prime years of productivity, magnifying economic consequences for the victims, their families and the communities. In a review of epidemiological studies of RTAs in developing countries, the most common age range affected was between 15-40 years, and a predominance of male population. The proportion of males in RTAs causality records was between 65-99%, with the ratio of male to females generally exceeding 2:1 (Odero, Garner and Zwi, 1997). The same study reported over representation of adolescents and youths in RTA causality records (Odero, et al, 1997). Odamo, (1995) in a study conducted in Igbobi Orthopedic Hospital Lagos, Nigeria on RTAs involving commercial motorcyclist, the proportion of males among 139 cases was 70.5% in 1991, with a subsequent annual statistics showing a similar pattern: 700% males of 337 victims in 1992, 70.6% males of 412 victims in 1993, and 70.8% males of 96 patients in 1994 (Odamo, 1995). Oluwadiya, Oginni, Olasinde, and Fadiora (2004) also reported male: female ratio of accident victims to be 2.8:1 in a study conducted in 2001 on pattern of limb injuries resulting from motorcycle accidents in Osun State, Nigeria.

A 1998 study at the Obafemi Awolowo Teaching Hospital, Ile-Ife, Nigeria, showed that injuries to limb occurred in 79.3% of patients who reported at the emergency department of that hospital. This is consistent with the rising trend of RTA in African communities. It has

been noted that motorcycle injuries constitute main contributor to the high incidence of an increase in RTA in developing counties (Nantulya and Reich, 2002)

The most critical injuries to motorcyclists in crashes are head injuries, followed by upper torso and leg injuries (Haworth and Schulze, 1996). Many studies have shown that head injury is a leading cause of death following road accidents (Bergman, Rivera, and Richards, 1990; Kemp and Sibert, 1997; Adesunkanmi et al, 2000, Nantulya and Reich, 2002, WHO, 2004; Loganathan, 2009, & Ehline, 2009). In European countries, head injuries contribute to around 75% of the deaths among motorcycle riders, while in some low-income and middle-income countries head injuries are estimated to account for up to 88% of such fatalities (Umar, 2002). The social costs of head injuries for survivors, their families and communities are high, because they frequently require specialized or long term care. Several studies consider head injury as the commonest cause of fatality in RTA victims (Santikarn, Santijiarakul and Rujivipat 2002; Adegbehingbe et al, 2004; NHTSA, 2006; Levin and Perconti, 2009).

Head injuries result in higher medical costs than any other type of injury; the injuries exert a high toll on a country's health care costs and its economy (Blincoe, 2002). A prospective study conducted by the National Institute of Mental Health and Neurosciences, in Bangalore, India revealed that the severity of head injury, death due to head injury, incidence of skull fracture and occurrence of post-traumatic epilepsy were higher among those who were not using helmet as compared to those with helmets. Consequently the duration of hospitalization and the economic cost of managing head injuries were more for non-helmet wearing group (Ganapathy, 2001). Studies have shown that in most countries, motorcycle riders tend to sustain multiple injuries to the head, chest and legs. Head injuries contribute to most cases of deaths, while leg injuries contribute to most cases of long term disability (Santikarn et al, 2002). The facilities and the intervention necessary to improve survival are very expensive and often unavailable especially in resource-poor countries; hence prevention is the most desirable or effective intervention (Adesunkanmi et al, 2000).

Various factors are associated with accidents including alcohol and high speed. Drunk riders are usually found to be speeding, less likely to wear a helmet, and more frequently to be involved in single motorcycle crashes than non-drinkers (Peck-Asa and Kraus, 1996). It is important to mention that alcohol use has remained a significant factor in motorcycle

accidents. According to Peek-Asa and Kraus (1996) motorcyclists have the highest frequency of alcohol use among all road users. Holubowycz and McLean (1995) have revealed that 25% of motorcycle riders with blood alcohol concentration of at least 150mg/dl were probably experiencing alcohol-related problems prior to the accident, compared with only a very small proportion of those with lower blood alcohol concentration.

According to Adegbehingbe, (2003) motorcycle riders apparently lack public health education and the application of safety measures, thus predisposing them to having serious and fatal injuries in many instances. Illiteracy, the lack of basic knowledge of traffic rules and regulations, the intensity of traffic mix and lack of separation of motorcycle riders from fast moving motorized vehicles heighten the risk of injury for commercial motorcycle riders.

2.2 Factors that Influence Use of the Crash Helmet

Laws making helmet use compulsory is an important factor that promotes use of crash helmets, especially in low-income and middle-income countries where helmet wearing rates are low and where there are large numbers of users of motorcycles (WHO,2006). There are many studies that have evaluated the impact of motorcycle helmet laws on helmet wearing rates, head injury and death. When mandatory helmet laws were enforced, helmet-wearing rates have been found to increase to 90% or higher (Servadei, Begliomini, Gardini, Taggi and Kraus, 2003). In 1989, Oregon, Texas, California, Maryland, Washington and Nebraska in the United States of America (USA) enacted helmet use laws that govern all motorcycle occupants. After the first year of the enactment of the universal helmet law the following reduction in motorcycle fatalities occurred in these states: Oregon33%, Nebraska-32%, Texas-23%, Washington State-15%, California-37% and Maryland-20% (NHSTA, 2006). When such laws were repealed, wearing rates fall back to less than 60% (Turner & Hagelin, 2004). In 1997 when the helmet laws changed, limiting coverage to those under the age of 21 in the six states, (Texas, Arkansas, Louisiana, Florida, Kentucky and Pennsylvania) helmet use decreased (NHSTA, 2006).

Studies from high-income countries suggest that mandatory helmet wearing results in 25% reduction in head injuries in cyclists (Elvik & Vaa, 2004). A number of studies in Texas, USA have shown that introducing comprehensive motorcycle helmet legislation is associated with a decrease in injuries and fatalities. In one of these studies was a decrease in injury rates

of between 9-11% (WHO, 2006), while another showed more striking reductions of 52-59% in head injuries and fatalities (Preusser, Hedlund and Ulmer, 2000). Conversely, repeal of helmet legislation in Florida led to increases between 17.2%-20.5% in both fatalities and fatality rates (Muller, 2004 & Ulmer and Preusser, 2003a). In 2002, when Florida repealed their all-rider motorcycle helmet law, there were 40% more motorcyclists admitted to hospitals for treatment in 30 months immediately after the helmet law change (NHTSA, 2006). Deaths increased by 24% above what was expected from the increased registrations after the repeal of the law (NHTSA, 2006). Fatalities in Florida per 10,000 registered motorcycle increased by 21 percent compared to 13 percent nationally for the two years before and after the law changed (75 percent higher than the national rate). Deaths of motorcycle riders under the age of 21 who were not wearing helmet increased by 18 percent, even though the law still applies to them (NHTSA, 2006).

Consequently, helmet use decreased following the changes in helmet laws in Arkansas and Texas. Fatalities in these two states increased by 21 percent and 31 percent compared with the previous year when the universal helmet law was in place (NHTSA, 2006). In 1998 universal helmet law repeal in Kentucky and 1999 repeal in Louisiana produced effects similar to Arkansas and Texas. Observed helmet use dropped from nearly full compliance under the universal law to about 50 percent in Kentucky and over 100 percent in Louisiana. Injuries also increased substantially in both States (48% in Louisiana and 34% in Kentucky) (NHTSA, 2004). The rate of fatalities and injuries per registered motorcycle increased in both states following the helmet law repeals (Ulmer et al, 2003a). In Italy, a study conducted to determine the effectiveness of helmet law on traumatic brain injuries confirmed that helmet use reduces hospital admissions from head injuries by 28%-37% (La Torre, Bertazzani, Zotta, van Beeck and Ricciardi, 2002). Similar results were also published for Taiwan (Plasencia, Borrel and Anto, 1995).

Data from Thailand indicated that head injuries decreased by 21% following legislation and enforcement of helmet use by motorcyclists (Ichikawa et al, 2003). The introduction of compulsory wearing of motorcycle helmets in Australia in the 1960's resulted in a substantial decline in serious head injuries sustained by motorcyclists (Nairn, 1993). Observational studies have shown that when helmet use is voluntary for all or most motorcyclists, use rates range anywhere from about 30 percent to 60 percent but are generally 40-50 percent when all motorcyclists are required by law to wear helmets, use rates are typically close to 100 percent

(Bowman & Rounds, 1988). The result of another study that investigated the effectiveness of motorcycle helmet legislation introduced in Anambra State, Nigeria in 1976 - 1979 indicated that there was a sharp increase in motorcyclist injuries and fatalities following the abrogation of the law (Asogwa, 1999). There was however no control comparison to confirm the rather surprising results (Asogwa, 1999). This was attributed to the large proportion of riders and percentages that wore the helmet incorrectly i.e either loosely secured or not secured at all. Asogwa argues that the helmets could have given riders a false sense of security, leading to greater risk taking.

International recommendations provide strong support for countries to implement mandatory helmet use. Some countries may use the international policy environment and international law as a means of providing the necessary impetus for developing national policies on helmet use. International agreements can also be used by civil societies to advocate for helmet law reform in their countries. The world report on road traffic injury prevention recommends that all countries, regardless of their level of income should follow this good practice of setting and enforcing laws requiring riders of motorized two-wheelers to wear helmets (WHO, 2004).

In 2004, the World Health Assembly adopted Resolution WHA 57.10, which recommends that member states especially developing countries, to legislate and strictly enforce the wearing of crash helmets by motorcyclists (Resolution of the World Health Assembly, 2004). The World Health Assembly resolution was an international agreement that can be used by those wishing to influence policy on helmet use as a basis for obtaining political support for this measure. In particular, such a resolution has a direct relevance for the ministries of health, who by adopting WHA resolutions undertake to support the principles enshrined in them. According to the United Nations General Assembly Resolution A60/5 (2005)

> "Invites Member State to implement the recommendations of the World report on road traffic injury prevention including those related to the five main risk factors, namely the non-use of safety belts and child restraints, the non-use of helmets, drinking and driving, inappropriate and excessive speed, as well as the lack of appropriate infrastructure"

There are various reasons for non-use of helmets that have been documented from studies conducted in different countries. Motorcyclists feel that they are less likely to have a crash

when traveling short distances and they therefore do not wear a helmet for such trips (WHO, 2006). Helmets are also considered hot and uncomfortable (WHO, 2006). Findings from a study conducted in California revealed that 60% of the motorcyclists were not wearing crash helmet at the time of their accident, 26% said they did not wear helmet because they were uncomfortable and not convenient, and 53% had no expectation of crash involvements. In a study conducted in Rome, Italy on helmet use among adolescent motorcycle and moped riders, among those who reported sometimes or never using helmets, the most frequent reasons for none use of helmet were that they were uncomfortable while wearing it, helmet was not available and wearing of helmet was also considered useless (CDC, 1996). In some countries where there is a strong social influence of peers and parents on helmet use among adolescents, use of helmets may be influenced by adolescents' beliefs about whether or not their fathers wear a helmet while riding a motorcycle (WHO, 2006).

Limited best practices based on knowledge coupled with deteriorating standard of education and not only cost and warm climate may be the contributing factors resulting in the decline of helmet use in Nigeria (Ime, 2006). Also cultural or perhaps religious reasons may explain the use of helmet. A typical Northerner in Nigeria may decline helmet use since it will compromise his wearing of the 'Ulla'- traditional hat (Ime, 2006). Some noted that helmets cannot be worn over some traditional or religious head gear for examples, turbans worn by Sikhs while some in parts of Africa it is said to mess up one's hair (WHO, 2006).

Elsewhere, the use of helmet is seen as a colonial imposition that should be resisted similar to the phobia for seat belts use in vehicles (Ime, 2006). The ludicrous attitude of both commercial motorcycle riders and passengers towards the helmet is another important inhibiting factor to helmet use. Even when the helmet is available, there is no attempt to use it as prescribed. According to Abati (2009) most commercial motorcycle riders and passengers wear the helmet on top of a cap, headgear or a turban. The excuse is that it is risky to allow a helmet that has touched another man's head to touch ones head. Abati (2009) noted that in our cultures, there is a superstitious belief that the head must be protected, because it is the home of a person's destiny known as *ori' or 'ayanmo' among the Yorubas and 'chi' Igbos*. The meaning of these anthropological concepts is more spiritual than physical. Many Nigerians insist that sharing helmet with another person could result in the transfer of bad luck, while some passengers of commercial motorcycle also complained that helmet could become a ready weapon for kidnappers (Abati, 2009). Passengers of commercial motorcycle

riders may also be reluctant to wear the helmets provided for them by the riders due to concern over their cleanliness or infections that might be transmitted through helmet use for example, head lice (Abati, 2009).

There are claims that helmets increase risk of head injuries and reduce peripheral vision and hearing (Insurance Institute for Highway Safety, 2007). Although Goldstein's (1986) study conducted in Los Angeles is often cited by helmet opponents as evidence that helmet causes neck injuries, allegedly by adding to head mass in accident. However, findings from several studies have refuted Goldstein's finding. Studies have shown that helmets conforming to standards and correctly worn do not cause neck or spinal cord injuries (WHO, 2006). A study reported in the Annals of Emergency Medicine which analyzed 1,153 motorcycle crashes in four midwestern states – Illinosis, Iowa, Nebraska and Wisconsin showed that helmet reduces head injuries without an increased occurrence of spinal injuries in motorcycle trauma (Orsay, Muelleman, Peterson, Jurisic, Kosasih and Levy 1994).

Though research findings have shown that helmets do not affect peripheral vision or contribute to crashes, some riders have a strong belief that the technology impairs hearing and sight. Some studies have indicated that properly fitted helmets can actually improved the ability to hear by reducing the noise of the wind (WHO, 2006). A study was conducted by NTHSA to assess the effect of wearing a helmet on the ability of motorcycle riders to virtually detect the presence of vehicle in adjacent lanes before changing lanes and to detect traffic sounds when operating at normal highway speeds. The results from this study indicated that wearing a helmet does not restrict the ability to hear auditory signals or the likelihood of seeing a vehicle in an adjacent lane prior to changing lanes (NTHSA, 1996).

Regarding the claims that helmet obstruct vision, studies have shown that full-coverage helmet provide minor restriction in horizontal peripheral vision (Insurance Institute for Highway Safety, 2007). According to Mcknight and Mcknight (1994) wearing helmets restrict neither the ability to hear horns signals nor the likelihood of seeing a vehicle in an adjacent lane prior to initiating a lane change. There were no differences in hearing thresholds under three helmet conditions: no helmet, partial coverage and full coverage. The noise generated by a motorcycle is so loud that any reduction in hearing capability that may result from wearing a helmet is inconsequential. Any sound loud enough to be heard above the engine can be heard when wearing a helmet (McKnight and Mcknight, 1994).

In a study that assessed the impact of the helmet law and traumatic brain injury in Italy, there was a 66% decrease in admissions of traumatic brain injury for motorcycle and a 31% decrease in traumatic brain injury admissions to neurosurgical hospital units when the law was enacted (Servadei, et al, 2003). Although evidence has shown that there is sharp increase in deaths following head injuries when there is repeal of laws mandating motorcycle riders to wear helmets, some riders still believe that fatality rates are lower in places without helmets laws.

2.3 Pattern of Use of Crash Helmet (ever used, currently using and intending to use)

The National Institute of Health, Rome, Italy, in 1994 assessed compliance with law and factors associated with helmet use among adolescents in the metropolitan area. Findings from the study indicated that helmet use was low. 50% of the respondents reported helmet use, either sometimes or always (CDC, 1994). Similar study that investigated the use of, attitudes towards, and adherence to motorcycle helmets in a group of adolescents in Italy revealed that frequency of self-reported helmet use was 34.7%. Routine helmet use was higher in adolescents from households in which at least one family member wore a helmet, and in those who agreed that helmet use should be mandatory (Bianco, Traini, Santoro, Angelillo, 2005).

Generally, helmet use in developing countries is low (Odelowo, 1994 and Oluwadiya, 2004). According to Li, Li, Cai, Zhang and Lo (2008) motorcycle helmet wearing rates remain low in smaller cities in developing countries. A study that examined the knowledge, attitudes, and behavior of motorcyclists towards helmet use carried out in China, a large proportion of both motorcyclists and passengers (34% and 71%, respectively) did not wear a helmet, or did not have their helmet fastened (34% and 14%). Proper helmet usage rates were lower among male riders and younger people. Furthermore, proper helmet usage rates were lower among riders on secondary streets and those riding during the evenings and weekends (Li et al, 2008).

Observations of motorcycle helmet use in Indonesia, a developing country with helmet law, revealed high prevalence of helmet use. Eighty-nine percent of the motorcyclists wore helmet, although only 55% wore their helmet correctly using the chin strap buckled. The use of helmet was least at night and when no law enforcement agents were on patrol (Conrad,

Bradshaw, Lamsudin Kasniyah & Costello, 1996). In Pakistan, results from a study of frequency of helmet use among motorcycle, show that helmet use was (56.6%). This is as a result of enforcement by the traffic police who we (Mumtaz, Khan, Khan, Ahmed, Mahmood, 2007).

A hospital based study conducted in two teaching hospitals in Southwest Nigeria revealed that none of the 254 motorcycle crash victims admitted to the hospitals were wearing a helmet at the time of their collision (Kehinde, Olasinde, and Oginni, 2006). In a similar study that examined the peculiarities of motorcycle crash site characteristics in three tertiary hospitals in Southwest Nigeria, 95.6% of the motorcycle RTI patient reported none use of crash helmet among respondents (Oluwadiya, Kolawole, Adegbehinghe, Olasinde, Agodirin, Uwaezuoke, 2008).

According to Solagberu, Ofoegbu, Nasir, Ogundipe, Adekaye, Abdur-Rahman (2006), none of the motorcyclist wore helmet at the time of the injury in a 12 months prospective stud y of patients with motorcycle injuries conducted at University of Ilorin Teaching Hospital. The result revealed non-compliance by motorcyclists to helmet laws and reluctant enforcement of the law by appropriate authority. Amoran et al, (2005-2006) reported that practice of road safety measures was low in a rural Nigerian community and none of the respondent used any protective helmet in a cross-sectional study of commercial motorcyclists in Igboora, Nigeria.

2.4 The Crash Helmet and Rationale for Its Use

Generally, two approaches have been proposed to reduce injuries to motorcyclists in crashes. These approaches are, putting protection on the rider's body (mainly helmets and protective clothing) and mounting protection systems on the motorcycle (Haworth and Schulze, 1996). Evidence for the effectiveness of the first approach is much more unanimous. The most effective intervention currently available to reduce motorcyclist head injuries remains the motorcycle helmet (Haworth and Schulze, 1996). Motorcycle helmets provide the best protection from head injury for motorcyclists involved in traffic accidents (NHTSA, 2006). The passage of helmet use law governing all motorcyclists is the most effective method of increasing helmet use (WHO, 2006). The NHTSA of the USA strongly supports comprehensive motorcycle safety programmes that include helmet use (NHTSA, 2006). The effectiveness of the helmet in reducing head and brain injuries has been shown consistently,

with reductions in injuries between 63%-88% (Thompson, Rivara and Thompson, 2000) Motorcycle crash statistics show that helmets are about 29% effective in preventing accident fatalities. Riders wearing a helmet have 29% better chance of surviving a crash than rider without a helmet (NHTSA, 1996). Similarly, appropriately worn motorcycle helmets can reduce head injuries in motorcyclists by 72% (Liu, Ivers, Norton, Blows and Lo, 2004).

Wearing a crash helmet is the single most effective way of reducing head injuries and fatalities resulting from motorcycle accidents (WHO, 2006). Motorcyclists who do not wear helmets are at greater risk of sustaining head injuries and dying from these injuries (WHO, 2006). A motorcyclist not wearing helmet is 40 percent more likely to suffer a fatal head injury and 15 percent more likely to suffer a non-fatal injury than a helmeted motorcyclist when involve in a crash (NHSTA, 2006). However, cyclists who do not wear helmets place additional costs on hospitals. Disability that results from these head injuries incurs costs at individual, family and societal levels (WHO, 2006). Studies that compared hospital costs for motorcyclist with or without helmet revealed that riders who do not wear helmet and got involved in crashes were less likely to have insurance and were more likely to have higher hospital costs than helmeted riders involved in similar crashes (NHTSA, 2006). The NHTSA estimated that motorcycle helmet use saved $19.5 billion in economic costs from 1984 through 2002 and additional $14.8 billion would have been saved if all motorcyclists had worn helmets during the same period under review (NHTSA, 2004).

According to NHTSA (2004), motorcycle helmets provide the best protection from head injury for motorcyclists in accidents. Helmets are 67 percent effective in preventing brain injuries and those motorcyclists without helmets involved in crashes were three times more likely to suffer brain injuries than those wearing helmet (NHTSA, 1996). Study on impact of motorcycle helmet use on patient outcome and cost of hospitalization revealed that on the average, helmet use led to average hospital costs that were about 20 percent less than costs of those who did not wear helmets. In addition, for patients who were treated on an inpatient rehabilitation floor after leaving the trauma unit, average costs without helmet riders were nearly twice those riders with helmet. The result also confirmed earlier findings that riders without helmets were younger, suffered more head and neck injuries, and had higher overall injury severity scores (Brant, Ahrns, Corpron, Franklin and Wahl, 2002).

Findings from a prospective study conducted in Bangalore, in India revealed that if all occupants of motorized two wheelers compulsorily wear helmet the death rate among two wheeler occupants due to head injury will be decreased by 30-40 percent, head injuries will be reduced by 20-30 percent, severity will be reduced by 50%, consequent neurological disability will be reduced by 20-40%, duration of hospitalization will be reduced by 20–40%, medical cost towards treatment of head injuries will be reduced by 25-30%, whilst neurosurgeons would have 20-30% of their professional time available to treat brain tumors rather than treat severe head injuries which need not have occurred in the first place (Ganapathy, 2001).

Many contemporary analyses have also addressed the efficacy of helmet usage. It has been stated that in USA, the probability of sustaining an injury while wearing a helmet is 15.1% compared to 22.8% whilst not wearing one. Published systematic reviews examining the effects of wearing a helmet on the risk of head injury as a result of collision came to the following conclusions (WHO, 2006)

- Motorcycle helmets reduce the risk of mortality and head injury in motorcycle riders who crash. Though the effects of death may be modified by other factors surrounding the crash, such as the speed the motorcyclist was riding with when the accident occurred. Accident at higher speeds may result in multiple injuries. It may likely lead to death, regardless of how well the head is protected (WHO, 2006).
- Some studies suggested that helmets have no effect on the risk of neck injuries but protective for face injuries (WHO, 2006).
- Increasing motorcycle helmet use in countries where such use has been low is likely to dramatically reduce the rate of head injury and death (WHO, 2006).

Reports from all parts of the world revealed that helmet use with enforcement result in significant reductions in head injury frequency, and severity and deaths in motorcycle crashes (Servadei et al, 2003).

According, to WHO (2006), the technical expertise behind the design of high quality helmet is based on an understanding of what happens to the head in the event of a motorcycle accident. Furthermore an appreciation of the anatomy of the head is important in

understanding the mechanism of injuries to the head and brain. The important anatomical information about the head was outlined by WHO (2006) as follows:

- The brain is enclosed within a rigid skull.
- The brain sits on the bones that make up the base of the skull.
- The spinal cord passes through a hole in the underside of the brain.
- Under the skull, adhering to the bones is a tough tissue called the dura that surrounds the brain.
- Between the brain and the dura is a space containing cerebrospinal fluid that protects the brain tissue from mechanical shocks.
- The brain floats in the cerebrospinal fluid but can only move about 1 millimeter in any direction.
- The skull is covered by the scalp, which provides some additional protection.

During a motorcycle accident the two principal mechanisms of injury to the brain are through direct contact and through acceleration-deceleration (WHO, 2006). Each of this mechanism causes different types of injuries. When a motorcycle is involved in a collision, the rider is often thrown from the cycle. If the rider's head hits an object, such as the ground, the head's forward motion is stopped, but the brain, having its own mass, continues to move forward until it strikes the inside of the skull. It then rebounds, striking the opposite side of the skull. This type of injury can result in minor head injury, such as concussion or fatal head injury (WHO, 2006).

Head injuries that result from either direct contact or acceleration-deceleration injuries are divided into two categories: open or closed injuries. Most traumatic brain injuries are the result of closed head injuries, this implies that there is no open wound to the brain (WHO, 2006). Motorcycle riders who do not wear a helmet run a much risk of sustaining any of these head and traumatic brain injuries, or combination of them. Helmet provides an additional layer for the brain and thus protects the wearer from some of the more severe forms or traumatic brain injury (WHO, 2006).

Helmet aims to reduce the risk of serious head and brain injuries by reducing the impact of a force or collision to the head (WHO, 2006). It is designed to cushion and protect rider's head from the impact of an accident. Just like safety belts in cars, helmet cannot provide total protection against head injury or death, but it reduces the incidence of both. A similar study

also found 39% reduction in risk of death after adjusting for age, gender and seating position (Norvell & Cummings, 2002).

According to WHO (2006), the helmet works in three ways:

- It reduces the deceleration of the skull and the brain movement by managing the impact. The soft material incorporated in the helmet absorbs some impact and therefore the head comes to a halt more slowly.
- It spreads the forces of the impact over a great surface area so that they are not concentrated on particular areas of the skulls.
- It prevents direct contact between the skull and the impacting object by acting as a mechanical barrier between the head and the object.

These basic functions are achieved by combining the four basic components of the helmet, which are as follows:

The Outer Shell: This is the strong outer surface of the helmet that distributes the impact over a large surface and lessens the forces before it reaches the head. This shell is tough, designed to compress when it hits anything hard. It provides protection against penetration by small, sharp and high speed objects and it also protect the padding inside the helmet from abrasions and knocks during daily use (WHO, 2006).

The Impact-Absorbing Liner: this is made up of a soft, crushable padded material, usually expanded polystyrene. This dense layer cushions absorbs the shock as the helmet stops and the head tries to continue moving (WHO, 2006).

The Comfort Padding: This is the foam and cloth layer that sits next to the head. It helps keep the head comfortable and the helmet fitting snugly. In some helmets, this paddling can be taken out for cleaning (WHO, 2006).

The Retention System or Chin Strap: This is the mechanism that keeps the helmet on the head in a crash. A strap is connected to each side of the shell. The chin and neck strap are specifically designed to keep the helmet on during an impact. For a helmet to function properly as it is designed, the strap must be correctly used (WHO, 2006).

Motorcycle as a means of transportation, has enhanced the lives of many individuals and societies (Sharma, 2008). Like all other motorized vehicles, it is a useful and enjoyable means of transportation (Cohn and LLP, 2010). However, the benefits have come with a price. More than 120,000 motorcyclists have died in traffic crashes (Cohn and LLP, 2010).

According to the group, per vehicle mile, motorcyclists are about 26 times as likely as car passenger to die in a traffic crash. Although the numbers of lives lost in motorcycle road crashes in high-income countries indicate a downward trend in recent decades, for most of the world's population, the burden of road traffic injury in terms of societal and economic costs is rising substantially. The best available evidence suggests the burden is greatest and growing in low-income and middle-income countries (Amcratunga, Hijar & Norton, 2006).

CONCEPTUAL FRAME WORK

A conceptual framework presents a systematic way of understanding events and situation. It is a set of concepts, definitions, and proportions that explains or predict these events or situations by illustrating the relationships between variables (National Cancer Institute, 2005).

The purpose of theory in research is to help the researcher to be able to explain the dynamics of the health behaviors, including processes of changing them, and the influences of many forces that affect health behaviours, such as social and physical environments. Theory and frameworks also provide planners the most suitable information such as target audiences, methods for fostering change, and outcomes for evaluation before planning and implementing health promotion interventions (National Cancer Institute, 2005).

The combination of two behavioural change models was used in this study to guide the design of this study, as no single theory can capture all the variables or elements involved in the study. The selected theories were the Health Belief Model (HBM) and Transtheoretical Model.

Health Belief Model

The Health Belief Model is a very useful theoretical framework for predicting preventive health behavior, and remains one of the most widely used in the field of health promotion and education. The model explains and predicts health behaviors with special reference to preventive health behaviour by focusing on the perceptions and beliefs of individuals. The model was developed in 1950s by social psychologists Hochbaum, Rosenstock and Kegels in the US Public Health Services (National Cancer Institute, 2005).

The key tenents of the model are that someone would initiate a health action against a situation or event if he/she beliefs that

- He or she is vulnerable to the event/situation e.g. motorcycle accident
- Motorcycle accidents are serious events

The other belief inherent in the model are that a person will initiate a preventive health-related behavior such as use of a crash helmet if he/she

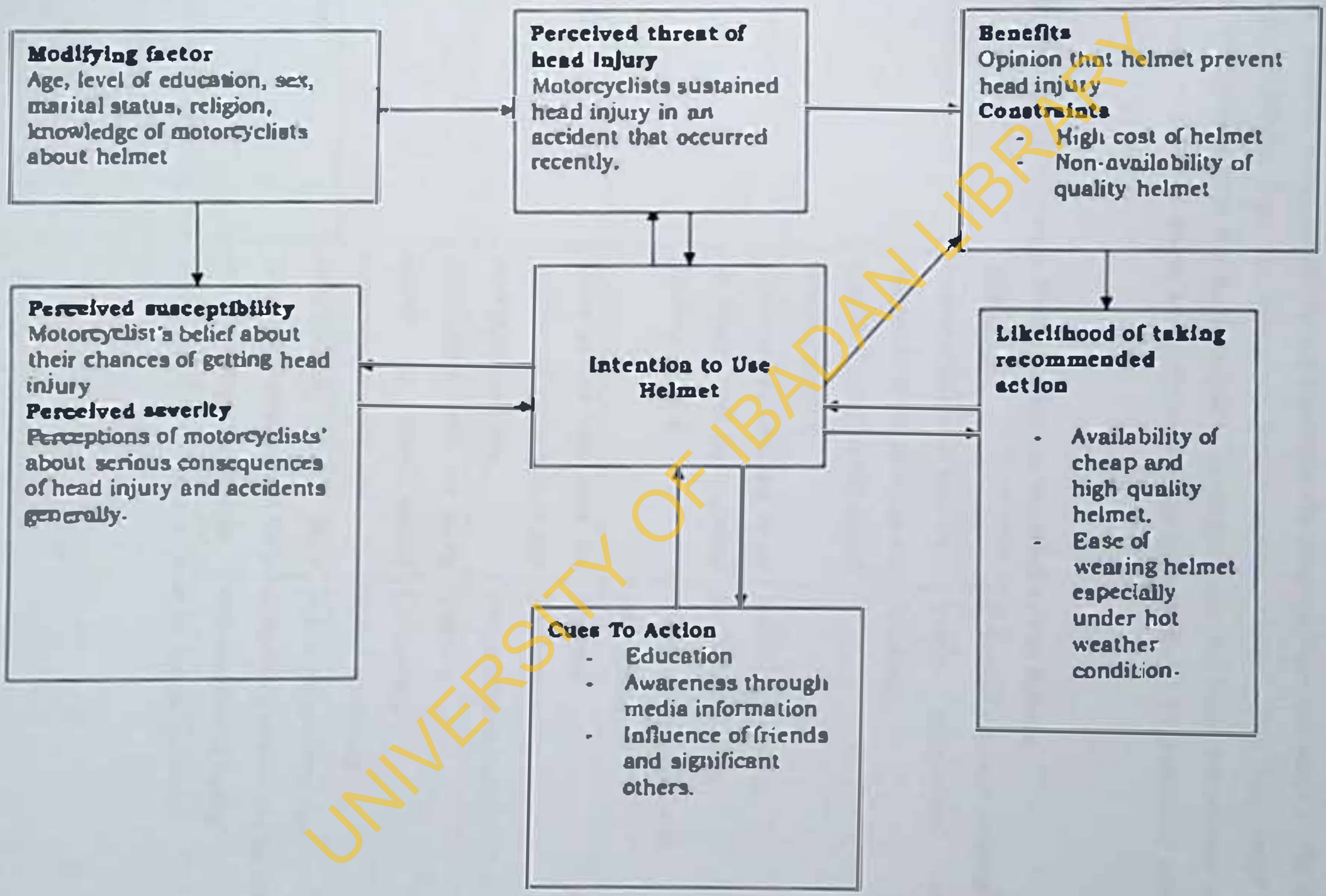
- Beliefs that a negative health condition (i.e., head injury) can be avoided,
- Has a positive expectation that by taking a recommended action, he/she will avoid a negative condition (i.e. using helmet will be effective in preventing head injuries),
- Believes that he/she can successfully take a recommended health action (i.e. he/she can use helmet correctly and with confidence) and that
- The cost of taking action by far outweighs the cost of inactions.

Figure 1 illustrates application of the HBM to commercial motorcyclists' intention to use crash helmet. The model include the following constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self efficacy. According to the model, several other factors can, however serve as triggers or cues for taking action such as significant others, news and awareness through media.

In applying this theory to this study, questions were raised to learn about perceptions of motorcyclists relating to helmet use. The questionnaires were designed to tease out information about motorcyclists' perceived vulnerability to motorcycle accidents and head injury as well as severity and consequences of head injuries. Questions on belief about efficacy of using helmet to reduce impact of head injury were also asked. Questions were also asked to tease out information about availability of helmet and its cost. (See figure 1 for details of application of HBM to use of crash helmet).

Figure 1: Health Belief Model Applied To Intention To Use Crash Helmet

(Adapted from Change Process- A Social and Behavioral Foundation for Health Education and Health Behavior and Health Education Theory, Research and Practice, compilation of lecture notes by Professor William Brieger).



Stages of Change Model (Transtheoretical Model)

This model's basic premise is that behaviour change is a process, not an event. As a person attempts to change a behavior, he or she moves through five stages which are *pre-contemplation, contemplation, preparation, action, and maintenance.* The model is circular not linear. In other words, people do not systematically progress from one stage to the next, ultimately graduating from the behaviour change process. Instead, they may enter the behavior change process at any stage, relapse to an earlier stage, and begin the process once more. People at different points along this continuum have different informational needs, interventions (NCI, 2005).

Table I: The Stages of Change Model Applied to Intention to Use Helmet

Stage	Definition	Potential Change Strategies
Pre-contemplation	Motorcyclists who have no intentions to use or not to use helmet. They have not started thinking about it	Public enlightment and Advocacy
Contemplation	Motorcyclists who are aware of helmet and have started thinking about it	Public enlightment, Social-marketing, Values clarification and Peer education
Preparation	Motorcyclists who have the intention of using helmet and have purchased one.	Training Social support Policy intervention
Action	Motorcyclist who are using helmet or have started experimenting with one.	Training Counseling Social marketing
Maintenance	Motorcyclists that have consistently used helmet for a considerable period of time.	Public enlightment on advantages of continuous use Enforcement of policy

Source: National Cancer Institute (2005) Theory at a Glance, A Guide for Health Promotion Practice.

This theory helped in documenting the pattern of use of crash helmet among the motorcyclists, these included, never, sometimes, and always users as well as reasons for such pattern of use

CHAPTER THREE

MATERIALS AND METHODS

This chapter presents the description of the study area, research design and process. The chapter also included the following methodological elements: the study population, sample size and sampling technique, method of data collection, validity and reliability, data management and analysis, ethical consideration and limitation of the study.

Study Design

The study was a descriptive cross-sectional survey. It was limited in scope to the documentation of the perceptions, knowledge as well as use of the crash helmet among commercial motorcyclists in Ido LGA of Oyo State.

Study Area

The study was carried out in Ido Local Government Area, Oyo State, Nigeria. The LGA has its head quarters at Ido along the Ibadan-Eruwa road. The LGA came into being in May 1989 and it was carved out of the former Akinyele Local Government Area. The LGA covers an area spanning the following major communities: Apata, Ijokodo, Omi-Adio, Ido, Akufo and Apete and Bakatari and important villages such as Ogunwehinde, Dada, Oderemi, Odetola, Odufemi and Alagbaa. It shares boundaries with Ogun State in the South, Ibarapa East LGA in the West, Afijio LGA and Akinyele LGA in the North and in the East it shares boundaries with Ibadan North, Ibadan North West, Ibadan South West and Oluyole LGAs. The LGA consists of ten wards.

The major occupation of the people is farming. They grow a variety of crops such as cocoa, kola nuts, palm-trees, oranges, pineapples, plantain, maize, cassava, banana and a wide range of other fruits. Ido LGA can be aptly referred to as one of the fruit baskets of the state. Parts of the LGA has some industries and other economic ventures such as the Nigerian Wire and Cable industries Ltd, Nigeria Mining Corporation, Union Beverages Nigeria Ltd, Lafia Canning industries and Lafia Hotel. The LGA also enjoys the services of medium and small scale industries for the processing of agricultural produce such as cassava and cashew nuts.

Some principal towns such as Apata, Ijokodo, Apete and Omi-Adio have access to electricity supply, though the supply is erratic. Most parts of the LGA lack pipe-borne water. There are three maternity centers in the LGA and they are located in Ido, Akufo and Omi-Adio. The six dispensaries in the LGA are located at Ido, Omi-Adio, Apete, Akufo, Odetola and Kogue.

Majority of the people depend on commuter services such as taxis, commercial minibuses and motorcycles as means of internal transportation. There is tremendous increase in the use of motorcycle for commercial purposes in the major towns and villages. Most roads are not tarred and it is only motorcycles that can be used to reach many of the villages and hamlets in the LGA.

Study Population

The study population consisted commercial motorcyclists in Ido Local Government Area. In the LGA, the umbrella union that coordinates the activities of registered motorcyclists is known as National Union of Road Transport Workers (NURTW) Okada Branch. This union is sub-divided into two centers namely Omi-Adio centre and Apete center. The Omi-Adio and Apete centers have thirteen units each respectively with the leaders of each unit coordinating the activities of its unit members. The leaders of the various units meet once a month at their designated center offices to discuss issues relating to their unit activities and commercial motorcyclists' welfare and needs.

Each unit is coordinated by the following officers: the Chairman, Vice-chairman, Secretary, Financial Secretary, Welfare Secretary and Treasurer. These officers are chosen by election. The criteria for becoming members of a particular unit vary across the NURTW, okada branch. For example in Ido unit, eligible new members must hire or procure a motorcycle and pay a prescribed union fee of two thousand five hundred naira. In Oke-oloro unit, under Omi-Adio center, new members are expected to provide two passport photographs, and a referee. The situation is not the same in Apete Central Riders Unit, a unit under Apete centre. Here each eligible new member procures a file, where background information about him is documented, provides photocopies of the evidence of payment for his motorcycle and pays a membership fee of four thousand naira.

Meetings in each unit are held on assigned days of the week. Members of each unit are expected to attend their unit meetings regularly and absence from meetings without prior

notice attracts a monetary fine or punishment. On a daily basis, members buy a ticket of thirty naira before they can be allowed to operate in their various units.

Ido motorcycle operators disclosed that they encounter lots of challenges. These include high cost of motorcycle spare parts, high vehicle repairs/operating cost, disregard by other road users especially motorists, police harassment, bad roads and lack of access to credit and government support. The Local Government has not in any way contributed to the development of the motorcycle business, yet it is a source of revenue for the LGA through sales of hackney permit which all motorcyclists procure annually from the Local Government Head Quarters, in Ido community.

Sample Size Determinantion for the Quantitative Component of the Study

The sample size (n) was determined by using the following formula:

$$n = \frac{z^2 p (1-p)}{d^2}$$

Where n = minimum sample size required

z = confidence limit of survey at 95% C.I = 1.96

p = proportion of motorcycle riders that use crash helmet =10% (Asogwa, 1996)

d= absolute deviation from true value (degree of accuracy) = 3%

$$n = \frac{1.962 \times 0.1 \times 0.9}{0.03^2} = 384.4$$

The sample size was raised to 500 to cater for possible instances of attrition and non-response. This was particularly done because commercial motorcyclists are highly mobile occupational group.

Sampling Technique

A preliminary study was conducted to document the number of motorcyclist units in Ido LGA, including the number of motorcyclist in each unit. This was done by reviewing records of the two main centers (Ido and Apete). Visits were then made to all the units to document the number of registered motorcyclists in each of them. The study revealed that there were a total of 26 units consisting of 876 commercial motorcyclists in Ido LGA. The study was however carried out among 799 motorcyclists in 24 units, because two units namely Ido Junction Unit and Student Riders Unit that were not willing to participate in the study were excluded (for details, see table 2).

The reasons given by the two units for non-participation were:

1. One of the units by name "Student Riders Association" had dissolved membership of the unit because most of their members left motorcycling business for the Wonder Bank Microfinance scheme that evolved prior to the period of the study.
2. The second unit, Ido Junction Unit, could not participate because some members of the unit were arrested by the Nigerian Police, Omi-Adio Area Office, as a result of a clash between Police officers in Omi-Adio Area office and NURTW in the area. The few members seen as at the time the researcher visited the unit were not interested in the survey because of the prevailing tension.

The procedures adopted for the selection of the motorcyclists consisted of the following steps:

Step 1: Proportional sampling method was used to determine the proportion of motorcyclist surveyed in each unit. This was calculated using the following formula:

$$\text{Proportion of motorcyclists selected from each unit} = \frac{\text{Total number of motorcyclist in each unit}}{\text{Total number of commercial motorcyclists in Ido LGA}} \times \frac{\text{Sample Size}}{1}$$

Step 2: Systematic random sampling method was then used to select motorcyclists from the quota allocated to each unit with each unit register serving as sampling frame from where surveyed motorcyclist were drawn using the following sub-steps below:

a. Comprehensive lists of all registered motorcyclist in the 24 units were compiled. This served as a sample frames. A number was then assigned randomly to each motorcyclist in the sample frames.

b. Using formula N/n, a sample interval k was determined, where N was total population of commercial motorcyclists in Ido LGA and n was the sample size.

$$k = N/n = 799/500 = 1.598 \text{ which is approximately } 2$$

c. Following this, a starting point of 3 was randomly selected by balloting from the sampling frames, after which every 2nd motorcyclist was selected from the sampling frames until the sample size of 500 was attained.

Table 2: List of Motorcycle Riders Units in Ido LGA and Total Number of Registered Members in Each Unit.

S/No	Unit Name	Number of Registered Member	Proportion Selected
1	Apete Central Riders	180	113
2	Jeje Temidire OICRA	50	31
3	Adeori Okin Ijokodo Riders	50	31
4	Ojumore Akere Riders	35	21
5	Igbehinadun Awotan	33	21
6	Arola Commercial Riders	30	19
7	United Brothers Association	60	38
8	Yokelepekun	20	13
9	Lojijilowole	20	13
10	Ariyibi Junction	15	9
11	Olomo Junction	16	10
12	Araromi Junction	13	8
13	Lakoto Osajin	15	9
14	Oke-Oloro	55	34
15	Abidogun	57	37
16	Ido	35	22
17	Alafara	10	9
18	Batake	8	5
19	Idiya	12	8
20	Onikanga	10	6
21	Akufo	20	13
22	Ogala	15	9
23	Ologuneru	25	16
24	NNPC 2	15	9
	TOTAL	799	500

Eligibility Criteria

The eligibility criteria for the study were as follows:

- Consent to be involved in the study and being a registered member of a unit
- Being on duty at their parks or garages during the period of the study.

Methods and Instruments for Data Collection

Information was collected using both qualitative and quantitative data collection techniques. The instruments were designed after reviewing literature and extracting pertinent variables relating to the crash helmet, perceptions and pattern of use by commercial motorcyclists.

Qualitative Method

The Focus Group Discussion (FGD) was used as a diagnostic tool to gain better insight into commercial motorcycling business, motorcyclists' perceptions of the crash helmet and its use. A discussion guide consisting of eight questions which focused on the knowledge, perception, and use of the crash helmet as well as prevalence of accidents among commercial motorcyclists was used to facilitate the discussions. (See appendix III)

Quantitative Methods

- *Observation Checklist:* An observation checklist was designed to document the pattern of use of crash helmet among the commercial motorcyclists. This was done because obtaining information about actual pattern of use would not be feasible without direct observation. The observation checklist was adapted from the survey instruments of an observational study on the prevalence of safety counter-measures among motorcyclists in the city of California (WHO, 2006). The checklist consists of 12 items, measuring motorcycle rider and passenger-characteristics, use of crash helmet, type of crash helmet worn by motorcycle rider, number of passengers carried by a motorcyclists and types of helmet worn by passengers. (See appendix II for the checklist).
- Semi-structured interview. The semi-structured interview was done with the aid of a semi-structured questionnaire. Information obtained from the FGD served as a guide in developing the semi-structured questionnaire for the study. Most of the questions were pre-coded with only one open-ended question. The questionnaire was divided into 5 sections (see Appendix IV). Section I covered socio-demographic

characteristics as well as questions relating to motorcycling operation. Section 2 assessed respondents' knowledge of crash helmet, while section 3 focused on the perceptions of respondents about the crash helmet. Section 4 focused on the pattern of use of crash helmet by motorcyclists and section 5 consisted items on prevalence of accidents while riding and the types of injury sustained. The questionnaire was first drawn in English and then translated to Yoruba. The Yoruba version was thereafter translated back to English. This back translation was done to ensure accuracy of the translation. The Yoruba translation was done by a Community Health Development Worker, who retired from the Department of Health Promotion and Education, Faculty of Public Health, University of Ibadan. The translator is fluent both in English and Yoruba. The translated version was also reviewed by the investigator who is also a Yoruba.

On the whole three methods of data collection were used to enhance the validity of the results obtained. The methods have peculiar strengths and weaknesses; so the strengths of one made up for the weaknesses of the others.

Validity and Reliability of Instruments

Validity

Several measures were taken to ensure the validity and reliability of the instruments. The instruments were subjected to two stages of pre-testing. First in-house pre-testing of instruments was done among experts in the field of Health Promotion and Education in the College of Medicine, University of Ibadan, Ibadan.

The second stage of the pre-test exercise was done among 50 commercial motorcyclists (i.e 10% of the sample size) in Ona-Ara LGA. This LGA has similar characteristics with Ido LGA. The two LGAs are similar in terms of level of development, the occupation practiced by the people, as well as structure, composition and function of commercial motorcycle riders association. Necessary corrections were made following the second pretest exercise.

Reliability

The questionnaire also went through measures of internal consistency with the use of Cronbach's alpha co-efficient analysis to confirm its reliability. This is a model of internal consistency, based on the average inter-item correlation. A result showing correlation

coefficient greater than 0.05 is said to be reliable. In this study the result was 0.92, which is greater than 0.05, thereby confirming its high degree of reliability.

Four Research Assistants who were fluent in both English and Yoruba were recruited and trained as observers and interviewers. They were trained on the following: procedures for questionnaire administration; objectives of the study; sampling processes; how to secure respondents informed consent; importance of collecting valid data; data collection as well as interviewing techniques and techniques for reviewing questionnaires to ensure completeness. The trained field assistants were involved in the pre-testing of the instruments. This was done to create opportunity for the research assistants to acquire practical interviewing skills. In order to avoid the problem of unreliability of data, each questionnaire was carefully examined for accuracy of responses and completeness.

Data Collection Procedure

The study was carried out from May to August 2007 with the assistance of four Research Assistants. The data collection processes are highlighted below:

- **Observation**: The observations were carried out concurrently by having one person each conduct the observation at the three major junctions within the study site in the morning (8:00 - 8:30am), afternoon (1:00-1:30 pm) and in the evening (5:00-5:30pm) for a period of one day. The junctions were Apete, Ijokodo and Omi-Adio. The junctions were chosen for the exercise because they were far apart and so duplication of observations would be prevented.
- **Focus group Discussion**: A total of ten FGDs were conducted. The sessions were conducted in a venue that was free of distraction. The venues were carefully selected with the input of leaders of the motorcycle association. The venues used were conducive for participants to discuss freely. Each FGD session lasted for a mean duration of 45 minutes with each FGD session involving a group of discussant ranging from 6-8 discussants. The discussion sessions were conducted by a moderator, a note taker, who documented discussants responses using a tape recorder and through verbatim writing of proceedings. An observer also monitored the group dynamism and non-verbal communication that were characterized in each group. Prior to the commencement of each discussion session, the discussants were provided

with full details of the study and an assurance of confidentiality of the disclosed information. Numbers were assigned to discussants for the purpose of identification during the discussion session only. The numbers were not used to divulge the identities of participants. Permission to use a tape recorder was sought and verbal consent was obtained from discussants prior to commencement of each session. Each discussion was a highly interactive as discussants took turns to air their views in respect of the issues raised for discussion. Discussants were encouraged to feel free to disagree with one another if the need arises without interfering into one another's opinion. Table 3, presents the focus group discussion time table used for the study.

Table 3: Focus group discussions time table

S/No	Unit	Date	Time
1	Ido unit	18th June, 2007	10 am – 11am
2	Ido junction	18th June, 2007	12pm – 1 pm
3	Abidogun unit	19th June, 2007	11am – 12pm
4	Oke Oloro unit	19th June, 2007	12.30 pm – 1.30 pm
5	Ologuncru unit	20th June, 2007	11 am – 12 pm
6	Apete Center Riders unit	21st June, 2007	10 am – 11am
7	Jeje Temidire unit	21st June, 2007	12 pm – 1 pm
8	United Brothers Association unit	22nd June, 2007	10 am – 11 am
9	Arola Commercial Motorcycle Riders unit	23rd June, 2007	11am – 12 pm
10	Ade Ori Okin unit	23rd June, 2007	1pm – 2 pm

- **Semi-structured Interview:** All the 24 motorcycle units that agreed to participate in the study as earlier discussed in the sampling process were visited. The questionnaires were administered by research assistants under the supervision of the investigator and were filled according to the responses provided by the interviewees. The questionnaire administration process involved the following steps:
  I. Identification/visit to selected motorcycle units for formal introduction and to seek permission to conduct the study
  II. Identification and establishment of rapport with eligible participants in each of the units including n disclosure of the nature of the study, study objectives, the inconveniences that might be involved and assurance of confidentiality of responses
  III. Administration of questionnaires to the participants
  IV. Review of administered questionnaire for completeness after interview

The series of data gathering activities (observation, FGD and semi-structured interview) were done sequentially, one after the other, starting with observation and ending with the interview with the experiences gathered in one activity used to guide the design and conduct of the other.

Operational Definitions

a. Commercial Motorcycle Rider (CMR): Any person riding or hiring out a motorcycle for the purpose of business or job.
b. Road Traffic Accident (RTA): all undesirable or damaging occurrences happening unexpectedly or by chance on the road.
c. Okada: local name coined for any CMR in Ibadan.

Data Management and Analysis

Focus Group Discussion: A debriefing session was held at the end of every FGD session. It was an opportunity to get the discussants to comment on the outcome of the discussion. The tape recorded sessions were transcribed and, some editing was done. The transcript was mapped out with codes to show participants responses. A code book was developed to show a list of all the codes used and what they meant. Key findings were summarized with the profile of the discussants. For each theme or issue discussed, analysis was done with a view to highlighting responses that cuts across the groups. Intra and inter group variation in responses were also identified.

Observation Checklist: Each checklist was sorted and manually coded by the researcher with the use of a coding guide. The coded records were fed into a computer and subjected to descriptive and inferential statistical analysis. The inferential statistical tool used was the Chi-square. Analysis was done using SPSS Version 11 statistical package.

Semi-structured Interview: A serial number was assigned to each questionnaire for easy identification and recall of any questionnaire with problems. Each questionnaire was sorted and manually coded by the researcher with the use of a coding guide. The coded data or responses were fed into a computer and subjected to descriptive and inferential statistical treatment. The inferential statistical tools used were Chi-square, T-test and ANOVA. Analysis was done using SPSS Version 11 statistical package.

Presentation of findings: Finally, information obtained from the qualitative methods were summarized and presented in tables and charts for better understanding and are presented in chapter four of this dissertation. The qualitative results were merged with similar quantitative results with a view to providing a more holistic picture. This way while the quantitative results provided the hard data, relating to the phenomena studied, the qualitative results provided additional insight on them in a descriptive prose form.

Ethical Consideration

Prior to the commencement of data collection, permission for the study was obtained from the President of the National Union of Road Transport Workers, Okada branch in Ido LGA. Preliminary visits were paid to all the unit heads to intimate them about the study and solicited for their support. The researcher also attended unit meetings to discuss the study objectives, establish full rapport with the study population and set up a convenient time for the study. Appointments were fixed with members of the selected unit members to prepare them for the FGD. The introductory letter that was given to the researcher by the Department of Health Promotion and Education facilitated entry into all the motorcyclists' units. Verbal informed consent was obtained from all participants after explaining the study objectives to them and ascertaining that they fully understood the study. Confidentiality of participants' responses was ensured during and after the data collection.

Limitation

For a study of this nature, some overlapping observations of the commercial and private motorcycle riders were inevitable because some private motorcycle owners engage in motorcycling business to boost their income since commercial motorcyclists had no distinguishing uniform. Such private riders were very few and usually operate late in the evenings.

Some respondents were not willing to provide information required by the researcher at the initial stage because of the fear of being arrested by Law Enforcement Agents for non-use of crash helmet. Efforts were however made to reduce this problem by assuring them of the confidentiality of information provided and that Law enforcement agents would not be involved in the study. It was also revealed that the outcome of the study would not be used to institute punitive measures against anyone.

During the process of questionnaire administration, passengers' entry into the motorcycle parks occasionally caused disruption to the interview process. Each time this occurred, interview had to be suspended till later time when the motorcyclists return from their trips. Incentive was provided for interviewees on completion of questionnaire to pay for their time and to avoid abandoning the interview as time was very crucial and valuable to motorcyclists.

CHAPTER FOUR

RESULTS

This chapter presents the qualitative and quantitative results of this study under the following sections:

- Socio-demographic characteristics of the participants
- Commercial motorcyclists' knowledge about crash helmet
- Commercial motorcyclists' perception about crash helmet
- Use of crash helmet by commercial motorcyclists
- Factors influencing the use of crash helmet among commercial motorcyclists
- Participants level of awareness about the state law on use of crash helmet
- Reported prevalence of accidents among commercial motorcyclists
- Participants suggestions for promoting the use of crash helmet among commercial motorcyclists

Socio-demographic characteristics and work related experiences of the participants

This section highlights participants' socio-demographic characteristics and work related experiences. The socio-demographic profile of the 500 participants is shown in Table 4. All participants were males and their age ranged from 15 to 55 years with a mean age of 28.9±7 1years. Over a quarter (29.0%) of the participants were young persons aged 15-24 years. Among this sub-group of young persons 4.8% were adolescents aged 15-19. Slightly above half (50.6%) were within the 25-34 years age bracket that can be described as adults. A majority (80.0%) had primary and secondary education. Recipients of secondary education (59.8%) topped the list of the level of education attained by the participants. A little over half (50.8%) of the participants were married, while only (43.2%) were single. Most of them (93.8%) were of the Yoruba ethnic group. There were slightly more Muslims (53.8%) than Christians (45.4%). (See details in Table 4)

Majority of the participants had no formal training on how to ride commercial motorcycles. Forty-six percent were trained by self while 41% were trained by friends. (See Figure 2 for details). The time of operation varies among the participants. Slightly half of them operate all the time (241) i.e. mornings, afternoon, evenings and in the nights. Only very few

participants operate in the morning (125), afternoon (13), evening (148) and nights (78) (See details on Figure 3).

Participants were asked about safety of motorcycling business in the area. Slightly more than half (60%) of the participants reported that commercial motorcycling business was safe, while a few (40%) reported that it was dangerous (see Figure 4 for details).

Table 4: The Socio-demographic characteristics of the participants

N=500

Characteristics	No	%
Age*		
15-24	145**	29.0
25-34	253	50.6
35-44	81	16.2
45+	21	4.2
Educational status		
Non-formal	14	2.8
Primary	101	20.2
Secondary	299	59.8
Tertiary	83	16.6
No response	3	0.6
Marital Status		
Single/never married	216	43.2
Married	254	50.8
Divorced	17	3.4
Separated	13	2.6
Ethnic group		
Yoruba	469	93.8
Igbo	25	5.0
Hausa	6	1.2
Religion		
Islam	269	53.8
Christianity	227	45.4
Traditional	4	0.8

* Overall mean age of participants = 28.9±7.1years; Age range = 15 - 55 years.

** These are classified as young persons (Federal Ministry of Health, 2007)

Figure 2: Participants' source of training on how to ride motorcycle.

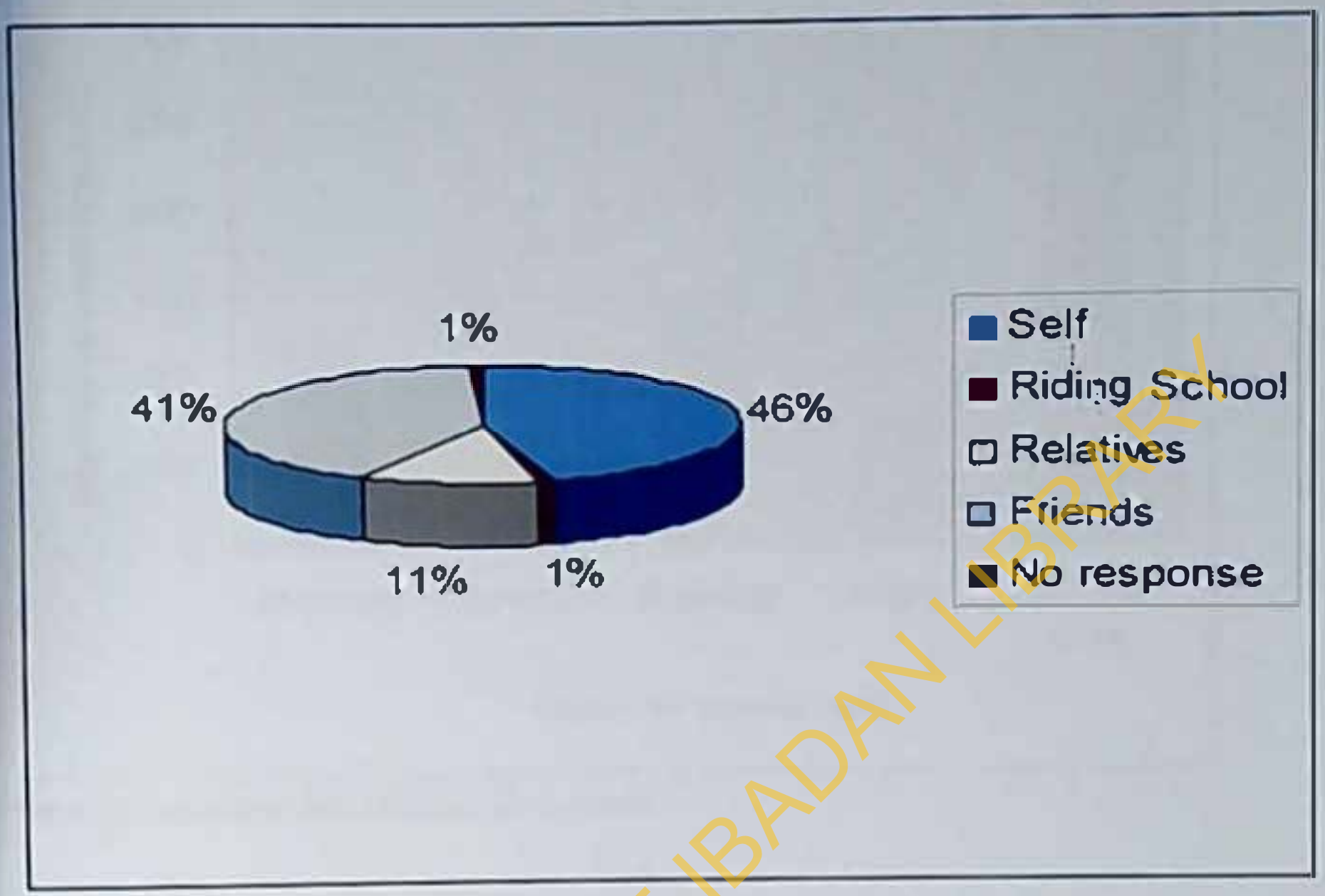
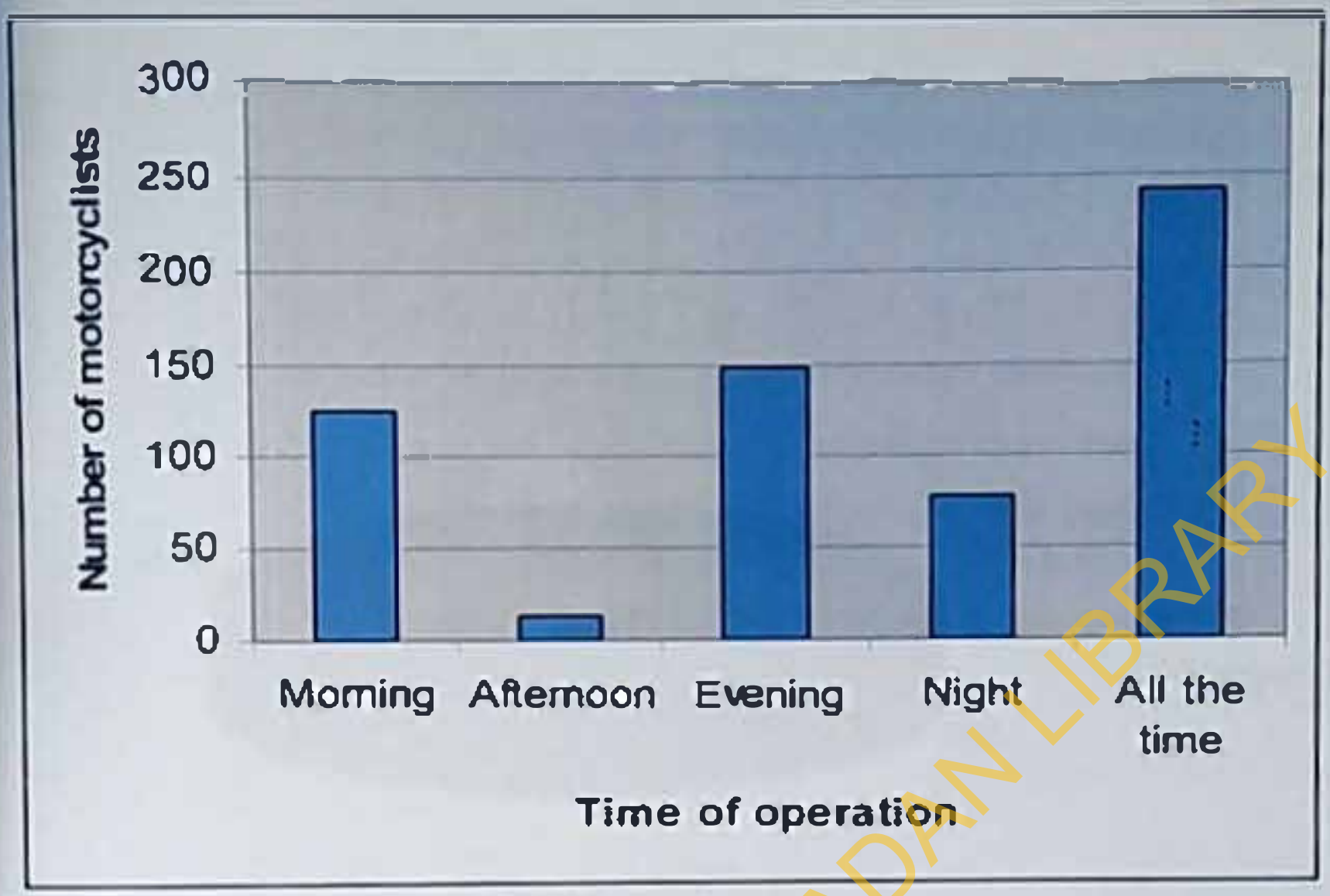


Figure 3: Time of operation of participants *

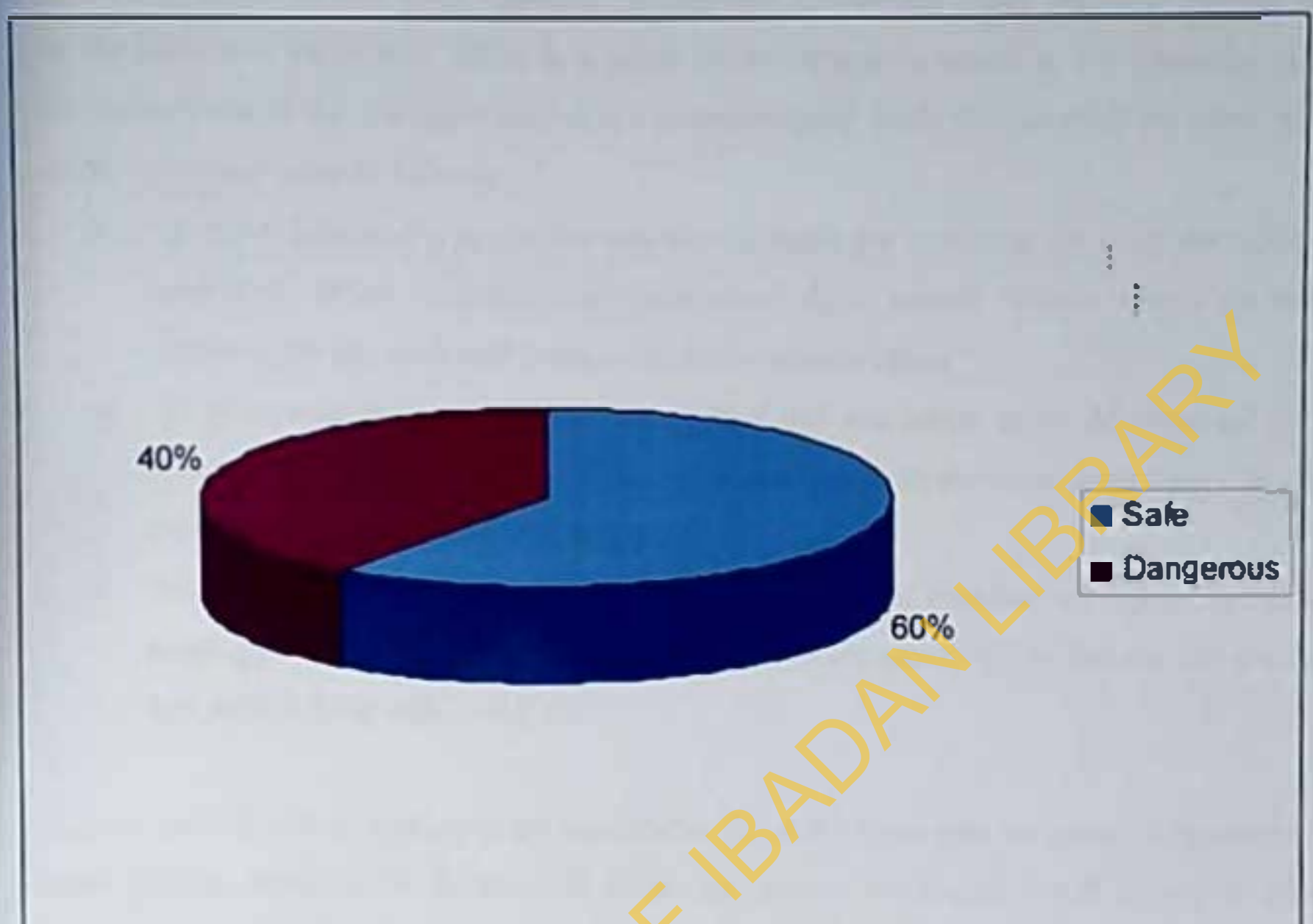
N=500



*Multiple responses were included (all the time)

Figure 4: Participants view on safety level regarding commercial motorcycling business in the area

N=500



Knowledge about crash helmet

This section highlights findings on participants' knowledge about the crash helmet. The qualitative aspect of this study explored participants' knowledge about the crash helmet. One of the questions asked was 'What is a crash helmet and how useful is it?' Majority of the discussants stated that the crash helmet is a protective gear made for covering the head. Some of the responses were as follows:

- *"A crash helmet is a protective cap that is made for covering the head for effective protection. When a cyclist is knocked down by a vehicle, helmet serves as shock absorber for the skull and brain so as not to sustain injury."*
- *"It is a protective gear for the head God will not allow us to be involved in an accident, but should an accident occur, helmet protects the head from injury in case there is head on collision with any object."*
- *"Helmet is for personal protection, because if a cyclist that has his helmet on hit his head against the ground or any hard surface in an accident, the helmet will prevent him from having injury or scars."*

A question was asked relating to the knowledge about the types and essential components of crash helmet. Most of the discussants across the groups mentioned brand names of crash helmet such as *Honda*, *Naifang* and *Jincheng* as types of crash helmet.

A discussant had this to say on types of helmet:

- *"Helmets are named by brand or manufacturer's name, we have Honda, Naifang and Jincheng helmets."*

Only very few discussants correctly mentioned at least one type of helmet in all the groups. The types mentioned were:

- Full-face helmet
- Half-face helmet with face glass
- Open-face helmets

Nearly all participants in all the groups erroneously mentioned 'construction hat' as a type of crash helmet.

The other description of the crash helmet by the discussants included:

- *"Helmet are designed in different ways, some cover all head parts with the chin and ear"*
- *"Some helmets cover the ear, while some have face glass for preventing bug from entering the eyes, and others some are like the ones construction engineers use at site".*
- *"There are helmet like full face, open face, half face, but their prices very depending on their quality".*
- *"I know of three types of helmet, the one with foam inside, ordinary helmet like that of engineers and the one that covers whole head"*

On issues relating to essential components of the crash helmet, at least, two discussants in each group were able to mention one essential component of a crash helmet, namely: chin/neck strap and comfort padding. Excerpts of discussants were as follows:

- *"Good helmet must have inner foam, must be thick, very strong and must cover every part of the head. This is the type of helmet I grew up to see my father used. It does not break easily even when you smash it against a hard object".*
- *"Helmet must also have a belt to hold it firm on the head to prevent it from falling off".*

Three discussants across the groups disclosed that face glass was an essential component of the crash helmet. Other responses from the discussants included:

- *"Helmet must have a face glass for preventing bugs, flies and dust from entering the eyes. It must also have ear cover and a chin strap. This type of helmet is usually worn by post men and they are very expensive".*
- *"It must have a face glass for protecting the eyes, it must have foam inside serving as an insulator, it prevent helmet from generating heat".*
- *"Inferior helmets are made of plastic, while the original ones are made of combination of unbreakable plastic and rubber. The original helmets have face glass to prevent bugs and flies from entering the eyes. They even have ear covers".*

The discussants were also requested to discuss the appropriate time that the helmet should be worn. The views of discussants varied within and across the groups. Most discussants within

and across the groups admitted that the helmet should be worn all the time whenever a motorcyclist is riding, typical responses were:

- *"It (Helmet) is the first thing a motorcycle rider should wear before igniting the motorcycle engine, because that is the message of caution written on petrol tank of all motorcycles by the manufacturer."*
- *"Helmet is supposed to be worn all the time when riding".*
- *"Helmet should be worn when riding, it should be worn on the head with the chin strap correctly buckled to the neck to prevent it from falling off".*

Two discussants within a group had these to say:

- *"A motorcyclist must wear helmet all the time he finds himself riding. Not wearing one is like a driver that wants to drive without the car key".*
- *"It is important to wear 'koto' (Yoruba name for crash helmet) whenever a motorcycle rider is riding, not wearing one is like a driver driving without seat belt."*

Few discussants within and across the groups however maintained that the helmet should only be worn at certain times such as in the mornings, evenings, during rainy or dry season and when one is traveling. Two discussants, one in Apete and another one in Omi-Adio groups commented on the time for wearing the crash helmet as follows:

- *"It (helmet) is not convenient to wear helmet in the afternoon because it makes one to sweat profusely and it causes headache, it should be worn only in the mornings and evenings because the weather is usually cold".*
- *"It (helmet) should be worn when embarking on long distant trips because it will not allow wind to enter the ear."*

Two discussants in Ido group added:

- *"Helmet should be worn during rainy season and when traveling to long distant places like Oyo, Abeokuta, Ife, because it reduces wind noise roaring by the ears."*
- *"My belief is that helmet should be worn when traveling and not for short distant trips which we make in this area. Most of us have helmet, but we use it for trips when police are checking so as to avoid disturbances and embarrassments."*

In the quantitative survey, the participants were asked whether they had ever seen a crash helmet. All the participants (100%) reported ever seeing one. When asked about the four components of a crash helmet, the component mentioned were, chin strap (68.4%), shining outer surface (36.2%), impact absorbing liner (42.4%) and comfort padding (54.6%). (See Table 5 for details).

On appropriate period for the use of crash helmet, 51.0% of the participants claimed that the crash helmet should be worn at all times when riding. Other responses were: during long distance trips only (20.0%), when it is raining (20.0%), during short distant trips only (5.0%) and when law enforcement officers are checking (3.0%). (For details, see Figure 5).

The participants were given a list of statements relating to the crash helmet and were requested to state whether each was true or not. The following top the list of participants' responses: full face crash helmet gives the most protection to the head (88.4%), and helmet should not be stored near a gasoline or excessive heat (83.8%). helmet reduces head injury in case of accidents (81.0%). A majority (75.0%) wrongly stated that an industrial helmet was as good as a crash helmet. (See Table 6 for details)

Overall, the mean knowledge score of the participants on crash helmet, using a 12-point knowledge scale, was 7.1±2.1points. The proportion of the participants whose scores were below the mean and those whose scores were above the mean are highlighted in Figure 6. A majority (65.0%) of the participants scored above the mean knowledge score of 7.1 ±2.1. Overall, 65.0% had knowledge scores of 50% and above (See Figure 7).

Table 7 highlights the participants' mean knowledge scores by age. Adults aged 45 years and above had the highest mean score of 7.8 ±2.3 while young persons aged 15-24 years had the lowest mean score of 6.2 ±2.2. The relationship between their ages and knowledge of crash helmet was found to be statistically significant ($p<0.05$). The comparison of the participants' mean knowledge scores by marital status is highlighted in Table 8. Participants who were married had higher mean knowledge score of 7.5±1.9 while those who were separated had a mean score of 6.3±1.9. The mean scores for those who were never married and divorced were 6.7±2.1 and 6.9±2.6 respectively. The relationship between their knowledge by marital status was found to be statistically significant ($p<0.05$). The participants' mean knowledge score were compared by level of education. The results are presented in Table 9. Participants

without formal schooling had the highest mean knowledge score of 7.8±2.1 while those with primary education had the lowest mean knowledge score of 6.5 ±2.4. The relationship between the participants' knowledge by level of education was statistically significant ($p<0.05$).

The participants' knowledge score were compared by their ethnic affiliation. The Yoruba's had a mean knowledge score of 7.1±2.2 while the mean score for the other ethnic groups as a collectivity was 6.5±1.9. There was no statistically significant relationship between knowledge among the Yoruba's and other ethnic groups ($p>0.05$). (See Table 10 for details)

The comparison of the participants' mean knowledge scores by religion is highlighted in Table 11. Traditionalist had the highest mean knowledge score of 8.5±1.7. The mean knowledge scores of the other groups of participants are highlighted in the table. The relationship between their mean knowledge scores by religion was not however statistically significant. Table 12 shows the comparison of participants mean knowledge scores by use of crash helmet. Participants who had ever used the crash helmet had slightly higher knowledge score of 7.6±2.1 than those who had never used crash helmet 7.3±2.2. There was no statistically significant relationship between participants' knowledge and use of crash helmet.

When participants were asked about the major sources of information about the crash helmet, the following topped the list: Federal Road Safety Corps (50.8%), friends (32.6%) and police (30.2%). Other sources included: television (25.2%), radio (22.0%), motorcyclists' association (21.8%), newspaper (11.6%), magazine (7.2%), and poster (4.2%). (See Table 13 for details)

Table 5 Participants knowledge about the importance and component parts of the crash helmet

Components of crash helmet	No	%
1. Shining outer surface (N=497)		
Yes	181	23.7
No	316	63.2
2. Chin strap (N=498)		
Yes	342	68.7
No	156	31.3
3. Impact absorbing liner (N=497)		
Yes	212	42.7
No	285	57.3
4. Comfort padding (N=497)		
Yes	273	54.9
No	224	44.0

The N represents the total number of participants who responded to the variables

Figure 5: Participants responses as to the knowledge about the appropriate time for a motorcyclist to wear crash helmet

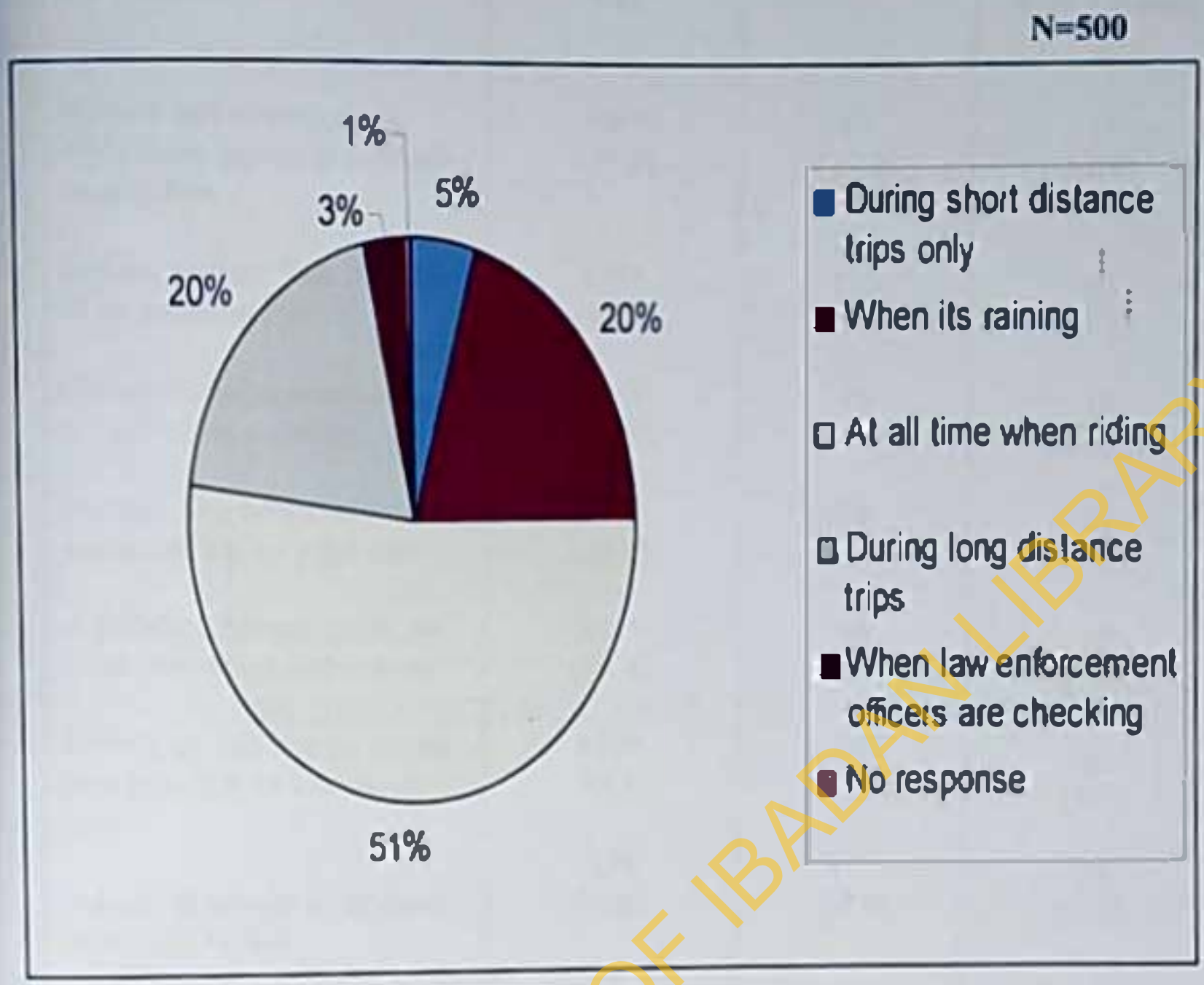


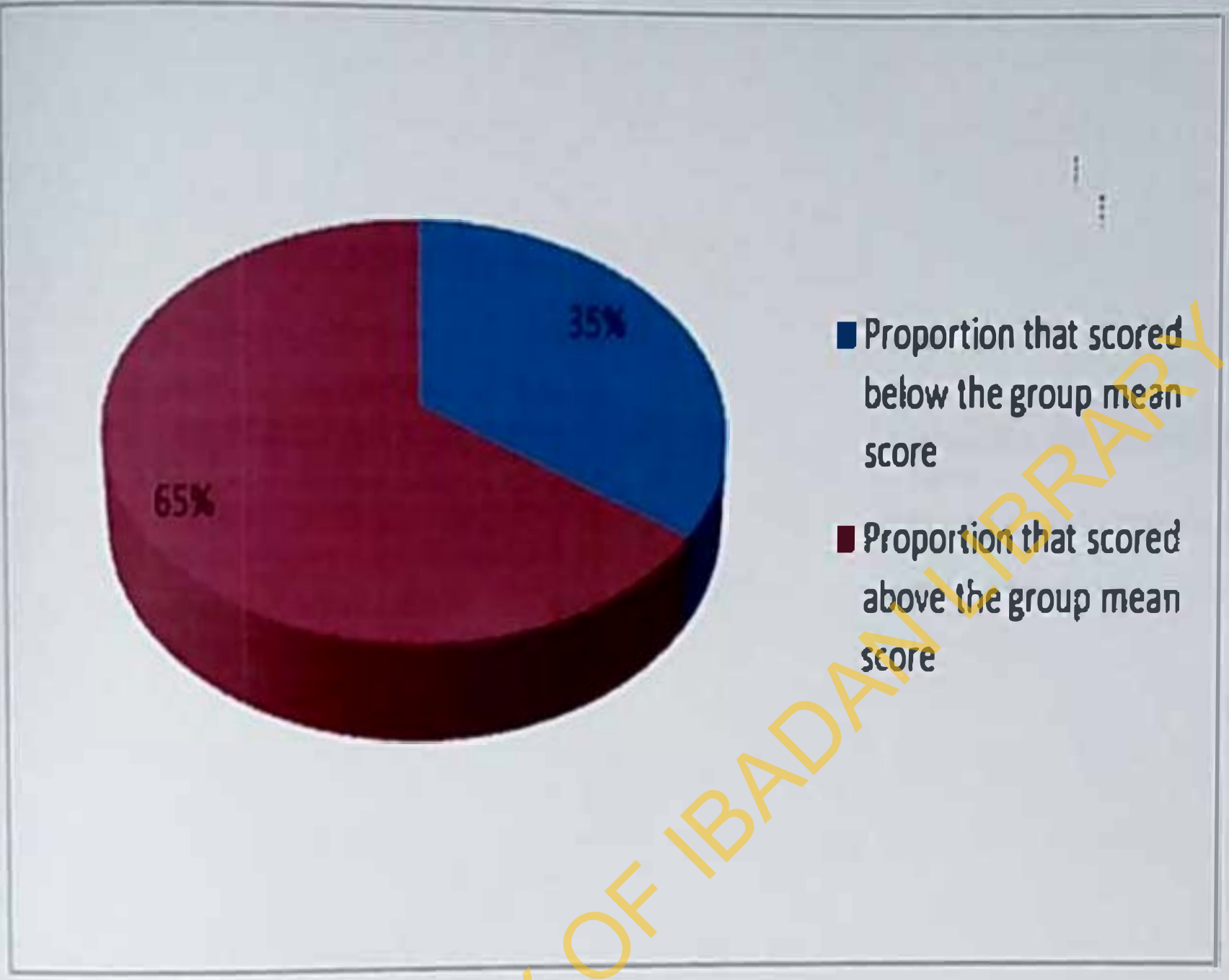
Table 6 Participants responses about the functions and care of the crash helmet

N=500

S/N	Statements	Yes	No	Don't Know	No** Response
1.	Helmet can protect ones brain from injury in case of an accident	399* (79.8)	85 (17.0)	14 (2.8)	2 (0.4)
2.	Helmet protect face in case of an accident	313* (62.6)	173 (34.6)	14 (2.8)	0 (0.0)
3.	Helmet reduces head injury in case of an accident	405* (81.0)	77 (15.4)	18 (3.6)	0 (0.0)
4.	Helmet cuts down on wind noise roaring by your ears	292* (58.4)	190 (38.0)	16 (3.2)	2 (0.4)
5.	A full-face helmet gives the most protection to the head	442* (88.4)	44 (8.8)	12 (2.4)	2 (0.4)
6.	Helmet should not be stored near gasoline or excessive heat	419* (83.8)	56 (11.2)	25 (5.0)	0 (00)
7.	Industrial helmet is as good as a crash helmet	375 (75.0)	87* (17.4)	29 (5.8)	9 (1.8)

* Correct Statement about the functions and care of the crash helmet
** Participants who did not answer the questions

Figure 6 Proportion of participants whose knowledge scores were below the mean and those whose scores were above the mean



• The proportion of participants whose knowledge scores were above 50% was 65.4% respectively

Figure 7: Proportion of participants whose knowledge scores were 50% and below and those whose scores were 50% and above

N= 500

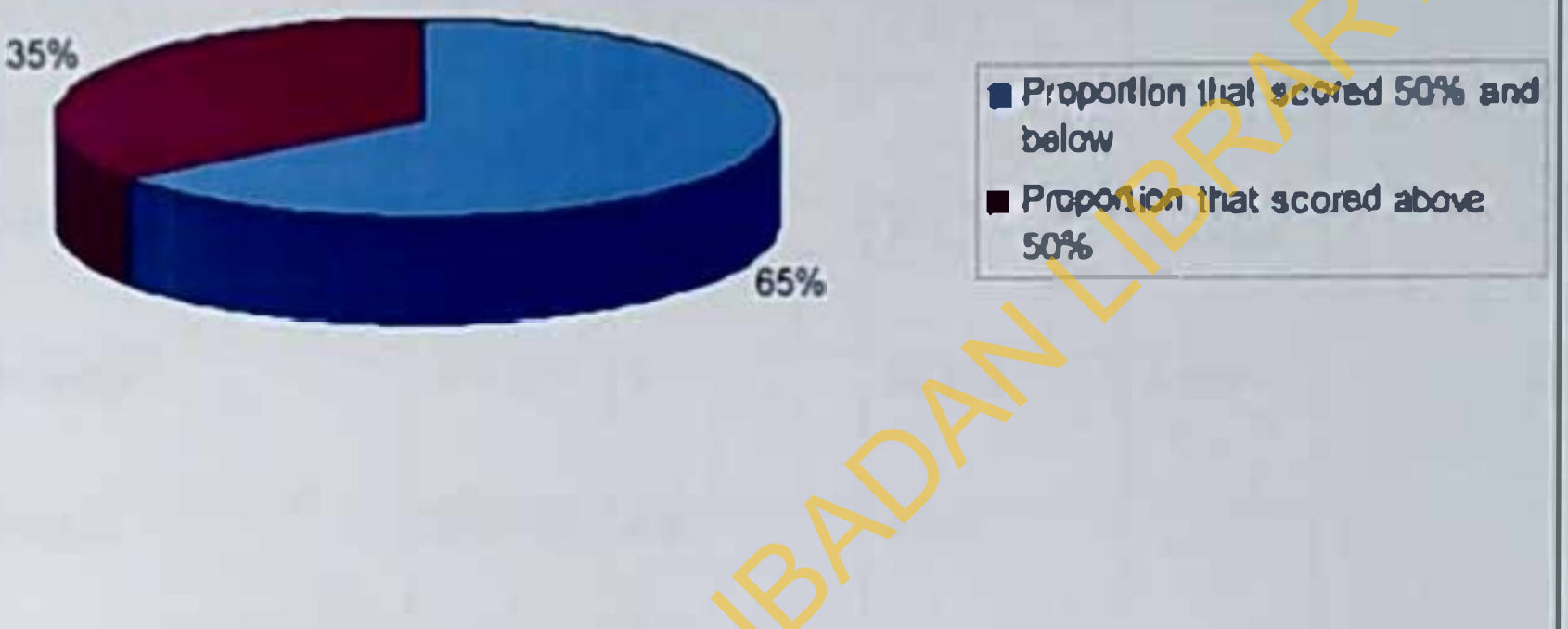


Table 7 Comparison of participants' mean knowledge scores by age

Age (Years)	Number	Mean score	Std deviation	F
15-24	129	6.16	2.197	13.594
25-34	239	7.44	2.069	
35-44	84	7.63	1.795	
45 and above	28	7.75	2.287	
ANOVA				
Vnrintion	SS	Df	MS	p-value
Between	175.237	3	58.412	0.000*
Within	2045.261	476	4.297	
Total	2220.498	479		

* Relationship was statistically significant (p<0.05)

Table 8 Comparison of participants' mean knowledge scores by marital status

Marital status	Number	Mean score	Std deviation	F
Never married	216	6.74	2.197	6.079
Married	253	7.53	1.991	
Separated	13	6.38	1.981	
Divorced	17	6.94	2.657	
ANOVA				
Variation	SS	Df	MS	p-value
Between	80.945	3	26.982	0.000*
Within	2197.059	495	4.439	
Total	2278.004	498		

*Relationship was statistically significant (p<0.05)

Table 9 Comparison of participants' mean knowledge scores by educational status

Educational status	Number	Mean score	Std deviation	F
No formal education	14	7.86	2.14	5.246
Primary education	101	6.56	2.45	
Secondary Education	299	7.14	2.02	
Tertiary Education	83	7.73	1.98	
ANOVA				
Vnrintion	SS	Df	MS	p-value
Between	70.048	3	23.349	0.001*
Within	2194.09	493	4.450	
Total	2264.141	496		

*Relationship was statistically significant (p<0.05)

Table 10 Comparison of participants' mean knowledge scores by ethnic group

Ethnic Group	Number	Mean Score	Std deviation	T	p-value
Yoruba	469	7.18	2.15	1.802	0.95*
Others	31	6.52	1.93		
Total	500	6.85	2.04		

*Relationship was not statistically significant (p>0.05)

Table 11 Comparison of participants' mean knowledge score by Religion

Religion	Number	Mean score	Std deviation	F
Islam	269	7.01	2.15	1.660
Christianity	227	7.26	2.12	
Traditional	4	8.50	1.73	

ANOVA

Variation	SS	Df	MS	p-value
Between	15.120	2	7.560	0.911*
Within	2263.632	497	4.555	
Total	2278.752	499		

*Relationship was not statistically significant (p>0.05)

Table 12 Comparison of participants' mean knowledge score by use of the crash helmet

Use of Crash Helmet	Number	Mean Score	SD	T	p-value
Ever used crash helmet	229	7.62	2.07	1.36	0.176*
Never used crash helmet	109	7.28	2.16		

*Relationship was not statistically significant (p>0.05)

Table 13 Participants' Sources of information about Crash Helmet

N=500

Sources*	No	%
FRSC**	254	50.8
Friends	163	32.6
Police	152	30.4
Television	126	25.6
Radio	110	22.0
Newspaper	58	11.6
Magazine	36	7.2
Association***	109	21.8
Posters	21	4.2

*Multiple responses were included
**Federal Road Safety Commission
***This refers to the motorcyclist's Association

Participants' perceptions relating to crash helmet

During the FGD, participants were asked to share their views on the effectiveness of the crash helmet in preventing head injury. The opinion and perceptions of discussants varied across the groups in this regard. Most discussants across the group viewed the helmet as being useful in many ways. According to a discussant,

- *"Helmet is good and it has lots of benefits. It is for protection. Helmet reduces the severity of head injury if one has an accident. I have seen motorcycle riders that fell off the motorcycle in the event of accident but they were not injured because they had their helmet on; helmet with face glass prevent dirt and bugs from entering the eyes. There are lots of advantages in wearing helmet, but most motorcycle riders are very stubborn, they will be giving one reason or the other. There is one particular motorcycle rider that said, "if he wears helmet he always have head ache". To me helmet is good."*

A discussant in another group remarked that the usefulness of crash helmet cannot be over emphasized. He stressed that

- *"... helmet is useful. Its usefulness is not comparable. There is no substitute for it. ordinary cap cannot play the vital role of protection that it plays."*

All the discussants in one group shared the view that the helmet is very useful. The words of two discussants in this group typified their perception of the crash helmet:

- *"Helmet is useful. Apart from the fact that it protects the head, it also minimizes intensity of heat of the sun on the head because too much of sun can cause brain damage."*
- *"Helmet prevents dusts from entering the eyes and it covers the head from sun's radiation."*

All discussants in another group opined that the helmet is very useful. Remarks of discussants in this group included the following:

- *"Helmet is useful in several ways; in case a motorcycle rider hits his head on the ground when he falls off from motorcycle, helmet will serve as a means of protection by absorbing the shocks and neutralizing the pain and the impact on brain."*
- *"It can reduce head injury, because if a cyclist that is not putting on helmet has head on collision in an accident, it might lead to brain damage or death".*

- *"Helmet is useful for motorcycle riders. If one sustains laceration or bruises on the arm or leg it can easily be treated, but the cost of treating brain or head injury is high. They may spend like N55, 000 on X-ray alone not to talk of other hospital expenses"*

Few discussants across the groups were of the opinion that helmet is not useful in preventing or reducing head injury.
Typical responses were

- *"Helmet is not useful for motorcyclists shuttling within the city, because it hinders us from hearing vehicle horn when ever we put it on especially the type that covers the ear."*
- *"My own opinion is that helmet is not useful in the prevention of accidents .I witnessed an accident along Apetefew months ago. In this accident as the motorcycle rider fell, his helmet was the first thing that fell off the cyclists' head because the chin strap of his helmet cut. It was God that saved him he would have hit his head against a sharp object. This means that helmet is not useful."*
- *"My prayer is that God will continue to protect commercial motorcyclists. Helmet is not doing any thing. Do you know that helmet does not cover arm, legs, neck or spinal cord? Secondly, helmet makes one to sweat. This can even make one to develop mental problem. It is because most motorcycle riders are normal, if not that they would have by now developed mental problem as a result of sweat and headache that helmet causes."*

A discussant in Ido group corroborated their views relating to the utility of the crash helmet. He was of the view that the wearing of helmet is part of fashion and that it is not useful in any way.

Respondents' perceptions relating to crash helmet as revealed in the quantitative survey are presented in table 14. More than half (55.4%) of the participants disagreed with the statement that the crash helmet contributes to neck injuries when accidents occur. Seventeen percent of participants were of the perception that helmet contributes to spinal cord injury when an

accident occurs, while the view of 48.5% was that wearing crash helmet reduces vision and thus increases the risk of having an accident (see Table 14 for details)

Table 14 also revealed that more than half (64%) of the participants agreed that wearing helmet makes it difficult for motorcyclist to hear well, while nearly half (49.6%) disagreed with the statement that people with traditional medicine/charms that protect them from accidents need not wear helmet. Almost equal proportions of the participants either agreed or disagreed with the statement that wearing helmet increases tiredness. Fifty-nine percent of the participants disagreed that making the wearing of crash helmet compulsory is the best way of ensuring compliance with its use.

Furthermore, it is revealed in Table 14 that more than half (67.4%) of the participants agreed that wearing the helmet causes headaches and or neck pain while 81.2% of the participants agreed that wearing helmet induces sweat especially during the dry season. Many participants (57.4%) disagreed with the view that crash helmet laws should be enforced for commercial motorcyclist. A majority (70.6%) of the participants agreed that crash helmet laws are only enforced when police and other law enforcement agents want to collect money illegally in lieu of arrest euphemism for taking bribes by law enforcement agents.

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Table 14 Participants' perception relating to crash helmet

N=500

Statement	Perceptions			
	Agree	Disagree	Undecided	No response
Helmet contributes to neck injuries when accident occur	151 (30.2)	277 (55.4)	69 (13.8)	3 (0.6)
Helmet contributes to spinal cord injuries when accident occurs	85 (17.0)	331 (66.2)	81 (16.2)	3 (0.6)
Wearing of helmet reduces vision and increases riders risk of having an accidents	242 (48.5)	216 (43.2)	37 (7.4)	5 (1.0)
Wearing helmet makes it difficult for motorcyclist to hear well	320 (64.0)	138 (27.6)	38 (7.6)	4 (0.8)
People with traditional medicine/charms that protect them from accident need not buy or wear helmet	73 (14.6)	248 (49.6)	176 (35.2)	3 (0.6)
Many people don't wear helmet because it scatter the hair	199 (39.8)	215 (43.0)	84 (16.8)	2 (0.4)
Wearing helmet increases tiredness	227 (45.4)	223 (44.6)	48 (9.6)	2 (0.4)
Making wearing of helmet compulsory is the best way to ensure compliance	161 (32.2)	295 (59.0)	35 (7.0)	9 (1.8)
Wearing helmet causes headache and neck pain	337 (67.4)	126 (25.2)	33 (6.6)	4 (0.8)
Wearing helmet increases over confidence not to take precaution against accident	132 (26.4)	323 (64.6)	40 (8.0)	5 (1.0)
Wearing helmet causes sweat especially during dry season	406 (81.2)	72 (14.4)	13 (2.6)	9 (1.8)
A rider wearing helmet has a better chance of surviving a crash than a rider without helmet	226 (45.2)	249 (50.2)	21 (4.2)	4 (0.2)
Passengers do not need to wear crash helmet	376 (75.2)	101 (20.2)	16 (3.2)	7 (1.4)
Crash helmet law should be enforced for commercial motorcycle riders	194 (38.8)	287 (57.4)	17 (3.4)	2 (0.4)
Crash helmet law is only enforced when police and other law enforcement agents wants to collect money	353 (70.6)	106 (21.2)	36 (7.2)	5 (1.0)

Use of crash helmet by commercial motorcycle riders

Observation of motorcycle riders

Of the 400 commercial motorcyclists observed, only sixty-seven (17%) wore crash helmets (See Figure 8 for details). Sixty-nine percent of the commercial motorcyclists who wore crash helmet fastened the helmet to their chin. (See Figure 9 for details). The types of helmet worn by motorcyclist were also observed. The most common type of crash helmet worn by motorcyclist was half face helmet (60%), some wore the construction hat (18%) (See details on figure 10).

The pattern of use of crash helmet was compared by time of the day. It was observed that use of crash helmet was slightly high in the morning (40.3%) compared to other times of the day (afternoon 34.3% and evening 25.4%). The relationship between use of crash helmet and time of the day was not statistically significant ($p>0.05$). (See table 15 for details).

A higher proportion (65.7%) of those operating in Apete area wore crash helmet, compared with their counterparts in Ijokodo (32.8%) and Omi-Adio (1.5%) communities. There was a significant difference between use of crash helmet and community or location of operation ($P<0.05$). (See table 16 for details).

In the Focus group discussion, the general consensus among the discussants in Omi-Adio was that commercial motorcycle riders in their area did not wear crash helmet.
Two discussants in one of the groups explained as follows:

- *"We don't use helmet in Omi-Adio; there is no rider that uses helmet. Although we have but we don't use because it causes lots of sicknesses."*
- *"Wearing of helmet is not common among commercial motorcyclists in this area, because we ply remote areas, where there are no vehicles to contend with. If we should wear helmet it will prevent us from hearing well. Secondly, we are not used to wearing helmet because it causes headache, it generates lot of heat and it makes one to sweat. We have helmet but we don't wear it."*

Similarly, use of the helmet was not reported to be common among commercial motorcyclists in Apete area except among those who take passengers to Ibadan Polytechnic Typical comments were as follows:

- *"Most commercial motorcyclists hardly wear helmet because it causes headache, very few of them wear it, some have it but they put it on when they see police afar off".*
- *"When the law was introduced, there was no rider that was not wearing helmet, but presently only few riders use helmet. The police no longer enforce the law, except in some places where there is a laid down rule that all motorcyclists shuttling there must wear helmet. For example you cannot carry passenger to Polytechnic, Ibadan without wearing helmet."*

Only very few discussants in Apete Area reported that use of helmet is common among commercial motorcyclists in their area. They turned out to be those who carry passengers to Ibadan Polytechnic. One of the discussants in one of the groups remarked:

- *"Helmet use is common among commercial motorcyclists in this area because it is a must for a rider to wear helmet especially when carrying passenger to the Polytechnic. It is compulsory for motorcyclist shuttling between Apete and Poly to have his helmet on."*

Another discussant had this to say:

- *"We are trying to wear helmet in this area but the problem is from dealers of motorcycles. They have spoilt the sales of helmet. When helmet was sold at N200 they usually give us helmet with the motorcycle, but now if we buy motorcycle they don't give us helmet again. They keep it and sell to us separately. This is not supposed to be so. This is the reason why most people don't wear helmet."*

The interview revealed that majority (67.6%) of the participants had crash helmet. Of the 67.6% participants that had crash helmet, only 68% used them. (See Figure 11 for details). The frequency of use of crash helmets varied among the participants (See Table 17). The gold standard in the highway code is to use the crash helmet always. Only 33.4% of the participants use crash helmet always, while 17.5% use helmet sometimes. Few participants (14.5%) use crash helmet when traveling while 2.4% use crash helmet only when the law enforcement agents were on patrol.

Majority (91.5%) of the participants who used crash helmet reported that they wore it securely fastened to the chin, while 8.5% reported that they did not. When participants without crash helmet were asked about their intention to procure a crash helmet, only 33.3% expressed the intention to procure one (see Table 17 for details).

Table 18 shows comparison between the participants' use of the crash helmet and their socio-demographic characteristics. The use of crash helmet was highest among participants aged 25-34 years (49.8%), followed by those aged 35-44 (23.6%). Participants aged 45years and above 17(7.4%) had the lowest prevalence of crash helmet use. The relationship between the participants' age and use of crash helmet was however statistically significant ($p<0.05$). A higher proportion (59.4%) of those who use crash helmets were married compared with their never married counterparts (33.6%). There was however no statistically significant relationship between their marital status and use of crash helmet.

The use of crash helmet was highest among those with secondary education (57.5%) followed by those with tertiary education (21.1%). The participants with no formal education, 5(2.2%) had the lowest prevalence of helmet use. The relationship between the participants' level of education and use of crash helmet was not statistically significant ($p>0.05$). A slightly higher proportion of those that used crash helmets were Christians (51.5%) followed by Moslems (48.5%). There was a statistically significant relationship between the participants' religion and use of crash helmet.

A majority (96.0%) of those who used crash helmets were Yoruba while only 4.0% were Igbo. No statistically significant relationship was found between the participants' ethnicity and use of crash helmet. Other details of the association between the participants' use of crash helmet and socio-demographic characteristics are shown in Table 18.

Figure 8: Observed use of crash helmet among participants

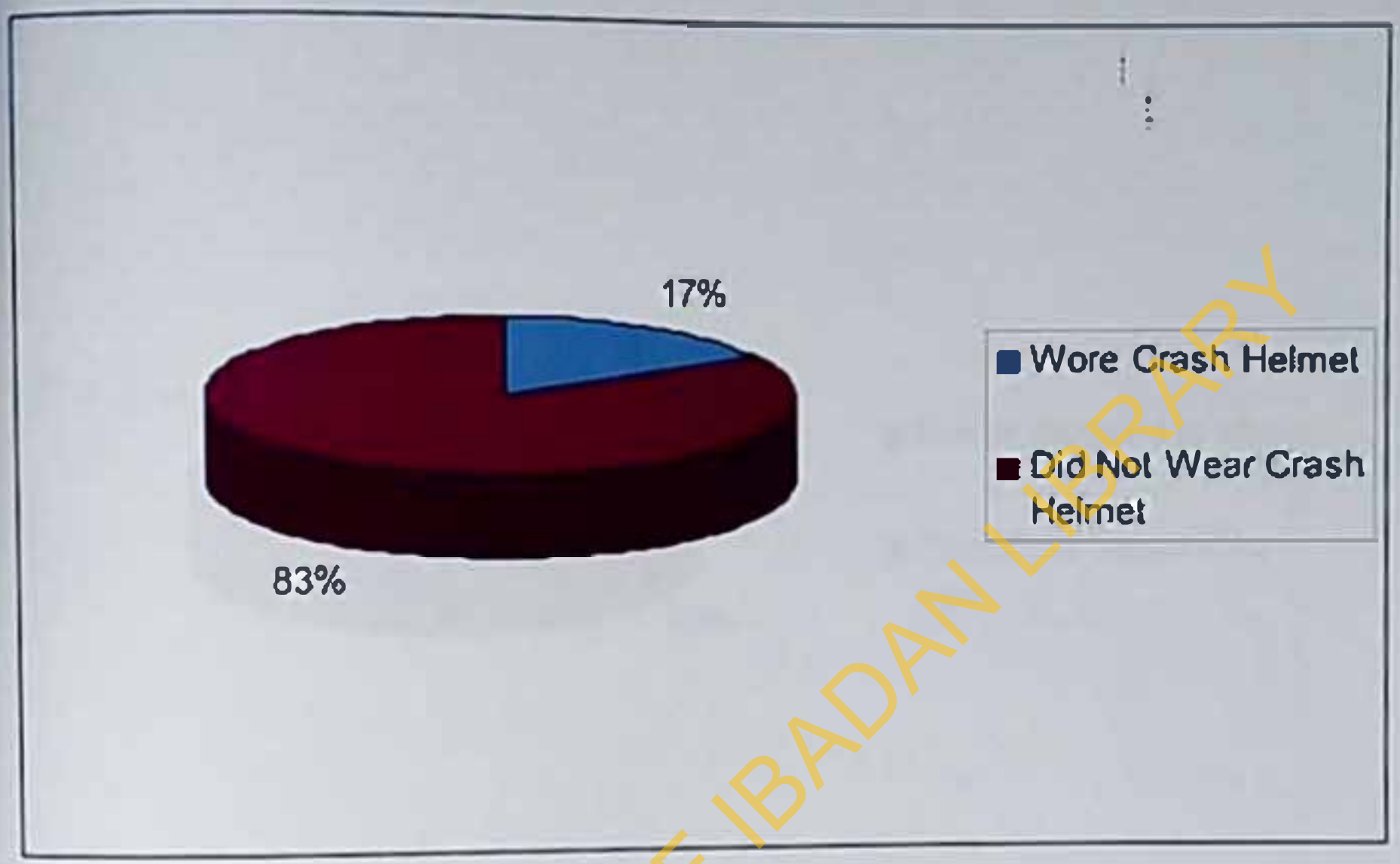


Figure 8: Observed use of crash helmet among participants

N=400

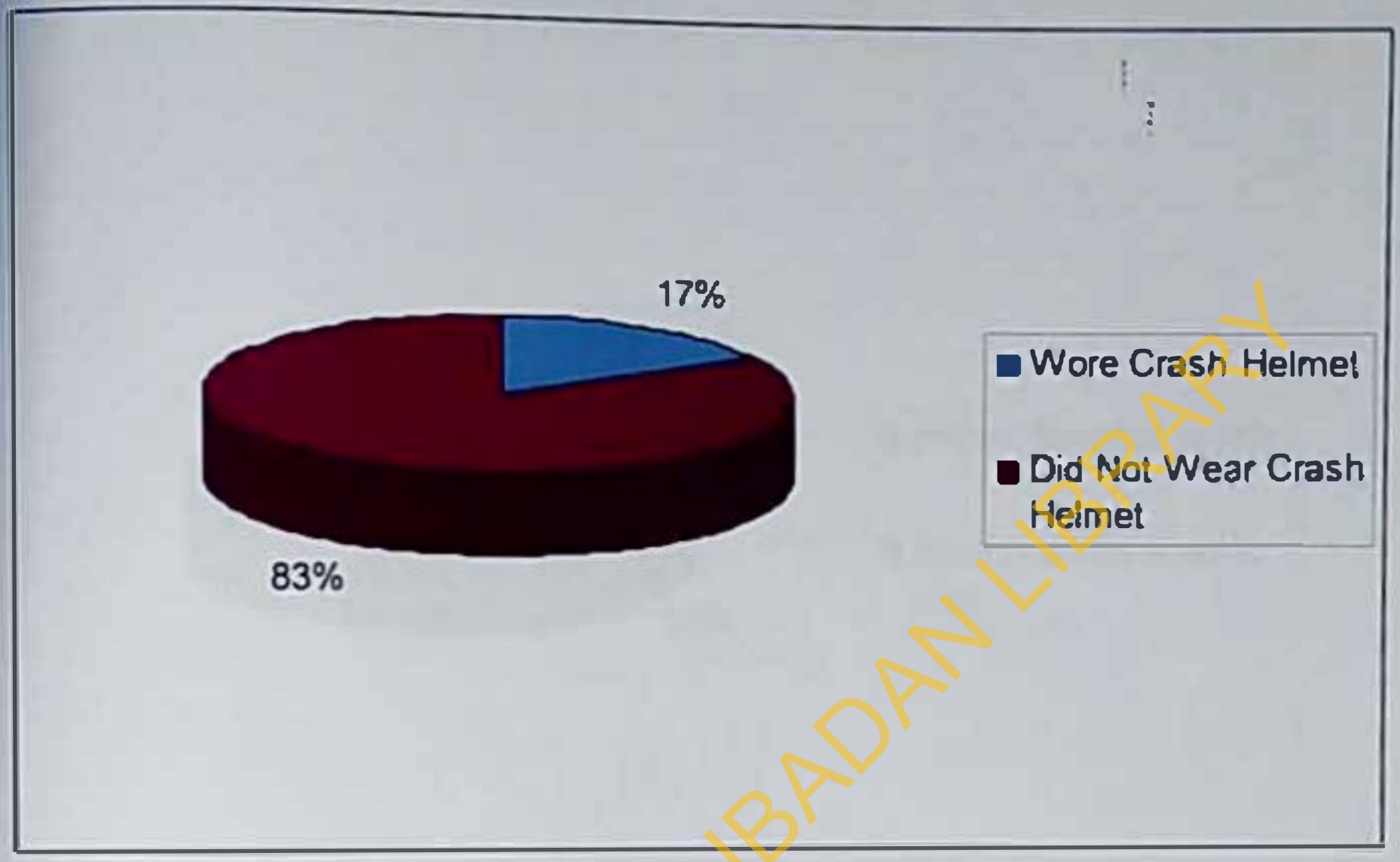


Figure 9: Pattern of wearing the crash helmet among the participants

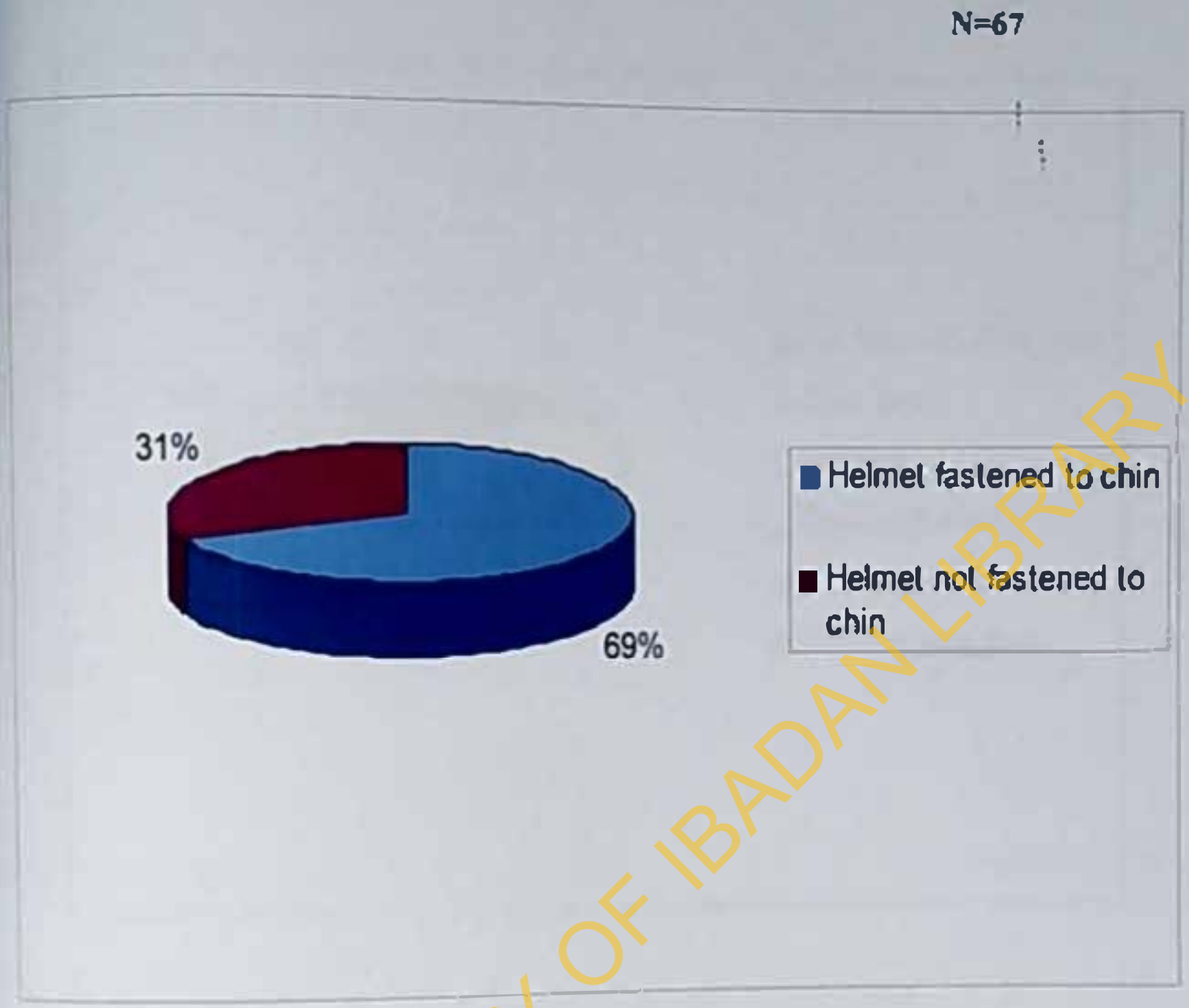


Figure 10: Type of crash helmet worn by participants

N=67

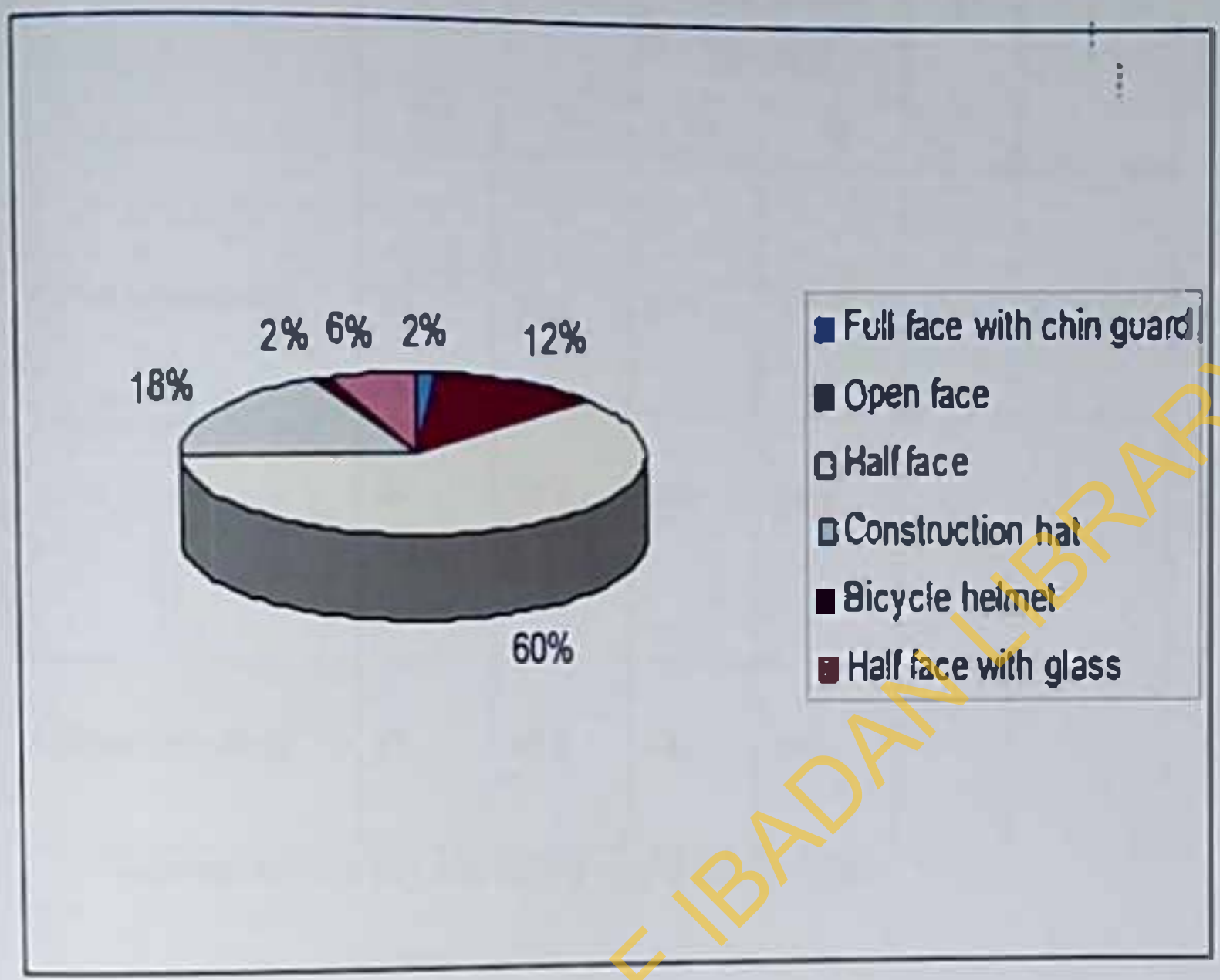


Table 15 Comparison of participants' use of helmet by time of operation

Time of the day	Use crash helmet (N=67)		Did not use crash helmet (N=333)		X^2	p-value
	No	%	No	%		
8.00am (morning)	27	40.3	113	33.9	1.986	0.370*
1.00pm (afternoon)	23	34.3	107	32.1		
5.00pm (evening)	17	25.4	113	33.9		

*Relationship was not statistically significant (p>0.05)

Table 16 Comparison of participants' use of helmet by community or location of operation

Location of operation	Use crash helmet (N=67)		Did not use crash helmet (N=333)		χ^2	p-value
	No	%	No	%		
Apete**	44	65.7	116	34.8	31.157	0.000*
Ijokodo	22	32.8	118	35.8		
Omi-Adio	1	1.5	99	29.7		

*Relationship was statistically significant ($p<0.05$)

**Apete motorcycle riders who take passengers to Ibadan polytechnic wear the crash helmet because authorities of the institutions make it mandatory

Figure 11: Frequency of use of crash helmet among the participants

N=338

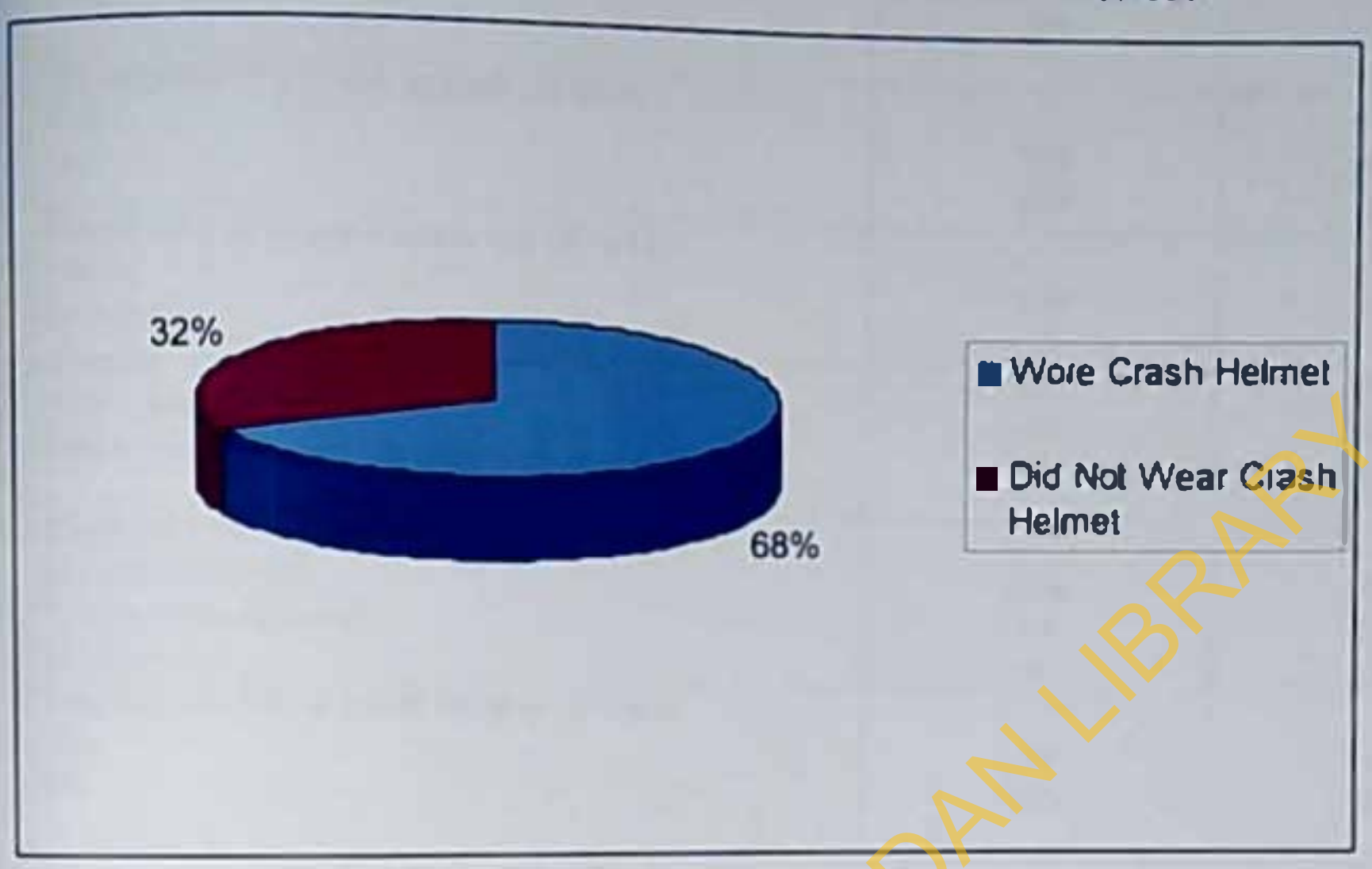


Table 17 Participants' ownership of helmet, pattern of use, mode of wearing the crash helmet and intention to procure one

Use of Helmet	No	%
Ownership of a crash helmet (N=500)		
Yes	338	67.6
No	162	32.4
Frequency of crash helmet use (N=338)		
Never	109	32.2
Sometimes	59	17.5
Always	113	33.4
When traveling	49	14.5
When enforcement officers are on patrol	8	2.4
Mode of wearing the crash helmet (N=229):		
Securely fastened	204	89.1
Not securely fastened	19	8.3
No response	6	2.6
Intention to buy n crash helmet (N=162):		
Yes	54	33.3
No	108	66.7

Table 18 Comparison of participants' use of helmet by socio-demographic characteristics

N=338

Characteristics	Use crash helmet (N=229)		Don't use crash helmet (N=109)		X^2	p-value
	No	%	No	%		
Age						
15-24yrs	44	19.2	26	23.9	11.07	0.011
25-34yrs	114	49.8	66	60.6		
35-44yrs	54	23.6	16	14.7		
45 and above	17	7.4	1	0.9		
Marital status						
Never married	77	33.6	43	39.4	5.589	0.133*
Married	136	59.4	56	51.4		
Divorced	7	3.1	8	7.3		
Separated	9	3.9	2	1.8		
Highest level of education						
No formal Schooling	5	2.2	5	4.6	5.48	0.140*
Primary Education	44	19.3	12	11.1		
Secondary Education	131	57.5	71	65.7		
Tertiary Education	48	21.2	20	18.5		
Religion						
Christianity	117	51.5	41	37.6	5.73	0.017
Islam	110	48.5	68	62.4		
Ethnic Group						
Yoruba	215	96.0	104	95.4	0.06	0.808*
Igbo	9	4.0	5	4.6		

*Relationship was not statistically significaot (p>0.05)

Factors influencing participants' use/non use of crash helmet

The focus group discussants were asked about the reasons why some riders do not wear helmet. The principal reasons adduced by majority of the discussant for not wearing a crash helmet included the following:

- Inferior nature of the available helmet
- Helmet causes discomfort such as heat and sweating especially under hot sun.
- Helmet prevents one from hearing well
- High cost of good quality helmet
- Helmet causes headache
- It does not make ones style of dressing alright
- Helmets are no longer sold with motorcycles

One discussant took time off to articulate the reasons why many motorcyclists do not use the crash helmet. He declared:

"Though helmet is useful, but there are many reasons why many motorcyclists don't use helmet especially in our own area. Some of these reasons are as follows: firstly is the road safety policy. This is the principal reason why most cyclists do not use helmet. The policy says that a cyclist must have two helmets, one for him and the other for his passenger. Passengers reject this helmet because they can't wear what another person has worn. It is also cumbersome for a cyclist to be carrying two helmets around. He has no boot or special place to keep it. Second reason is that helmet generates heat. A helmet is supposed to be worn with the chin guard or strap securely fastened. If it is worn this way within 30 minutes the cyclists will start sweating profusely and might develop headache. The third reason is fake helmet. Good quality helmet are no longer available in the market. For example, I have seen a cyclist that was injured by helmet in an accident. The cyclist died on the spot. Infact, helmet is not serving its purpose. I remember 2 years ago when Government said cyclists must wear helmet compulsorily. It was after then that we saw a rider that was involved in a crash. This cyclist died as a result of head injury. If quality helmet are produced, cyclist will buy and wear them. Manufacturers of helmet are only interested in making money. Another reason is the cost of helmet. Quality helmets are sold at an

that hired motorcycle for a week to buy helmet of N5000 that will only be useful for a week? The fifth reason is that helmet transmits diseases like dandruff, or ringworm. One can even contract HIV, if one should use helmet that is stained with blood. These are the contributing factors to non-use of helmet by most cyclists."

Another discussant supported him by saying:

- *"These helmets are not good, and they should produce quality helmet that will not break easily."*

Most discussants across the group explained that helmet could be discomforting. Typical responses that reflected this view included the following:

- *"if I wear helmet it will prevent me from hearing well. One may not even hear if a vehicle is approaching. We are not used to wearing helmet because it causes headache and it generate lots of heat and sweat."*
- *"I am also part of the cyclists that don't wear helmet. I don't wear it because it usually generates heat. The moment it starts giving out heat my brain will be aching me."*
- *"I use helmet all the time, under hot or cold weather. The moment I leave for my house to relax, I will start having headache, because it usually gives out heat to the brain. This is the only disadvantage of wearing helmet."*
- *"There are some (helmet) that seem as if one is carrying heavy load on the head if one wears it and it affects the neck. Another thing is that for some one that uses cap, if he wears helmet on the cap, the helmet will not make his dressing to look fine and the person will not like it."*

The prohibitive cost of good quality helmets was also a concern which most discussants commented on. It was disclosed that most motorcyclists cannot afford to procure it. A discussant said,

- *"We are aware that helmet use is compulsory but it is not affordable. ..... I can't afford to spend N3,000 to N4,000 on the crash helmet when I 've not catered for*

costly, with their prices ranging from ₦3,500 to ₦5,000. How do you expect a cyclist that hired motorcycle for a week to buy helmet of ₦5000 that will only be useful for a week? The fifth reason is that helmet transmits diseases like dandruff, or ringworm. One can even contract HIV, if one should use helmet that is stained with blood. These are the contributing factors to non-use of helmet by most cyclists."

Another discussant supported him by saying:

- *"These helmets are not good and they should produce quality helmet that will not break easily."*

Most discussants across the group explained that helmet could be discomforting. Typical responses that reflected this view included the following:

- *"if I wear helmet it will prevent me from hearing well. One may not even hear if a vehicle is approaching. We are not used to wearing helmet because it causes headache and it generate lots of heat and sweat."*
- *"I am also part of the cyclists that don't wear helmet. I don't wear it because it usually generates heat. The moment it starts giving out heat my brain will be aching me."*
- *"I use helmet all the time, under hot or cold weather. The moment I leave for my house to relax, I will start having headache, because it usually gives out heat to the brain. This is the only disadvantage of wearing helmet."*
- *"There are some (helmet) that seem as if one is carrying heavy load on the head if one wears it and it affects the neck. Another thing is that for some one that uses cap, if he wears helmet on the cap, the helmet will not make his dressing to look fine and the person will not like it."*

The prohibitive cost of good quality helmets was also a concern which most discussants commented on. It was disclosed that most motorcyclists cannot afford to procure it. A discussant said,

- *"We are aware that helmet use is compulsory but it is not affordable. ..... I can't afford to spend ₦3,000 to ₦4,000 on the crash helmet when I've not catered for*

my family and paid my house rent; helmet should be sold with motorcycle at affordable prices".

A discussant from the same group added,

- *"Price of helmet is too high. For example some helmets are sold for ₦5,000. Good quality helmet cost between ₦3,500 and ₦5,000, except for construction hat that are sold at lesser price, but it can even contribute to head injury because it breaks easily.*

The dilemma faced by motorcyclists regarding the cost of a helmet generated a lot of discussion. Two discussants commented on this again by saying

- *"Manufacturers usually produce motorcycle with a helmet but dealers sell the helmet separately so as to generate more money. Government should do something about it."*
- *"We would be wearing helmet if it is sold with a motorcycle. I cannot afford to buy a motorcycle on credit and be paying back the money installmentally and still be thinking of buying helmet".*

The factors influencing the use of crash helmet were explored among the participants. Among the participants who do not use crash helmet, 45.9% reported that they were not using because crash helmet generate heat and sweat, 16.5% felt that crash helmet is of no importance to them, while 6.4% reported that it caused headache. (See Table 19 for details)

The reasons adduced for using crash helmets sometimes included that use of crash helmet is mandatory for riders in their areas of operation (52.7%), it causes headache (32.7%), and makes people sweat (14.5%). Slightly above half (52.3%) of the participants who use crash helmet always used it because of the perception that it protects the head from injury. Twenty-three percent of participants used crash helmet always because it is mandatory for commercial motorcyclists in the areas of operation, while 18% used it always to prevent insect from entering their ears and eyes. Only very few participants (7.2%) used crash helmets always to avoid police harassment.

The 55.1% of participants who used crash helmet when traveling do so to protect their head from injury, while 32.7% used it to prevent wind from entering their ears and eyes. Equal

proportions of participants use it when traveling to avoid police harassment (6.1%) and to prevent insects from entering their eyes (6.1%). Majority (87.5%) of the participants used crash helmet when law enforcement agents were on patrol and it was worn to avoid harassment. A few 12.5% wore the helmet only to prevent police from collecting money from them. (See details in Table 19).

Table 19 Factors influencing participants' use/non use of crash helmet

Frequency of Use	Factors	N	%
Never	• Obstruct sight	20	18.4
	• Breaks easily & injures head	2	1.8
	• Generate heat & sweat	50	45.9
	• Police had ceased it	6	5.5
	• Contributes to head injury	6	5.5
	• Causes headache	7	6.4
	• Useless	18	16.5
Sometimes	• Mandatory to wear it in area of operation	29	52.7
	• Induces sweat	8	14.5
	• Causes headache	18	32.7
When Traveling	• To protect my head	27	55.1
	• To prevent wind entering my eyes/ears	16	32.7
	• To avoid police harassment	3	6.1
	• To prevent insects from entering my eyes	3	6.1
Always	• To protect my head	60	53.1
	• To prevent bugs/flies from my ears/eyes	20	17.7
	• To avoid police harassment	7	6.2
	• Mandatory to wear crash helmet in area of operation	26	23.0
When law officers are on patrol	• To avoid police harassment	7	87.5
	• To avoid giving Police money	1	12.5

Participants' awareness about the state law on use of crash helmet

The qualitative aspect of this study also explored participants' awareness about the state law that mandates the use of the crash helmet for motorcyclists. One of the questions asked was 'Is there any law or high way code that mandates use of crash helmet for motorcycle riders?'

Majority of the discussants admitted that there is a law that made use of helmet mandatory for all motorcycle riders. Some added that the law was introduced two years ago by the Oyo State government during Governor Ladoja's administration. Typical responses from discussants were:

- *"It was the government that enacted the law on helmet use. Cyclists and passengers are expected to wear helmet when riding a motorcycle."*
- *"The law was enacted in 2005. The law says that any motorcyclist seen not wearing helmet while riding on a bike will be fined or charged to court."*
- *"Government enacted the law. The law says that all motorcyclists must wear helmet while riding. Any cyclist that is caught will be arrested by police and the penalty for not wearing helmet is a fine of N5,000."*

The reported fine for not wearing helmet varies. In the words of a discussant in one of the groups in Omi-Adio branch.

- *"If police in this area should catch a cyclist that hung his helmet on the handle bar of the motorcycle, they will arrest such rider, seize their helmet and ask him to pay a fine of N500"*

Furthermore, the focus group discussants were asked to express their opinion about the law that mandates the use of helmet for motorcyclists. Majority of the discussants said that the law was not good and should be scrapped. Some of the discussants in some of the groups stated that they would be happy if the law was scrapped. Below are quotes from some of the discussants:

- *"I will be happy if the law is scrapped, because with or without helmet it is God's protection that matters. I have seen people that have been in this business for many years that have never had an accident. I have also seen somebody who died within*

some months he started the business. So wearing helmet does not stop anything that has been destined to happen."

- *"My own opinion is that the law should be canceled, because helmet provides little or no protection at all. It even contributes to injury. For example if a cyclist should hit his head against an object in an accident the helmet can break and even injure the cyclist's head. In addition, those that ought to enforce this law like the police, and other law enforcement agents don't wear helmet while riding. Why is it that it is only commercial motorcyclist they like inconveniencing in this country? I feel the law should be canceled."*

- *"Helmet law should be scrapped. If they are concerned about protecting the head, how about protection of other parts of the body? In most accidents the common site of injury are legs and arm. The most important thing is to put our trust in God for His utmost protection."*

- *"If they can cancel the law, it will be very good. The reason is that helmet does not proffer any protection. To me, its use or non-use means nothing; it makes no difference since people have not been using it. The only thing is to ride at a minimal speed. If they can cancel the law it will be good."*

Few discussants within a group reported that the law was no longer effective They added that law enforcement agents don't arrest motorcyclist that are found not wearing helmet One of the discussant had this to say.

- *"When the law was introduced it was very effective. Police usually arrest commercial motorcyclist for not wearing helmet. There is nothing like that again. I see it as a waste of money if you go ahead to buy helmet now. Few people that are using it are doing so because they feel like."*

Another discussant added that the reason why the law is no longer effective is because motorcyclists cannot cope with two additional helmets which are supposed to be meant for the passengers. He explained.

- *"Where will a cyclist keep two helmets that are meant for his passengers? Our own helmet that we sometimes hang on handle bars of motorcycle disturb at times."*

However, few discussants in three groups were of the opinion that the law is good. They said that the law should not be scrapped, but government should endeavor to make good quality helmets available and they should be sold at cheaper prices. These discussants explained:

- *"This law is for the benefit of cyclists and not that of government or their relatives. Government should please help us reduce price of helmet."*
- *"The law is good, but the problem in this country is that people tend to increase price of something when they observe or hear that some people have been mandated to use it. Helmet law is good. Helmet is useful as well, but its price should be affordable to the common man like us to buy."*
- *"Since the time they have introduced the law, I can't ride without wearing helmet. Apart from the fact that it prevents the head against injury, it also protects my head under the scorching sun. To me the law is good; they should not tamper with it."*

A discussant in one of the groups in Apete admitted that the law is good but people are just difficult to change. He remarked that in this country until laws are imposed people find it difficult to obey it. He explained that the law enforcement agents even see it as an opportunity for making money (taking bribes).

- *"In this area, the law enforcement agent has seen it as a way of making money. Since the law was enacted I have not seen a cyclist that has been charged to court for not using helmet. Policemen in this Apete have taken laws into their hand. There was a day a policeman was running after a motorcyclist because he was not wearing helmet. The fact is that policeman was only interested in collecting N20; he is not interested in the safety of the rider.*

Slightly more than half (57.4%) of the participants reported that there is a State Law mandating use of the crash helmet for commercial motorcyclists, while 10.4% said that there was no such law; 32.0% were not aware whether there was a state law or not. (See table 20 for details). Participants' awareness about the law was also explored. Few participants (17.5%) reported that the law states that it is mandatory for motorcyclists to wear crash helmet when riding, 3.8% stated that Federal Road Safety mandated use of crash helmet for all motorcyclists. Other statements made by participants are presented on Table 20.

Table 20 Participants' awareness about the state law on the use of crash helmet

	Number	%
Is wearing helmet mandatory by law: (N=500)		
Yes	287	57.4
No	52	10.4
Don't know	160	32.0
No Response	1	0.2
Awareness of what the law says: (N= 287)		
It is mandatory for motorcyclist to wear helmet when riding	50	17.4
Federal Road Safety Commission made helmet use mandatory for riders	11	3.8
Riders should wear helmet for protection of head	7	2.4
All motorcyclist must have crash helmet	2	0.7
No response	217	75.6

Prevalence of accidents among participants

The results of the FGD also threw light on the prevalence and causes of accidents among participants. Almost all the groups said that accidents were common among commercial motorcycle riders in their areas. The major causes of accident as disclosed by the discussants were:

- Over speeding
- Over loading
- Lack of experience and expertise of young cyclists
- Excessive alcohol consumption
- Hostile attitude of vehicle owners
- Faulty motorcycle parts
- Break failure
- Greediness of some cyclist to make more money
- Poor state of roads

There was a consensus of opinion among the discussants that car owners were the major contributors to most motorcycle accidents. Below are some typical responses from discussants:

- *"Motor car drivers are the causes of motorcycle accidents. They are never patient with us on the road. They see us as mere okada rider".*
- *"Car owners hate seeing commercial motorcycle riders, we are their enemies. At times if we meet on the road it will seem as if they should hit us or clear us off the road."*
- *"It is not that commercial motorcycle riders are careless or reckless while riding. Car owners are the major causes of most accidents. They may decide to stop without indicating with their hand."*

Alcohol consumption was generally attributed as a major cause of accidents by majority of the discussants. Few discussants remarked that this habit is rampant among younger motorcyclists. It was pointed out that drunk motorcyclists have poor mental ability to judge, they would carry over load and there is every tendency for such cyclist to over speed and break basic traffic rules. Responses from discussants included:

- *"When a drunk rides a motorcycle, it will seem as if he is riding a bicycle. When such an individual is speeding, it will seem as if he is not moving at all".*
- *"Excessive alcohol consumption habit of young motorcyclists is the major contributor to motorcycle accidents.*

A discussant also supported the claim that motorcyclists drink a lot. This discussant explained.

- *"Cyclists drink a lot and alcohol consumption and over speeding are other contributing factors to accidents."*

Two discussants in a group had this to share on greediness and over speeding as causes of accidents.

- *"It is not only break failure that causes accident, most motorcyclists are only interested in making as many trips as possible so as to make more money".*
- *"Over speeding and greed to carry as many passengers as possible in order to make more profit is a major cause of frequent accident among cyclist. A cyclist that over speeds will surely have accident."*

Many discussants in all the groups admitted that motorcyclists are highly prone to injuries. The common injuries they mentioned were:

- Fracture of the bone
- Dislocation of joints
- Injury in chest, genital organs and spinal cord
- Laceration
- Bruises

Few discussants admitted that cyclists were prone to head injury. They said that the common parts of the body where injuries occur were legs and arms. Typical responses included:

- *"Laceration, bruises or leg dislocation are common injuries that motorcyclists sustained in accidents. It's only fatal accident that leads to head injury or fractured legs."*
- *"Common injuries motorcycle accident victims sustained are fractured legs, neck bone, and spinal cord or head injury. If a motorcycle stumbles it is either the rider sometimes falls and get his head broken or injured or a vehicle hits him on the leg. I have*

also seen an accident where the rider was knocked down by a car. He got his spinal cord and scapula bone broken and he died on the spot."

- *"In some instances it (motorcycle accident) can lead to spinal cord injury, because a vehicle might hit the rider from the rear."*

Sixty-five percent of the participants had ever had accidents before while 61.8% had accident during the year preceding the study. Slightly more than half of the accidents that occurred within a year preceding the study occurred on weekends, 40.0% occurred in the evening, 29.2% and 16.3% took place in the morning and afternoon respectively. (See Table 21 for details)

Table 21 also revealed that many of these accidents occurred at a bend (35.6%), 19.8% on an un-tarred road and 16.8% on a tarred road. The two major causes of these accidents included collision with a vehicle (26.7%) and collision with another motorcycle (22.8%). Equal proportions of participants said that their accidents occurred due to mechanical fault in their motorcycle (15.8%) and stationary object (15.8%).

Table 22 shows that majority (82.2%) of the commercial motorcyclists who had accidents during the year preceding the study were flung off the motorcycle. Of these respondents, majority (87.2%) sustained injury, with the most common site/type of injury being the leg (67%) followed by bruises/abrasion (43.2%).

Table 21: Prevalence, time and causes of accidents

Responses	Number	%
Ever been involved in an accident: (N=500)		
Yes	327	65.4
No	172	34.4
No. of accident (under 1 year) (N=327)	202	61.8
Period of occurrence: (N=202)		
Weekday	99	49.0
Weekend	103	51.0
Time of occurrence: (N=202)		
Morning	59	29.2
Afternoon	33	16.3
Evening	88	43.6
Night	22	10.9
Place of occurrence: (N=202)		
At a junction	28	13.9
Roundabout	18	8.9
Straight stretch of the road	10	5.0
At a bend	72	35.6
On a tarred road	34	16.8
On an un-tarred road	40	19.8
Cause of accident: (N=202)		
Collision with a vehicle	54	26.7
Collision with another motorcycle	45	22.8
A pedestrian	15	7.4
A stationary objection	6	3.0
Bad road	32	15.8
Poor visibility	17	8.4
Mechanical problem with motorcycle	32	15.8
No response	1	.05

Table 22 Nature of accident and type of injury sustained

Responses	Number	%
Flung off Motorcycle: (N=202)		
Yes	166	82.2
No	36	17.8
Sustained injury: (N=202)		
Yes	176	87.2
No	26	17.8
Site of Injury: (N=176)		
Leg	118	67.0
Arm	30	17.0
Head	6	3.4
Ankle	1	0.6
Knee	20	11.4
Stomach	1	0.6
Type of Injury: (N=176)		
Bruises/Abrasion	76	43.2
Laceration	72	40.9
Fracture	11	6.3
Dislocation	15	8.5
Neck injury	2	1.1

Suggestions for promoting use of crash helmet among commercial motorcyclists

When discussants were asked how commercial motorcycle riders could be protected against accidents, various suggestions were given based on their experiences. Most discussants were of the opinion that State Government and the law enforcement agents should organize seminars for commercial motorcycle riders annually. One of them explained:

- *"Workshops and orientation training programmes should be organized for riders. The programme should involve officials of Federal Road Safety Commission sharing their experiences on causes of accidents and safety measures for preventing accidents. They could use different media (cinema, distribution of handbills and posters) focusing on how motorcyclists can protect themselves."*

Another discussant said:

- *"Police should put some measures in place to check against cyclist taking alcohol while riding. He added that those found to be drunk should be arrested and charge to court to serve as deterrent to others."*

A discussant also suggested that there should be age restriction for commercial motorcycling business. He stated that:

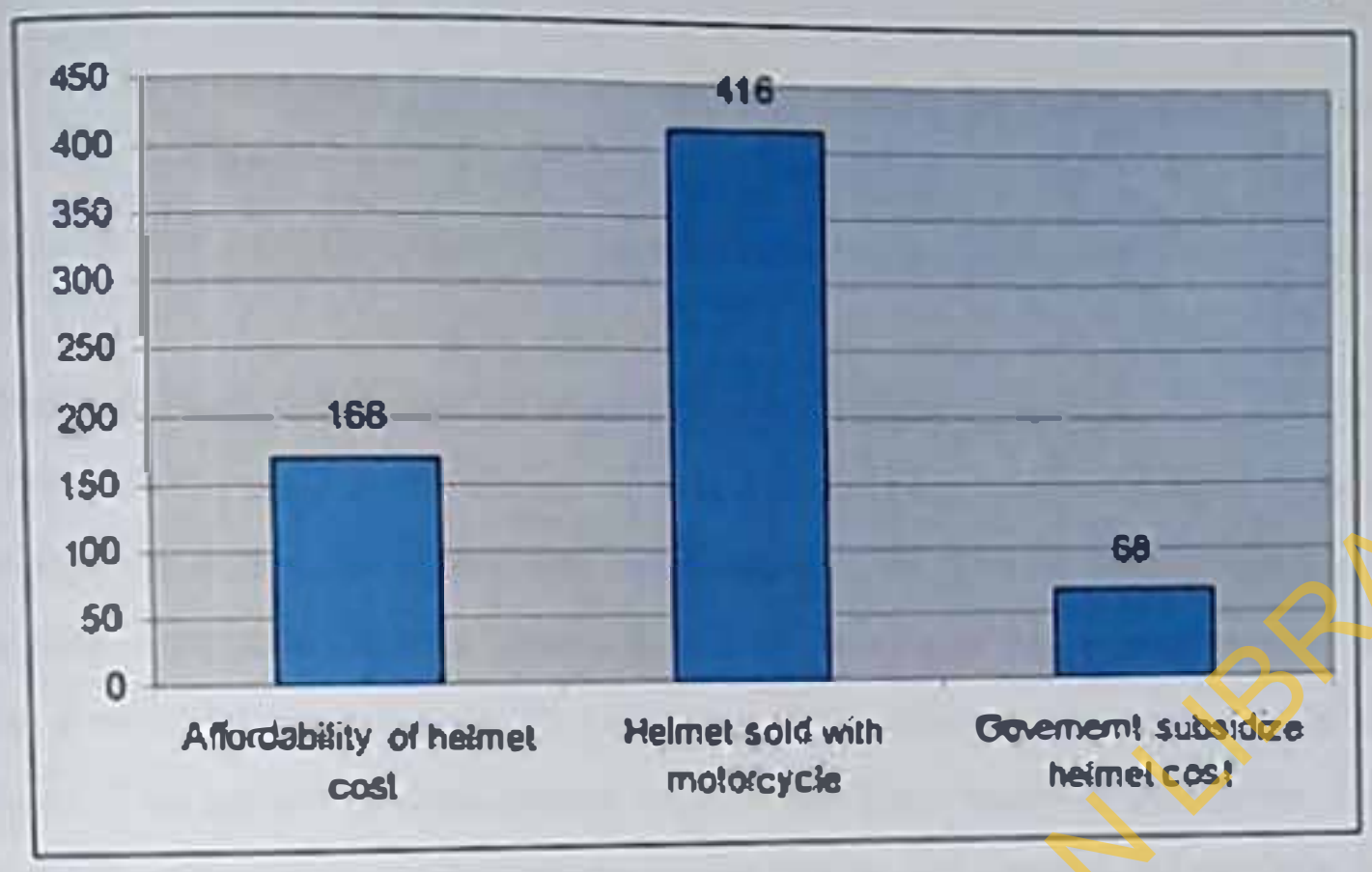
- *"Somebody that is young is not fit to ride okada especially for commercial purposes. Some (young people) see it as fashion. Government should put a body in place to regulate activities of commercial motorcycle riders. I suggest that only married men with children and those that have accommodation of their own should be allowed to operate as commercial motorcycle rider."*

Discussants also recommended that the quality of crash helmet need be improved and sold at affordable price.

Figure 12 highlights participants' suggestions for promoting use of crash helmet. Majority (83.2%) suggested that helmet should be sold with motorcycle. 33.6% stated that it should be sold at an affordable price while 13.6% recommended that government should subsidized cost of helmet.

Figure 12: Participants' suggestions for promoting use of helmet among commercial motorcycle riders

N=500*



*There were multiple responses

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

The findings obtain from this study are discussed using the information and results obtained from both qualitative and quantitative components of the study. The implications of the findings as well as conclusions and recommendations are presented in this chapter.

5.1 Socio-demographic characteristics of respondents

All the motorcyclists were males. This is not surprising because as at today commercial motorcycling is a male dominated business in study area. It is also predominantly male dominated occupation across Nigeria. Majority (79.6%) of the respondents were less than 35 years. Few older people aged 35 years and above also engage in commercial motorcycle business. This cannot be unconnected with the declining economy in Nigeria. The prevalence of unemployment is increasing among young people and commercial motorcycling is one of the means adopted by them to support themselves and their families. It is not uncommon to find retired people among the commercial motorcycle riders. The retired persons in Nigeria have problems getting their retirement benefits and so have to rely on menial jobs including involvement in commercial motorcycling business for survival. In a study carried out in Adamawa it was revealed that the peak ageof commercial motorcycle riders was 18-30 years (Ogunsanya and Galtima, 1993). The job attracts mostly young people who are looking for a source of living or an alternative source of income for school expenses among those who are schooling. The youthful age of the commercial motorcyclists in this study may explain why some of them are careless and reckless on the road.

Majority of the motorcyclists were Yoruba and were Moslems. This is understandable because the study was conducted in Ibadan, a predominantly Yoruba community.

More than half of the motorcyclists were married. Among the Yoruba, late marriage is discouraged. It is not uncommon for even jobless males to be married even if there is no sustainable means of supporting their family. Marriage, among the Yoruba, is an important obligation which attracts interest from parents, friends and significant others. Young people are often encouraged to marry early and late marriage is perceived to be an aberration.

Majority of the motorcyclists have formal education, with a large proportion of them having secondary education. This is similar to the study carried out in Yola, were about half of the respondents had a form of formal education (Ogunsanya and Galtima, 1993). In South Western Nigeria where Ibadan is located primary Education has been free for a long time and secondary education has been heavily subsidized over the years. This might account for why many of the commercial motorcyclists have one form of formal education or the other. According to Aluede (2006) the Southerners generally had early access to western education and civilization compared with the Northerners.

Majority of the motorcyclists did not received formal training for the job. Each rider either trained himself or relied on a friend to tutor him on how to do the business. Fadekemi, Ogini, Vincent, Ugboko, Richard and Adewole (2007) observed a similar situation in their studies carried out in Ile-Ife and Lagos which are located in the same geo-political zone as Ibadan. Most of their respondents had no formal training on the job.

5.2 Knowledge about crash helmet

With a mean knowledge score of 59% the respondents' knowledge about the crash helmet could be said to be fairly high. All the motorcyclists reported that they had ever seen a crash helmet, with Federal Road Safety Commission being the major source of information about the crash helmet. Knowledge about specific major components of the crash helmet was slightly low among the motorcyclists. The gap in knowledge of the major components of helmet may explain why adoption of the crash helmet is low among many motorcyclists. Since majority did not receive formal training for the job, they might lack basic knowledge of road safety measures and need for a commercial motorcyclist to be using a crash helmet.

Respondents' knowledge of some other specific issues was high. For instance, majority (80.0%) of the motorcyclists were able to state that the helmet was useful as a safety device for protecting the brain against injury and that the crash helmet is also effective in reducing head injuries (81.0%) in case of accidents. However, respondents' high knowledge has not translated to full scale helmet use. The result of a study conducted in two South Western locations (Lagos and Ile-Ife) was different from findings obtained in this study in terms of knowledge about the importance of the crash helmet (Oginni, Ugboko and Adewole, 2007). In many instances, helmet use practices lagged behind knowledge. For instance, although

52% stated that the crash helmet should be worn at all time. only 16.8% had the helmet on during the observation component of the survey.

5.3 Perception of crash helmet

This study reveals a lot about commercial motorcyclists' perceptions, opinions and beliefs about the crash helmet. Claims have been made by some motorcyclists that helmet increases the risk of neck injury and reduces peripheral vision and hearing, but there is no credible scientific evidence to support these claims. Perceptions such as these have potential in militating against helmet use by motorcycle riders. In the USA a study by Goldstein is often cited by helmet opponents as evidence that helmet cause neck injuries (Goldstein, 1986). Several other studies have however refuted Goldstein's findings. According Orsay, Muelleman, Peterson, Jurisic, Kosasih & Levi (1994), for instance, 'helmets reduce head injuries without an increased occurrence of spinal injuries in motorcycle trauma. Majority of the participants in this study held the view that the crash helmet does not contribute to neck and spinal cord injuries in accidents. Appropriate educational strategies are needed to reinforce this kind of perceptions.

About half of the motorcyclists were of the opinion that helmet reduces vision and increases riders risk of having accidents. Research findings have again disputed this perception elsewhere. Studies have shown that the helmet does not affect peripheral vision and does not increase risks of crashes. It has been noted that only full-face helmets provide minor restrictions in horizontal peripheral vision (Insurance Institute for Highway Safety, 2007). Majority of the participants also believed that helmets restrict the riders' ability to hear well. This is contrary to a study conducted in in 1996. The Study showed that helmet use does not impair ability to hear, rather it reduces the noise of the wind. The study further added that wearing of helmet does not restrict the ability of the rider to hear auditory signals or the likelihood of seeing a vehicle in an adjacent lane prior to changing lanes (McKnight and McKnight 1994).

McKnight and McKnight (1994) has similarly noted that helmet does not restrict the hearing of horns and that the crash helmet does not also affect the likelihood of seeing a vehicle in an adjacent lane prior to initiating a lane change. The non-agreement of the perceptions in this study with research findings could be that the participants were just not willing to give up their primordial views perceptions about helmets.

Majority of the motorcyclist disagreed with the view that making helmet use compulsory is the best way to ensure its compliance and that the crash helmet law should be enforced among commercial motorcyclists. According to the United States National Highway Traffic Safety Administration (2000), motorcyclists were the least group that favoured mandatory helmet use laws. The result in this study and the perception of American motorcyclists are indicative of the need to complement legal regulatory measures with appropriate educational interventions. Clearly, the results are reflections of the futility of coercing commercial motorcyclists to adopt crash helmet use. Educational interventions should, in situations like this, precede the use of legal means in promoting the crash helmet use.

5.4 Use of crash helmet

A good number of the participants in this study that possess the crash helmet reported its use. However, the pattern of helmet use among the motorcyclists range from 'never use' to 'use only' when law enforcement agents were on patrol. Very few participants who reported the use of the helmet did so always (33.6%), sometimes (17.5%), and when traveling (14.5%). Only eight (2.4%) motorcyclists use helmet when law enforcement agents were on patrol. Observations revealed that only 17.0% of the motorcyclists had a helmet on. Similarly, there was a slight difference between motorcyclists who fastened their helmet and those who reported that they fasten helmet when ever they wear it. More motorcyclists (89.1%) reported that they fastened helmet compared to what was observed. It was 68.7% that were observed to fasten their crash helmet belt when riding. The reported and observed use of helmet in this study reveals that actual performance of behaviour is contrary to reported behaviour.

Observation also showed that differences in time and locations influenced pattern of helmet use. It was noted in this study that use of helmet was highest in Apete compared to the Ijokodo and Omi-Adio, and the association was found to be significant. It was noted that many motorcyclists in Apete who take passengers to Ibadan Polytechnic were compelled to use helmet because of the mandatory helmet use law at the Polytechnic. The Polytechnic is a major operational location for the Apete Riders. This tends to justify the efficacy of the use of mandatory measures to promote crash helmet use. This observation should however not lead one to conclude that law enforcement alone is the best way of promoting adoption of the crash helmet among motorcyclists. The inherent drawback in the use of force is that immediately its application is stopped or suspended, people usually go back to their original ways of life or practices. Appropriate educational strategies are needed to complement

mandatory measures. Use of helmet was also highest in the morning (40.3%) and least at night (25.4%). According to a study that examined motorcycle helmet use and injuries in a developing country with helmet law, the wearing of helmet was least at night and when no police officers were around (Conrad, Bradshaw, Lamsudin, Kasniyah and Costello, 1996). This implies that motorcyclists wear the crash helmet to please law enforcement agents. Their crash helmet use behaviour is therefore not based on informed decision.

A study on knowledge, attitude and practices of road safety and first aid among commercial motorcyclists in Ibarapa, Central LGA in Oyo State, revealed that only one motorcyclist wore the helmet (Akinlade, 1999). A similar study earlier conducted in Igboora also in Ibarapa central LGA reported that none of the respondents used the protective helmet (Amoran, Owoaje, Giwa and Gbolahan 2006). According to the National Highway Traffic Safety Association (2007), 97% of motorcyclists observed in states with universal helmet laws wore helmet, compared to 90% in 2002 when the law was abrogated. In states without such laws, helmet use was 53% in 2002 and 50% in 2007 (Glassbrenner, 2004; Glassbrenner, 2006). These findings agree the findings of Scivadci, Begliomini, Gardini, Giustini, Taggi and Kraus (2003). They also found that when mandatory helmet was enforced in Italy, helmet wearing rates increases.

The study reveals that the factors which influence the use of the crash helmet range from its perceived protective effect to its use being made mandatory by some authorities. Among motorcyclists who reported that they always use helmet, the most common reasons for use was that the helmets offers a form of protection (53.1%), and that it was mandatory by authorities in their area of operation (23.0%). In addition, reasons for non-use of helmet among those who reported they had never used helmet were that the crash helmet was uncomfortable (45.9%), obstruct vision (18.4%) and useless (16.5%). The determinants of helmet use among motorcyclists and passengers as reported by several studies conducted in different countries include the following strong social influence, cost, availability, and vulnerability to accident on short distant trips. The other factors include concern over the sanitary status of helmet, infections that might be transmitted through helmet use and legal measures (WHO, 2006). According to a study on helmet use among adolescent motorcyclists and moped riders in Italy (CDC, 1994), the most common reasons for using the crash helmet as reported by respondent who use helmet always were its protective effect and because it

was required by law. The most frequent reasons among those who reported using helmet sometimes or never were its uncomfortability, non- availability and uselessness (CDC, 1994).

On the participants' level of awareness about the state law mandating the use of crash helmet for commercial motorcyclist, the study reveals that more than half of the respondents were aware of a state law enforcing the use of helmet. Some of the participants reported that they were not aware of the law, while few claimed that there was no such law. This could be the reason why helmet use was observed to be low in the area. The FGD findings supported the assertion that although there is a law mandating use of crash helmet, its enforcement was weak in the area.

5.5 Prevalence of accidents and injuries among commercial motorcyclists'

The study shows a high prevalence of accidents and injuries among the commercial motorcyclists in the study area. More than half of the motorcyclists had been involved in at least one accident before especially in the year preceding the study. The high prevalence of accidents involving motorcyclists in the study area was a source of concern. According to the National Highway Traffic Safety Administration (2002) of the USA, motorcycle injuries are getting worse. In Nigeria, several studies support the claim that motorcycle accidents account for the highest proportion of accidents, thus accounting for 54% of road traffic accidents in Nigeria (The Punch, 2007).

Slightly more than half of the accidents involving motorcyclists occurred during the weekends and in the evening. The most commonly reported place of occurrence of accident was at a bend and collision with another vehicle accounts for the most common cause of accidents in the area. These are all human factors. According to Parks (2000), human factors often account for much of the road traffic accidents. The FGD findings also supported the claim that human factors such as lack of experience, risk-taking, greediness and alcohol consumption that induces defective judgment are the most common cause of RTAs.

Majority of the motorcyclists had ever sustained injuries with lower extremities being the most common site of injury. Oluwadiya (2001) in his study at the Obafemi Awolowo Teaching Hospital Ile-Ife, Nigeria similarly found that limb injuries were the most common among patients who had motorcycle related accidents and injuries. In a study carried out in Benin by Umebese and Okukpo (2001) on motorcycle accidents, motorcycle injuries

constituted 14.4% of the total number of RTAs and majority of the injuries sustained involved the extremities, most especially the lower limbs.

Injuries ever sustained by motorcyclists in this study were predominantly soft tissue injuries, bruises and lacerations. Only two of the motorcyclists reported that they sustained neck injuries. A prospective review of motorcycle-related maxillofacial injuries among Nigeria intra-city road users also revealed that soft tissue injuries or combination with bone injury accounted for most of the injuries reported in accidents involving motorcyclists (Oginni, Ugboko, Ogundipe & Adegbehingbe, 2006).

5.6 Implications for Health Education and Social Policy

Health Education focuses on the modification of people's behaviour and behavioural antecedents (Green & Kreuter, 1991). Health education is thus concerned with helping people develop practices that ensure the best possible well-being (WHO, 1988). Health education principles and strategies can be used to address the challenges identified in this study.

Findings from this study revealed that the commercial motorcyclists had a fair knowledge of the components of the crash helmets. Industrial helmet was perceived to be as good as crash helmet by majority. There is therefore the tendency for commercial motorcyclists to be promoting the use of industrial helmet in place of a good quality crash helmet because the cost of an industrial helmet is more affordable. These situations could create misconceptions that can have discouraging effects on the use of crash helmet among commercial motorcyclists. In the light of this, there is need for training programmes to address this problem. Efforts need to be made to increase the knowledge of commercial motorcyclists on the purchase of good quality helmets and appropriate use of crash helmets as a safety measure. For such training programmes to be effectively implemented, the Federal Road Safety Commission should be actively involved. It is imperative to base such training programmes on well conducted training needs assessments. The training objectives should focus on the following: crash helmet as a safety measure, types of crash helmet, importance of crash helmet and provisions of the crash helmet related laws in Nigeria.

People's opinion about road safety generally, as well as and their views about helmet wearing in particular are useful pieces of information that can be used to design a helmet use public enlightenment programme (WHO, 2006). Results of the study suggested that generally

commercial motorcyclists harbored myths and misconceptions about the crash helmet and majority of the motorcyclists were not in favour of mandatory use of the crash helmet. Effective educational strategies such as peer education and public enlightenment are needed to tackle them. Continuous campaign through the mass media will help to address the misleading beliefs about the use of helmet, and modify attitudes to helmet use, reinforce appropriate helmet use practices, bolster public support for the programme and gain motorcyclists acceptance of use of crash helmet over time.

Helmet use in developing countries is very low (Odelowo, 1994, Oluwadiya, Oginni, Olasinde, Odu, Olakulehin & Olatoke, 2004). This study documented a low prevalence of crash helmet use, albeit a high prevalence of helmet ownership. The use of crash helmet was only very high in one of the study locations. This was attributed to the fact that helmet use was mandatory for motorcyclists in that location- The Polytechnic Ibadan. This suggests that the mobilization and involvement of the community and appropriate authorities can promote use of crash helmet. In the light of this, the Federal Road Safety Commission (FRSC) should identify and partner with authorities and communities to be involved in the promotion of the crash helmet use. Making low cost but high quality helmets available and enforcing their use might be helpful. Heat and sweating were cited as constituting key disincentives for the use of the crash helmet. A technological approach aimed at addressing these major concerns is worth exploring with a view to making the crash helmet used in Nigeria weather appropriate.

Furthermore, a sustainable helmet use programme in Nigeria needs to be anchored on sound advocacy that will complement other educational strategies. The advocacy aimed at promoting crash helmet use should be targeted at various stakeholders including all the motorcycle riders, law enforcement agencies, communities, local authorities and policy makers. The enforcement of the crash helmet policies or regulations should be made sustainable. After the conduct of the field work for this study, the Federal Government through the Federal Road Safety Commission embarked on the enforcement of the policy that makes wearing of the crash helmet mandatory in the country in January 2009. The enforcement of the policy by the law enforcement agencies was not sustained. Most commercial motorcycle riders in the study area discontinued use of the crash helmet about a month later when the law enforcement agents developed lukewarm attitudes to the enforcement of the policy.

Overall, the level of awareness of the provisions of the crash helmet law was low among the commercial motorcyclists. A few of them were not even aware of the law. In some other lands, the introduction or enactment of helmet use laws led to increases in crash helmet use and reductions in injuries to motorcyclists. For instance, Elvik and Vaa (2004), has noted that studies in developing countries suggested that mandatory helmet-wearing resulted in a 25% reduction in head injuries involving motorcyclists.

The National Highway Traffic Safety Administration (2000) of the USA also reported that compliance with crash helmet use was higher in states requiring all motorcyclists to wear helmet compared with states with little or no requirements. Studies have, however revealed that, even with such legislations, failure to use helmets, use of non-standard helmets and use of improperly secured helmets is not uncommon (Conrad et al, 1996 & Kulanthayan et al, 2000). This underscores the importance of complementary prevention strategies such as on-the-job training on road safety measures, as well as sustained public awareness and enlightment campaigns regarding the importance of the crash helmet use in Nigeria among all motorcycle riders.

Results of this study indicate that the prevalence of accidents is high among commercial motorcycle riders in the study area and those involved sustained some injuries. There are several factors contributing to the occurrence of these accidents. It is therefore necessary to upgrade commercial motorcyclists' knowledge and skills relating to the first aid management of accidents induced-injuries. This could be part of a pre-service or in service road safety education for all commercial motorcycle riders.

5.7 Conclusion

This study documented the perceptions and use of crash helmet among commercial motorcyclist in Ido LGA. It revealed a high level of awareness on the importance of using crash helmet and commercial motorcycle riders. Level of awareness relating to the protective effect of the crash helmet was high but relatively few of the motorcyclists adopted crash helmet use.

The findings on perception of the motorcyclists regarding use of crash helmet showed that majority of them had an aversion for crash helmet. This cannot be connected with the belief held by many of the motorcyclists that motorcycling business is a safe enterprise in the area.

Most of the motorcyclists were not in support of a law which makes crash helmet use mandatory, this is an issue which requires multiple health promotion and education strategies to address.

The study has shown that the factors accounting for the low level of the use of the crash helmet included perceptions of its ineffectiveness in preventing head injuries, weak enforcement of the crash helmet use, inconvenience, perceived obstruction of sight, cost and lack of good quality helmet.

The study participants were found to be prone to accidents and injuries. This is consistent with the rising trend of road traffic accidents and injuries in Nigerian communities involving motorcycle riders. Human factors appear to contribute a great deal to frequent motorcycle accidents in the study area.

5.8. Recommendations

The recommendations made based on the findings of the study are as follow:

1. There should be a well designed educational programme aimed at promoting crash helmet use among commercial motorcyclists. This programme should also be aimed at addressing the misconceptions associated with the use of the crash helmet.
2. It is essential for policy makers to consider measures for increasing helmet use such as enactment of legislations for mandatory helmet use. The enforcement measure should incorporate complementary prevention strategies such as community mobilization and public enlightenment. It is important to adequately educate the public before enforcing a law on crash helmets.
3. The Federal Road Safety Commission should sustain the enforcement of mandatory use of the helmet by ensuring that violators of this law are sanctioned. Effective enforcement of the law will increase people's support for the crash helmet, promote its use and reduce incidence of head injuries among motorcyclists.
4. Both pre-service and continuing education opportunities should be created for commercial motorcycle riders. This should be aimed at upgrading their knowledge about the importance of wearing the crash helmet and the provisions of the traffic regulations for all categories of road users.

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APPENDIX I

Table 23 Pattern of Motorcycle Registration in Nigeria by State

SN	State	Year 2001	Year 2002	Year 2003	Year 2004	Total
1	Abia	1759	3520	2421	3229	10929
2	Adamawa	4527	7546	7893	9551	29517
3	Akwa-Ibom	8677	10644	9291	9680	38292
4	Anambra	18525	15563	53411	50085	137584
5	Bauch	8371	11459	12149	17793	49772
6	Bayesa	870	700	1650	600	3820
7	Benue	5302	7182	6602	5036	24122
8	Borno	0	4080	970	9791	14841
9	Cross River	5020	2796	4819	14052	26687
10	Delta	6584	1635	389	2935	11543
11	Ebonyi	1410	728	709	965	3812
12	Edo	3912	3660	2478	1821	11871
13	Ekiti	2140	2354	3036	3334	10864
14	Enugun	7009	7381	5501	4673	24564
15	FCT	1800	4518	7187	5940	19445
16	Gombe	10557	1610	6866	9757	28790
17	Imo	2113	8767	1501	7549	19930
18	Jigawa	3637	3750	9043	10994	27424
19	Kaduna	847	3914	24965	5952	35678
20	Kano	25906	23654	11843	13105	74508
21	Katsina	6827	5524	5574	6257	24182
22	Kebbi	2300	3388	6449	6959	19096
23	Kogi	3170	2757	2183	2629	10739
24	Kwara	3200	1240	1782	4970	11192
25	Lagos	18420	38925	32561	11467	101373
26	Nasarawa	6932	6393	7051	3856	24232
27	Niger	7237	4301	8607	5134	25279
28	Ogun	3875	2127	2325	2019	10346

SN	State	Year 2001	Year 2002	Year 2003	Year 2004	Total
29	Ondo	13413	2472	5900	8780	30565
30	Osun	4771	6549	6580	1522	19422
31	Oyo	1636	2301	1414	3894	9245
32	Plateau	9969	4860	3172	11564	29565
33	Rivers	2566	6089	6486	6486	21627
34	Sokoto	5544	5097	5110	6462	22213
35	Taraba	3182	4713	5810	6462	20167
36	Yobe	2579	808	1254	3694	8335
37	Zamfara	4215	4294	6957	9477	24943

Source: Gbadamosi (2006) The Emergence of Motorcycle in Urban Transportation in Nigeria and its Implication on Traffic Safety Centre For Transport Studies Department of Geography and Regional Planning, Olabisi Onabanjo University, Nigeria.

APPENDIX II

OBSERVATION CHECKLIST FOR HELMET SURVEY.

Town: _____ Location: _____

Observer: _____ Date: _____

Instruction: Please fill in the options that were observed appropriately.

Item	Description	Code/Motorcycle Number									
		1	2	3	4	5	6	7	8	9	10
1.	Time of the Day										
2.	CMR wearing helmet while riding										
3.	Type of helmet										
4.	Helmet fastened to chin by CMR										
5	Helmet hung on handle bars of motorcycle										
6.	Number of passengers on the motorcycle										
7.	Passenger 1 wearing helmet										
8.	Type of helmet worn by passenger 1										
9.	Helmet fastened to chin by passenger 1										
10.	Passenger 2 wearing helmet										
11.	Type of helmet worn by passenger 2										
12.	Helmet fastened to chin by passenger 2										

CODES FOR OBSERVATION CHECKLIST FOR HELMET SURVEY

1. Time of the day: (e.g. 8:30 am, 4:00 pm)
2. CMR wearing helmet: 1= yes; 0 = No
3. Type of helmet: 1= Full face (with chin guard); 2= Open face (Cover ear & neck); 3= Half face; 4=Tropical; 5= Construction hat; 6= Bicycle helmet; 7 = Horse-riding hat
4. Helmet fastened to chin by CMR: 1= Yes; 0= No
5. Helmet hung on handle bars of motorcycle: 1= Yes; 0= No
6. Number of passengers on the motorcycle: (Actual number)
7. Passenger 1 wearing helmet: 1= Yes; 0= No
8. Type of helmet: 1= Full face (with chin guard); 2= Open face (Cover ear & neck); 3= Half face; 4=Tropical; 5= Construction hat; 6= Bicycle helmet; 7 = Horse-riding hat
9. Helmet fastened to chin: 1= Yes; 0= No
10. Passenger 2 wearing helmet: 1= Yes; 0= No
11. Type of helmet: 1= Full face (with chin guard); 2= Open face (Cover ear & neck); 3= Half face; 4=Tropical; 5= Construction hat; 6= Bicycle helmet; 7 = Horse-riding hat
12. Helmet fastened to chin: 1= Yes; 0= No

APPENDIX III

FOCUS GROUP DISCUSSION GUIDE (FGD)

PERCEPTIONS AND PATTERN OF USE OF CRASH HELMET AMONG COMMERCIAL MOTORCYCLISTS IN IDO LOCAL GOVERNMENT AREA

A: *Introduction*: I am ———————— and my colleagues are———————— We are from the College of Medicine, University of Ibadan. I thank you all for agreeing to participate in this discussion. The discussion focuses on the health concerns of commercial motorcycle riders with special reference to helmet use as a preventive measure. This discussion is part of the research project and its outcome will be useful in future for planning for ways of reducing head injuries which commercial motorcyclists sustained when accidents occur. We have specially invited you to come and share your views with us because of your wealth of experience. In this discussion no views expressed by any discussants will be judge write or wrong. We crave your indulgence to use a tape recorder because there is a limit to what the brain can remember and we do not want to forget the useful experiences we are here to share. We assure you that what is discussed here will not be used in any way against any one. All what will be discussed will be kept confidential.

B: FGD QUESTIONS

S/NO	MAIN QUESTION	FOLLOW UP QUESTIONS
1a	What do you feel about commercial motorcycle business (CMB) nowadays?	• What are the problems associated with the business? • How lucrative is it when compared with working for government?
1b	How do people learn about CMB?	• Learn how to ride • How to do the business • Learn high way code
2	Many people are getting involved in CMB these days Why is this?	• Probe for motivating factors and • Economic reasons
3	How do people start and run CMB?	• Probe for ownership of motorcycle

		• Sharing of motorcycle and how it is been shared. • Capital base for starting the business.
4	a. What is a crash helmet? b. How useful is a crash helmet? c. How knowledgeable are your colleagues about how to use it?	• Probe for types and brands. • Essential component of a helmet. • How it is worn and cost • When to use. • How to fasten. • Qualities of a good helmet.
5	How common is the wearing of crash helmet among commercial motorcyclists?	• Probe for affordability • Availability. • Inconvenience and how. • Associated believes. • Associated attitudes. • Reasons why some people don't wear.
6	How effective is the use of a crash helmet in the event of an accident?	• If effective, ask how. • If not effective ask for reasons.
7a	Is there any law or high way code which requested the use of crash helmet for motorcycle riders?	• How familiar are CMR with the law or high way code? • Who enforces it? Govt. of CMR Association. • What is the role of CMR Association in the use of crash helmet?
7b	What is your opinion about the law or regulation?	• Probe for reasons if it needs modification. • Reasons if the law should be

		scrapped. • Reasons if the law should be left as it is.
8a	How common are accidents among CMR in this area?	• Probe for causes. • Types of injuries sustained • Seriousness of injuries.
8b	What are CMR: • Beliefs to accident generally. • Attitudes to accidents generally.	• Probe for whether helmet reduces the severity of head injuries?

C. Conclusion: We have come to the end of this discussion and will like to thank everyone for active participation. Thank you.

APPENDIX IV

QUESTIONAIRRE FOR A STUDY ON PERCEPTION AND PREVALENCE OF USE OF CRASH HELMET AMONG COMMERCIAL MOTORCYLIST IN IDO LOCAL GOVT.

INTRODUCTION

I am..... from the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan. I am conducting a research focusing on commercial motorcycle riders' views concerning crash helmet and the way they use it. The information gathered will be useful for planning educational programmes relating to ways of protecting the health of commercial motorcyclists and their passengers. I wish to kindly request your voluntary participation by providing answers to the following questions honestly as this will increase the quality of the findings. Please be rest assured that all information provided by you would be kept strictly confidential and will not be used against you or your association. Thanks for your co-operation.

FOR OFFICE USE ONLY

SERIAL NUMBER .....

NAME OF UNIT .....

SECTION I: SOCIODEMOGRAPHIC DATA AND COMMERCIAL MOTORCYCLING RELATED EXPERIENCE

INSTRUCTION: Please tick (√) and respond appropriately to the following questions

1. Marital Status: 1. Never married ☐ 2. Married ☐ 3. Divorced ☐
   4. Widower ☐ 5. Separated ☐
2. Religion: 1. Islam ☐ 2. Christianity ☐ 3. Traditional ☐
   4. Others specify.....
3. Educational Status: 1. No formal education ☐ 2. Primary school not completed ☐
   3. Primary school completed ☐ 4. Secondary school not completed ☐
   5. Secondary school completed ☐ 6. College of Education ☐
   7. Polytechnic ☐ 8. University ☐
   9. Others specify.....
4. Ethnicity: 1. Yoruba ☐ 2. Igbo ☐ 3. Hausa ☐
   4. Others specify.....
5. Age at last birthday.....

6. Other job apart from Commercial motorcycling business .....

7. How did you learn how to ride? 1. Self ☐ 2. Riding school ☐ 3. Relatives ☐

4. Friends ☐ 5. Others specify .....

8. Owner of motorcycle you ride 1. Myself ☐ 2. Brother ☐ 3. Father ☐

4. Master/Owner ☐ 5. Others

specify .....

9. What are your reasons for going into commercial motorcycling business?

1. Unemployment ☐ 2. To complement income from other sources ☐

10. What time of the day do you usually work? (Please tick (√) all that apply to you)

1. Morning ☐ 2. Afternoon ☐ 3. Evening ☐ 4. Night ☐ 5. All the day ☐

11. Do you share the motorcycle with other people? 1. Yes ☐ 2. No ☐

12. How safe is commercial motorcycling business in this area? 1. Very safe ☐ 2. Safe ☐

3. Dangerous ☐ 4. Very dangerous ☐

SECTION 2: KNOWLEDGE ABOUT CRASH HELMET.

***INSTRUCTION:** Please tick (√) and respond appropriately to the following questions*

13. Have you ever seen a crash helmet? 1. Yes ☐ 2. No ☐ (If no go number 18)

*14. What are the main parts of a crash helmet? (*Please tick (√) as many that you know.*

1. A shinning outer shell ☐ 2. Chin/Neck strap ☐ 3. Impact absorbing liner ☐
4. Comfort padding ☐

*15. When should commercial motorcycle rider wear crash helmet?

1. During short trips only ☐ 2. Only when it is raining ☐ 3. Any time one is riding ☐

4. When travelling to a long distance place ☐ 5. When the police are checking ☐

*16. Which of the following is true about a crash helmet? (Please tick (√) either Yes or No or Don't know)

S/No	Statements	Yes	No	Don't know
1	Helmet can help protect one's brain from injury in case of accident?			
2	Helmet protects one's face in case of an accident?			
3	Helmet reduces head injury in case of an accident?			
4	Helmet cuts down on wind noise roaring by your			

	cars			
5	A full-face helmet gives the most protection to the head?			
6	Helmet should not be stored near gasoline or excessive heat?			
7	An industrial helmet is as good as a crash helmet?			

17. If yes, what are your sources of information about a crash helmet? *(Tick (√) the ones that apply to you from the list of sources below. You can tick more than one)*

1. Radio ☐ 2. T/V ☐ 3. Newspaper ☐ 4. Magazine ☐ 5. Posters ☐

6. Friends/peers ☐ 7. Police. ☐ 8. Road safety officials ☐

9. Others (specify).....

SECTION 3: PERCEPTION CONCERNING THE WEARING OF CRASH HELMET.

Below are statements relating to crash helmet. For each tick (√) whether you agree, disagree or you are undecided/not sure.

S/No	Statements	Agree	Disagreed	Undecided/not sure
18	Helmet contributes to neck injuries when accident occurs			
19	Helmet contributes to spinal cord injuries when accident occurs.			
20	Wearing of helmet reduces vision and increases rider's risk of having an accident			
21	Helmet makes it difficult for cyclist to hear well			
22	People with traditional medicine/charms that protect them from accident need not buy or wear crash helmet			
23	Many people don't wear helmet because it scatter the hair.			
24	Wearing helmet increases tiredness			
25	Making wearing of helmet compulsory is the best way to ensure compliance			
26	Wearing helmet causes head ache and neck pain			
27	Wearing helmet increases over confidence not to take precaution against accident			
28	Wearing helmet causes sweat especially during dry season			
29	A rider wearing a helmet has better chance of surviving a crash than a rider without helmet			
30	Passengers do not need to wear a crash helmet			
31	Crash helmet law should be enforced for commercial motorcycle riders			
32	Crash helmet law is only enforced when police and other law enforcement agents wants to collect money from us			

SECTION 4: PATTERN OF USE AND FACTOR INFLUENCING USE OF CRASH HELMET AMONG COMMERCIAL MOTORCYLE RIDERS.

33. Do you have a crash helmet? 1. Yes ☐ 2. No ☐ (if no go to question number 38)

34. If yes, do you wear it? 1. Yes ☐ 2. No ☐

35 How often do you wear it when riding? 1. Never ☐ 2. Sometimes ☐ 3. Always ☐

4. When traveling ☐ 5. When law enforcement agents (police and road safety) are on the way ☐

36. What are your reasons for wearing it?

	Frequency	Reasons
1.	Never	
2.	Sometimes	
3.	Always	
4.	When travelling	
5.	When law enforcement agents (police and road safety) are on the way	

37. How do you wear the crash helmet? 1. Securely fastened to chin ☐ 2. Not fastened to chin ☐

38. Do you intend to buy a crash helmet? 1. Yes ☐ 2. No ☐

39. How much does a helmet cost? .....?

40. Is the cost affordable? 1. Yes ☐ 2. No ☐

41. Is there a law making wearing of helmet mandatory? 1. Yes ☐ 2. No ☐ 3. Don't know ☐

42. If yes, what does the law say?

.....

.....

.....

SECTION 5. PATTERN OF ACCIDENTS AND INJURY

43. Have you ever been involved in an accident since you started riding a motorcycle for commercial

purposes? 1. Yes ☐ 2. No ☐ (if no go to question 58)

44. If yes, how many times have you been involved in motorcycle accident as a rider .....

Question 45-57 refers to most recent accident you had:

45. Have you ever had accident in the past 1year? 1. Yes ☐ No ☐ (if no go to question 58)

46. If yes, how many times have you had accident in the past 1year? .....

47. What period of the week did the last accident occur? 1. Week day ☐ 2. Weekend ☐

48. What time of the day did the accident occur 1. Morning ☐ 2. Afternoon ☐ 3. Evening ☐

49. Where did the accident occur? (Tick (√) all options that apply)

1. At a junction ☐ 2. Round about ☐ 3. Straight Stretch of the road ☐

4. At a bend ☐ 5. On a tarred road ☐ 6. On an untarred road ☐

7. Others, please specify.....

50. What caused the accident? (Please tick (√) the options that applies)

1. Collision with another vehicle ☐ 2. Collision with another motorcycle ☐ 3. A pedestrian ☐

4. A stationary object ☐ 5. Bad road ☐ 6. Poor visibility ☐

7. Mechanical problem with motorcycle ☐ 8. Others. specify.....

For each of the following question tick (√) either Yes or No

S/no	Statement	Yes	No
51	Were you wearing a crash helmet when the accident occurred?		
52	Did the helmet fall off your head when the accident occurred?		
53	Did the helmet crack or break as a result of the impact?		
54	Were you flung off the motorcycle?		
55	Did you sustain any injury?		

56. If yes, specify site of injury?.....

57. If yes, specify type of injury (Tick (√) all that applies)

1. Bruises/Abrasion ☐ 2. Laceration ☐ 3. Fracture ☐ 4. Dislocation ☐

5. Head injury ☐ 6. Neck injury ☐ 7. Burns

8. Others please specify.....

58. How can helmet use be promoted among commercial motorcycle riders? (Tick (√) all that applies)

1. Make cost of helmet affordable ☐ 2. Helmet should be sold with motorcycle ☐

3. Government should subsidized cost of helmet ☐

The 12-Point Knowledge Scale

Question Number	Varinbles Measured	Maximum Score
14	What are the main parts of crash helmet? a. A shinning outer shell b. Chin/neck strap c. Impact absorbing liner d. Comfort padding	4
15	When should commercial motorcycle rider wear crash helmet?	1
16	Which of the following is true about crash helmet: 1. Helmet can protect one's brain from injury in case of accidents? 2. Helmet protects one's face in case of an accident? 3. Helmet reduces head injury in case of an accident? 4. Helmets cuts down on wind noise roaring by your ears? 5. A full-face helmet gives the most protection to the head? 6. Helmet should not be stored near a gasoline or exercise heat? 7. An industrial helmet is as good as a crash helmet?	7

*The Question number in the questionnaire used