PREVALENCE OF REFRACTIVE ERRORS AND UTILIZATION OF CORRECTIVE LENSES FOR DRIVING AMONG FUEL TRUCK DRIVERS IN OYO, NIGERIA

BY

UWADIA IFEANYICHUKWU CHUKWUDI

Doctor of Optometry (UNIBEN)

MATRIC NO.: 173627

A PROJECT SUBMITTED TO THE DEPARTMENT OF HEALTH PROMOTION AND EDUCATION, FACULTY OF PUBLIC HEALTH, COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTERS IN PUBLIC HEALTH (HEALTH PROMOTION AND EDUCATION)

APRIL, 2015

DEDICATION

This work is dedicated to the Almighty God, who has the independent variable of faithfulness. His unending mercies and abundant grace has brought me thus far.

ABSTRACT

Road Traffic Injuries (RTIs) was the ninth leading cause of injuries in 1998 and projected by the World Health Organisation (WHO) to rise to the third leading cause of injuries worldwide by 2020. In recent years, there has been a substantial increase in the number of fuel-truck accidents involving fire outbreaks in Oyo State, Nigeria. Some studies have found the association between poor vision and road traffic accidents to be statistically significant. This study was conducted to investigate the prevalence of refractive errors and the use of corrective lenses for driving among fuel truck drivers in Oyo.

A descriptive cross sectional study was conducted using total coverage sampling technique to select 217 tanker drivers was utilized. Semi-structured questionnaire was interviewer administered to find out if they have corrective lenses for any errors present, and if they use them for driving. Eye examinations were conducted to find out their visual status. Data from the questionnaires and eye examinations were analysed using descriptive statistics, and Chi-square test at 5% level of significance.

The respondents were all males and ages ranged from 20-72 years. Mean age of respondents was 40.3 ±9.1 years. Most (88%) of the tanker drivers had formal education; 44.2% primary, 43.8% secondary, while a few (9.7%) never went to school. Most (83.1%) of the respondents were Yorubas (45.2%) and Hausas (42.9%). The mean number of years spent driving a tanker was 13.1 ±8.2 years. Almost one quarter (22.1%) had never heard about an eye examination and 24.4% felt eye examinations had no benefits. Less than half (47.5%) had undergone an eye examination previously. No significant association was found between the age of tanker drivers and poor vision; significant association was found between age of respondents and uptake of eye examination services. There was also an association between those who seek eye examination services and the utilisation of corrective lenses for driving. Only 3.2% of respondents had obtained corrective lenses for driving. More than one third (35.9%) of respondents indicated that they would not utilise spectacle correction even if it was prescribed for them. Less than one quarter of the tanker drivers (23.5%) were found to have refractive errors, and 5.9%, failed to meet the standard vision required for driving and should not have been driving without spectacle correction.

In order to increase the utilisation of corrective lenses for driving among fuel truck drivers, there is a need for drivers to undergo primary eye examinations before they are licensed and at license renewals. Majority of fuel truck drivers were comfortable with taking recommended medications, but lacked enthusiasm when spectacle correction was recommended. To help drivers view spectacle correction as medication just like drugs, it is critical for health educational interventions, to increase awareness, alter perception and ultimately change behaviour of fuel truck drivers for the utilisation of corrective lenses for driving.

Keywords: Fuel truck drivers, Refractive errors, Corrective lenses

Word count: 470

ACKNOWLEDGEMENTS

I gratefully acknowledge the following groups and individuals who made the completion of my project possible.

To begin with, I greatly appreciate my able supervisor, Prof. J. D. Adeniyi, who demystified the entire process and concepts, making the project enjoyable and doable in the short time available.

I wish to appreciate the teaching staff of the Department of Health Promotion and Education, Faculty of Public Health, Prof. O. Oladepo, Prof. A. J. Ajuwon, Dr. F. O. Oshiname, Dr. O. S. Arulogun, Dr. O. E. Oyewole, Mr. M. A. Titiloye, Mr. I. O. Dipeolu, Mrs. A. T. Desmenu and Mrs. M. M. Oluwasaanu for the knowledge and experiences they shared, and the lessons I learned from them over the period of study, as this put me in shape in character and learning to execute this project. Also, I appreciate the non-teaching staff, Mr. John Imaledo, Mr. O. Olubodun, Mr. Lanre Quadri, Mr. Segun Bello, Mr. P. Ayeni and Mr. T. O. Oyeyemi for their support, as they made my experience in the department enjoyable.

I exude many thanks to my great colleagues and friends, for their peer reviews and constructive criticisms of my study, most notably Messrs Irikefe Mark Oharume, Yadika Charles Shapu, Ugo Franklin Ifejika and Olumuyiwa Isaac Okunola.

I am deeply grateful to all staff of Metro Eye Clinic and all tanker drivers in Oyo making use of the Afijio tanker park who participated in the project. Their support and involvement especially in mobilization is truly appreciated.

I celebrate my beautiful wife and partner, Dr. Ebosike, who supported me totally through it all, my great siblings, Adaeze, Chukwuma, Uche and Azubuike for their psychosocial support, and to the most wonderful parents in the whole wide world, my very own mum and dad, Mr. and Mrs. P. I. K. Uwadia for understanding and support.

And above all, I give maximum gratitude and glory to the Almighty God whose unconditional love, mercy and grace has carried me thus far.

Uwadia, Ifeanyichukwu Chukwudi

CERTIFICATION

I certify that this work was carried out by Dr Ifeanyichukwu Chukwudi Uwadia in the Department of Health Promotion and Education, University of Ibadan, Ibadan.

……

Supervisor

J. D. Adeniyi, B.A. (Ife), MPH (Chapel Hill); ARSH (Lond); Dr. PH (John Hopkins)

Professor/Adjunct Lecturer

Department of Health Promotion and Education,

Faculty of Public Health,

College of Medicine,

University of Ibadan,

Ibadan, Nigeria

TABLE OF CONTENTS

.

CHAPTER TWO: LITERATURE REVIEW

CHAPTER FOUR: RESULTS

CHAPTER FIVE: DISCUSSION

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AIDS	–	Acquired Immune Deficiency Syndrome
CIVD	–	Commercial Intercity Vehicle Drivers
DALY	–	Disease Adjusted Life Years
FRSC	–	Federal Road Safety Commission
HBM	–	Health Belief Model
HIV	–	Human Immunodeficiency Virus
NURTW	–	Nigerian Union of Road Transport Workers
PTD	–	Petroleum Tanker Drivers
RTA	–	Road Traffic Accidents
RTI	–	Road Traffic Injuries
RTSSS	–	Road Transport Standardization Scheme
SPSS	–	Statistical Package for Social Sciences
TRACE	–	Traffic Accident Causation in Europe
VA	–	Visual Acuity
VIO	–	Vehicle Inspection Officer
WHO	–	World Health Organisation

DEFINITION OF TERMS

Corrective lenses:

Spectacles (corrective lenses) prescribed to be worn by persons who have refractive errors, to improve vision

Poor vision:

Poor vision for driving is any visual acuity less than 6/9.

Refractive errors:

A refractive error is a common eye disorder in which the eye cannot clearly focus the images from the outside world, resulting in blurred vision, and if severe, visual impairment

Road traffic accident:

A road traffic accident is an accident between two or more vehicles, a vehicle and a cyclist, a vehicle and a pedestrian, a vehicle and a fixed object such as a bridge, building, tree, post, etc, or a single vehicle that overturned on or near a public road.

Road traffic injury:

Injuries in road traffic accidents, that is, the number of people injured in road traffic accidents per million population.

Visual Impairment:

Visual impairment is defined as a visual acuity < 6/18 in the better seing eye.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

According to the World Health Organisation (WHO), road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. With an estimated 1.2 million people killed in road crashes each year and as many as 50 million injured and projections indicating that these figures will increase by as much as 80% in low-income and middle-income countries over the next 20 years, there is a need for new commitment to prevention (Murray, 1996).

The causes of road traffic accidents include poor maintenance of roads and vehicles, absence of appropriate road signs and poor driving skills. In addition, deplorable habits of drivers from inadequate training, inattentiveness, alcoholic intoxication, drug intake, excessive speeding, wrong overtaking, poor knowledge of traffic regulations, and physical disability, such as poor vision. Good visual acuity, good depth perception, normal colour vision, satisfactory eye co-ordination and the ability to adapt to various levels of illumination are essential to a driver in order to avoid road traffic accidents (Nwosu, 1989).

The aim of this study is to assess the general knowledge of fuel truck drivers about eye examinations and their perception towards the utilisation of corrective lenses for driving, to document their visual acuity status, to identify the barriers that affect the uptake of eye examination services and the level of utilisation of spectacle correction among fuel truck drivers. At the end of this study, the prevalence of refractive errors and other causes of poor vision for driving, as well as the level of utilisation of corrective lenses for driving among fuel truck drivers would be determined.

Road traffic accident (RTA) in Nigeria is a public health problem which needs to be given attention. Due to its multi-causal nature, a broad approach is necessary to ensure Nigerian roads are made safer. The group of persons mostly affected by road traffic accidents are young people (aged 15–30 years), and this implies a depletion in the labour force (Asogwa 1980).

In the Nigerian population annually, there is a huge reliance on commercial mode of transportation, and one in three persons are at risk of getting injured and one in nine persons are at risk of getting killed from RTA (Ezenwa 1986). This led to the establishment of the Federal Road Safety Commission (FRSC) by the Federal Government of Nigeria via Decree 45 of 1988 (Federal Republic of Nigeria Official Gazette 1988) as amended by Decree 35 of 1992 but effective 18th February 1988.

The FRSC recommendation about the visual fitness of drivers as contained in "Guidelines for the National Drivers License Scheme" is that for private motor drivers, a visual acuity of at least 6/12 in the better eye and 6/36 in the poorer eye is required while for commercial drivers, the minimum visual acuity would be 6/9 in the better eye and 6/24 in the poorer eye with or without glasses (Agunloye, 1990).

The FRSC also laid down minimum standards for a driving license to be obtained (Federal Republic of Nigeria official Gazette (2004) National Road Traffic Regulations, 79th edition). These include driving school attendance, possession of a learner's permit, evidence of having passed a driving test carried out by a Vehicle Inspection Officer (VIO), knowledge of the Highway Code, ability to read all road signs and most importantly passing an eye examination. Unfortunately, eye tests are seldom carried out.

Abilities required for driving include sensory ability, mental ability, motor ability and compensatory abilities. Vision is one of the most important sensory factors in driving and it accounts for about 95% of all sensory requirements (Taylor, 1982).

1.2 Problem Statement

There are three broad factors responsible for the occurrence of road traffic accidents. These are the human factor, the vehicle factor, and the environment. It is less and less proving to be efficient to deal with one factor in isolation, such as improving the state of the roads alone, and as such it is necessary to continuously improve the system on the basis of research and developments addressing the different components involved.

The problem is that in most cases, a cause becomes a cause only if it combines with several other hidden ones, and the so called 'responsible' cause is more and more a result of the influence of these combination of factors intervening in the driving interactions.

Since road traffic accidents (RTAs) have become a matter of complexity apart from some residual extreme cases showing atypical accident patterns (e.g. involving big holes on the road, breakdown of the car brakes, aberrant drivers' behaviours), road safety now has to put in check other relevant areas.

The human factor has been found to be most crucial, constituting up to 80% of RTAs. It includes the user (driver) state of health (physical/physiological and psycho-physiological), experience and behaviour (conflicting or risk taking) (TRACE: Traffic Accident Causation in Europe, 2008).

Since vision is the most important sensory factor affecting the driver’s ability to take a decision while driving, a culture that lacks a belief in routine health and indeed eye examination would mean a lot of drivers with poor vision do not even know their vision is poor, or that it could be better. For drivers who happen to find out they have poor vision and are prescribed treatment, there may be barriers that still prevent them from utilisation of the spectacles prescribed.

This makes it necessary to find out the prevalence of refractive errors and other causes of poor vision for driving amongst fuel truck drivers, their perception about the uptake of eye examination services and the utilisation of spectacle correction for driving.

1.3 Justification of the Study

The choice of fuel truck drivers as the study population for this study is due to the fact that they are long vehicle and long distance drivers, who make up an important but neglected study group as a review of literature proves. In recent years, there has been a substantial increase in the number of fuel-truck accidents involving fire outbreaks in Oyo State, Nigeria (Dare, Oke, & Olanrewaju, 2013).

Although some studies (Taylor 1982; Davidson 1985; Adekoya et. al 2009) found no association between poor vision and the occurrence of road traffic accidents, other studies conducted among commercial vehicle drivers have found the association between poor vision and road traffic accidents to be statistically significant (Nwosu 1989; Effiong 1993; Oladehinde et al. 2007).

Fuel truck drivers are mostly not educated, and poor driving has been also related to inability to read and write (Adogu & IIika 2006). The role of good vision as the most important sensory factor in driving, presents it as a crucial determinant of prevention of road traffic accidents while driving.

The Traffic Accident Causation in Europe (TRACE) report in 2008 described the main phases of an accident sequence to include the driving phase, rupture phase, emergency phase and impact phase. The driving phase was characterized by the behaviour on approaching the place (contributing factors). The rupture phase was characterized by meeting an unexpected event (triggering factors). Pivotal human functional failure in adapting to the unexpected event leads to the emergency phase characterized by avoidance manoeuvres and dynamic demands (aggravating factors), and finally the impact phase.

The role of good vision is critical as it presents itself as important in the driving phase, the rupture phase, and in the emergency phase of accident sequence. It therefore also contributes to accident severity.

This study would reveal the perception of drivers to having routine visual examinations, and provide information on the prevalence of refractive errors and other causes of poor vision amongst fuel truck drivers. It would also reveal the level of utilisation of spectacle correction among fuel truck drivers.

1.4 Research Questions

1. What is the prevalence of refractive errors among fuel truck drivers?
2. What is the level of uptake of eye examination services by fuel truck drivers?
3. What is the level of utilisation of corrective lenses for driving among fuel truck drivers?
4. What are the barriers to uptake of eye examination services?
5. What are the barriers to utilisation of corrective lenses for driving by fuel truck drivers?

1.5 Broad Objective

The broad objective was to determine the prevalence of refractive errors and the utilisation of corrective lenses for driving among fuel truck drivers.

1.6 Specific Objectives

The specific objectives were

1. To determine the visual acuity of fuel truck drivers in Oyo, Oyo State.
2. To find out the level of uptake of eye examination services by fuel truck drivers in Oyo, Oyo State.
3. To find out the level of utilisation of corrective lenses for driving of fuel truck drivers in Oyo, Oyo State.
4. To identify the barriers to uptake of eye examination services by fuel truck drivers at Oyo, Oyo State.
5. To identify the barriers to utilisation of corrective lenses for driving among fuel truck drivers at Oyo, Oyo State.

1.7 Hypothesis

1. **Ho:** There is no significant association between the age of fuel truck drivers and poor vision.
2. **Ho:** There is no significant association between the age of fuel truck drivers and the uptake of eye examination services.
3. **Ho:** There is no significant association between the ethnicity of fuel truck drivers and the uptake of eye examination services.
4. **Ho:** There is no significant association between the educational status of fuel truck drivers and the uptake of eye examination services
5. **Ho:** There is no significant association between the uptake of eye examination services and the utilisation of corrective lenses for driving.

CHAPTER TWO

LITERATURE REVIEW

A literature review of road traffic accidents, refractive errors and the utilisation of corrective lenses are presented in this chapter. It consists of the following sections: Road Traffic Accidents (RTA), Visual Acuity for driving; Relationship between poor vision and RTA; Attitude of drivers towards eye examination and spectacle utilisation; Uptake of eye examination among drivers; Utilisation and corrective lenses; and Prevalence of refractive error and poor vision among drivers.

2.1 Road Traffic Accidents (RTA)

According to the World Health Organisation, Road Traffic Injuries (RTIs) are the leading cause of death and injury worldwide. In 1998, an estimated 1,170,694 people died from road traffic injuries worldwide. RTIs were the tenth leading cause of death, accounting for 2.2% of all deaths, and the ninth leading causes of injuries. They were also the leading cause of injury-related death, accounting for 20.3% of all deaths from injury. Much worse is that this is projected to be on the increase due to rapid motorisation and urbanisation, as well as, a lack of injury prevention programmes in the public sector.

The number of fuel-truck accidents in Nigeria is quite substantial. A study by Dare, Oke and Olarenwaju (2009) on the incidents of fire outbreaks during fuel truck accidents in Oyo State found that of 358 road transport accidents recorded in Nigeria between 1999 and 2002, only 33 (9.2%) were due to cars while the rest (90.8%) involved trucks and heavy-duty vehicles.

The table below shows that Road Traffic Injuries is expected to be the third leading cause of the disease burden by 2020.

Table 2.1: Disease burden (Disease Adjusted Life Years lost) for 10 leading causes

1998	**2020**
1. Lower respiratory infections	1. Ischaemic heart disease
2. HIV/AIDS	2. Unipolar major depression
3. Perinatal conditions	***3. Road traffic injuries***
4. Diarrhoeal diseases	4. Cerebrovascular disease
5. Unipolar major depression	5. Chronic obstructive pulmonary disease
6. Ischaemic heart disease	6. Lower respiratory infections
7. Cerebrovascular disease	7. Tuberculosis
8. Malaria	8. War
9. Road traffic injuries	9. Diarrhoeal diseases
10. Chronic obstructive pulmonary disease	10. HIV/AIDS

Source: **WHO, Evidence, Information and Policy, 2000**

Road Traffic Accidents and Injuries suffer neglect in developing countries like Nigeria in research and policy as the awareness to their contribution to the burden of disease is low, especially due to little study on road traffic collisions and their consequences. Also a lack of multi-disciplinary collaboration in responding to the problem is predominant in these countries as the general perception is that RTIs should be the concern of the transport agencies rather than public health agencies.

2.2 Visual Acuity for Driving

The Road Transport Safety Standardization Scheme (RTSSS) specifies minimum safety requirements for fleet operators specified in its driver's safety standards section, and it requires fuel truck drivers to undergo periodic visual acuity tests. The minimum visual acuity for commercial drivers recommended by the FRSC is 6/9 in the better eye and 6/24 in the poorer eye with or without glasses (Agunloye, 1990).

In a study conducted on poor vision, refractive errors and barriers to treatment among commercial vehicle drivers in the Cape Coast municipality, Ovenseri-Ogomo G. and Adofo M. (2011) reported over 12% of the commercial drivers did not have the minimum visual acuity required for driving while 6.8% had visual impairment (VA < 6/18 in the better eye). He noted a poor utilisation of refractive error services and that the barriers to uptake of eye care services were largely due to unawareness of visual status. They reported that refractive errors were the commonest ocular finding followed by cataracts.

In a study conducted by Adekoya B. J. et. al (2009) looking into the visual function survey of commercial intercity vehicle drivers (CIVD) in Ilorin, they reported the prevalence of drivers with inadequate visual acuity (VA) to be 11.5%.

Bekibele, Ajav and Asuzu (2009) in a study on eye health of professional drivers of a Nigerian University found 5.6% of drivers presented with less than satisfactory binocular visual acuity (less than 6/18). They also reported that with refraction no driver had binocular vision less than 6/18. This simply implies that their refractive status was improved with corrective lenses.

2.3 Relationship between vision and road traffic accidents

The abilities required for driving include sensory ability, mental ability, motor ability and compensatory abilities. Vision is one of the most important sensory factors in driving accounting for about 95% of all sensory requirements. One of the most important and frequently used visual function tests is visual acuity. (Ovenseri-Ogomo & Adofo, 2011)

Although some studies have found no association between the impairment of visual function and the occurrence of RTAs (Davidson 1985; Hedin 1993, Silveira et al. 2007, Adekoya et al. 2009), some other studies have reported a relationship (Humphries 1987; Ivers et al. 1999; Nwosu 1999; Oladehinde et al. 2007). Bekibele et al, (2007) in a study on the prevalence of refractive error and attitude to spectacle use among drivers of public health institutions in Ibadan, Nigeriafound relative frequency of RTA among drivers was 16.2%, and reported that the risk was marginally higher among drivers with refractive error (OR 1.2, 95% CI: 0.4-3.7).

Vision is a fundamental component of safe driving (Bener, Ahmad, El-Tawil and Al-Bakr 2004). Driving critically utilises the organ of sight and it is a visually intensive task (Kotecha, Spratt and Viswanathan 2008). For safety therefore, it is expected that drivers have good vision for driving and adhere to the standards set by the FRSC which require periodic visual acuity checks.

2.4 Attitude towards eye examination and spectacle utilisation

Ebeigbe, Kio, and Okafor (2013) researched into the attitude and beliefs of Nigerian Undergraduates to Spectacle wear, with a total of 500 subjects used in the study of which 269 were males (54%) and 231 (46%) were females with age ranging from 18–30 years, (mean 23±2.4SD). They found that 68% of the total population had not heard of refractive error, or gone for an eye examination, even though they have had some kind of problem or the other with their eye. Also, they reported that 50% of the respondents responded that glasses could be used to correct refractive error, 50% of

the respondents believed they would wear corrective lenses if it was prescribed for them, and 64% of the respondents thought that corrective lenses were harmful to the eyes.

Adeoti (2009) researched into the beliefs and attitude of people towards wearing glasses in order to improve acceptance of glasses when prescribed thus reducing blindness and visual impairment due to uncorrected refractive errors. Of 198 respondents administered a pretested structured questionnaire during the parent-teacher association (PTA) meeting of three public secondary schools chosen at random from a list of schools in Osogbo, he reported that a significant percentage (38.4%) of the respondents will not use glasses if prescribed. Also, he reported that 51.5% of respondents will not allow their children to use prescribed corrective lenses, even though 96.3% of those that reported that they use corrective lenses had good experiences.

2.5 Uptake of eye examination among drivers

The uptake of eye examination among drivers has been reported to be very poor. A study conducted on the visual function of drivers and its relationship with Road Traffic Accidents in Urban Africa found that 20% did not undergo any prior driving test and only one third of those who had (n = 120, 30.9%) had a prior eye test (Pepple and Adio, 2014).

A visual function survey of commercial intercity vehicle drivers (CIVD) in Ilorin conducted by Adekoya et. al (2009) found that out of 399 drivers who constituted the study population, 337 drivers (84.5%) did not have their eyes tested at first licensing and 370 drivers (92.7%) did not have testing at least once during renewals.

2.6 Utilisation of corrective lenses for driving

Bekibele et. al (2007) studied the prevalence of refractive error and attitude to spectacle use among drivers of Public Institutions in Ibadan and found the proportion of drivers with refractive errors was 16.7%. They reported that only 9.4% of the drivers, 56.3% of those found to have refractive error) wear corrective lenses while driving, and the remainder 43.7% of them did not wear corrective lenses while driving.

In another study, on poor vision, refractive errors and barriers to treatment among commercial vehicle drivers in the Cape Coast municipality conducted by Ovenseri-Ogomo and Adofo (2011), it was found that 4.9% of respondents reported wearing corrective lenses, and only about 1% of the total respondents wear their corrective lenses for distance (without indicating whether they wear their corrective lenses while driving).

In a study on the ocular status of commercial drivers in Osun State with a study population of 99 commercial vehicle drivers registered with Nigerian Union of Road Transport Workers (NURTW), it was reported that not even a single driver had corrective lenses (Isawunmi M. A. et. al. 2011).

The utilisation of corrective lenses for driving by commercial drivers is really low, and the relatively higher proportion found in the first study has been linked with the academic environment in which the respondents drive, which increases their awareness.

2.7 Prevalence of refractive errors and poor vision among drivers

A study on the prevalence of refractive error and attitude to spectacle use among drivers of Public Institutions in Ibadan found the proportion of drivers with refractive errors was 16.7%. (Bekebele et al., 2007).

Another study on poor vision, refractive errors and barriers to treatment among commercial vehicle drivers in the Cape Coast municipality conducted by Ovenseri-Ogomo G. and Adofo M. (2011), found that refractive error was a common ocular condition among drivers and reported that 32% of the drivers had refractive errors.

In another study, Bekibele, Ajav and Asuzu (2009) which looked into the eye health of professional drivers of a Nigerian University, the most common visual problem affecting distance vision was found to be refractive errors, affecting 19.3% of them.

Isawunmi et. al. (2011) conducted a study on the ocular status of commercial drivers in Osun State with a study population of 99 commercial vehicle drivers registered with Nigerian Union of Road Transport Workers (NURTW) found that the most common form of visual problem affecting distance vision was refractive errors, as they recorded 31.3% of the study population having uncorrected refractive errors. 6.1% of the study population had visual impairment.

A study on prevalence of visual impairment among commercial motor vehicle drivers in Uyo, South-South Nigeria found the prevalence of visual impairment to be 1.7% in the better eye and 7.2% in the worse eye, and 2.1% were monocularly blind (Abraham and Umanah, 2010).

2.8 Conceptual Framework

Each theory used in health education and health promotion is built on different assumptions. They all state that behavioural changes occur by altering potential risk-producing situations and social relationships, risk perceptions, attitudes, self- efficacy beliefs, intentions and outcome expectations (Kalichman, 1997).

The Health Belief Model (HBM) is by far the most commonly used theory in health education and health promotion (Glanz, Rimer, and Lewis, 2002; National Cancer Institute [NCI], 2003). The underlying concept of the original HBM is that health behaviour is determined by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Hochbaum, 1958).

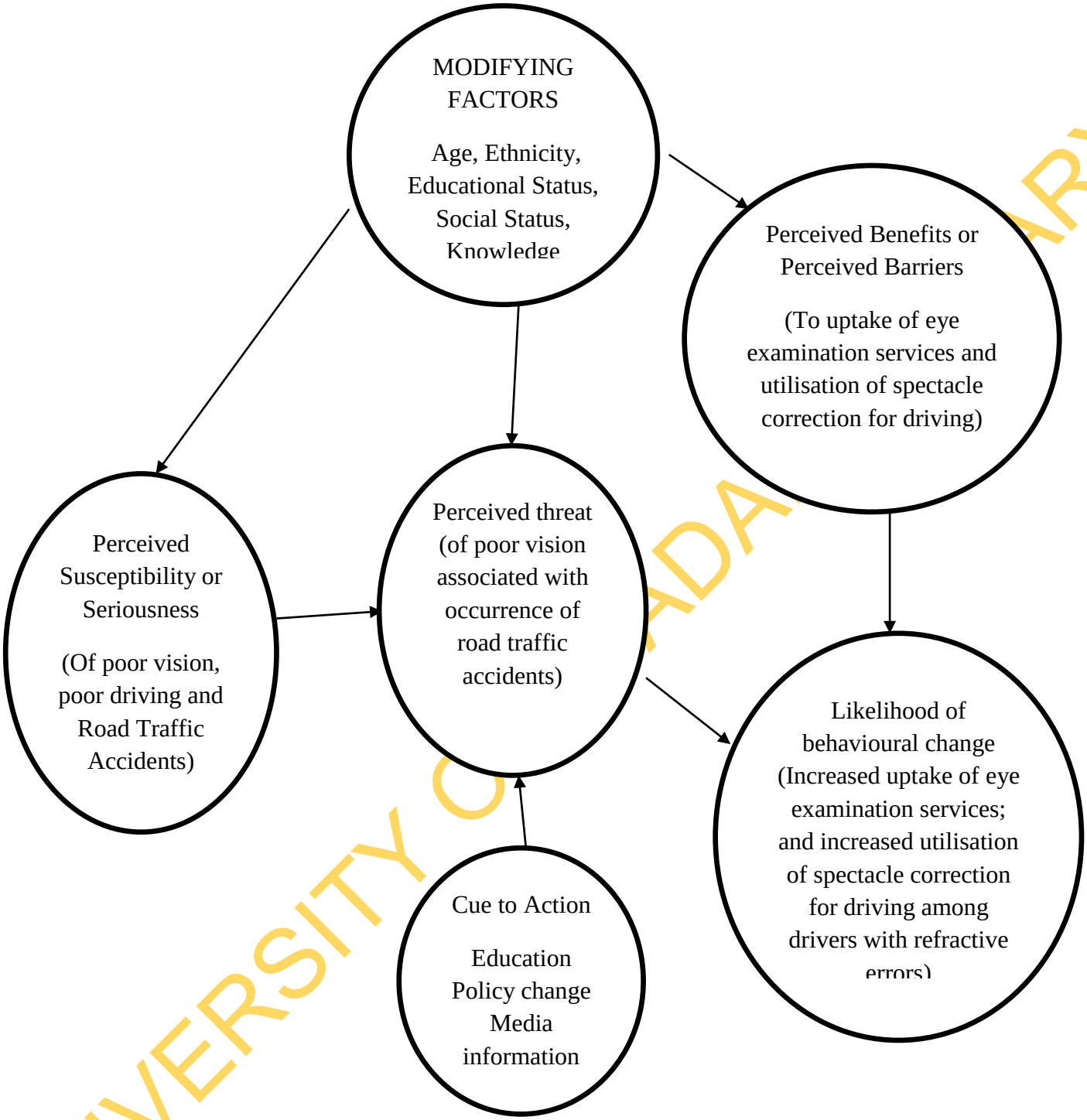
In this study, the health belief model is used to explain the uptake of eye examination services and the utilisation of corrective lenses for driving among fuel truck drivers in Oyo, Oyo state.

THE HEALTH BELIEF MODEL (HBM)

The Health Belief Model (HBM) was developed in the 1950s to explain and predict preventive health behaviour. The model focuses mainly on the attitudes and beliefs of individuals towards a disease, product or intervention method.

This model suggests that individuals determine the feasibility, benefits and costs related to an intervention or behaviour change based on the following six key constructs. Perceived Susceptibility; Perceived Severity; Perceived Benefits; Perceived Barriers; Cues to action; and Self-Efficacy.

HBM identifies that constructs lead to outcome behaviours. This is shown in the appendix. The theoretical framework is illustrated in the diagram below.



(Glanz, Rimer, and Lewis, 2002).

Figure 2.1: Application of the Health Belief Model

CHAPTER 3

METHODOLOGY

3.1 Study Design

A cross-sectional descriptive study was conducted involving fuel truck drivers in Oyo town. Respondents went through an eye examination comprising visual acuity, external and internal ocular eye health examinations, as well as objective and subjective refraction.

Structured questionnaires were also administered in the local language to the respondents by face-to-face interview. This is in order to collect demographic data, history of driving and road traffic accidents, uptake of eye care services and utilisation of corrective lenses for driving.

3.2 Study Site

The study was conducted in Oyo, Oyo State. Oyo town is a haven for fuel truck drivers as they transport fuel to different parts of the country. There are a lot of fuel truck parks and a lot of workshops so that trucks can be serviced and repaired. The NURTW, PTD Unit office is situated in one of the very large park with mechanic workshops. Majority of the fuel truck drivers were seen at the tanker parks in Afijio while about a quarter of them were attended to at the NURTW, PTD Unit office. The fuel truck drivers come from all over the country but are majorly Yoruba-speaking people and Hausa-speaking people.

3.3 Study Population

The study population was made up of fuel truck drivers who had been driving for a minimum of 6months.

3.4 Sample Size Determination

The sample size used was determined as follows:

$$n = \frac{(Z\alpha/_2)^2 \, x \, p_1 \, (1 - p_1)}{d^2}$$

Where: n = minimum sample size

Z (1-α) = a standard score at 95% confidence interval = 1.96

P1 = prevalence of 16.7% on average (Bekibele et al.) = 0.167

Studies conducted in Ibadan.

d = difference = 0.05

$$n = \frac{1.96^2 \, x \, 0.167(1 - 0.167)}{(0.05)^2}$$

n = 214

The minimum sample size for this study was determined to be 214with an additional 10% non-response rate to give a total of 235.

3.5 Recruitment of Study Respondents

The study was conducted in the tanker park in Afijio and in the PTD unit of NUPENG, Oyo. Total coverage sampling was employed. All fuel truck drivers at the Afijio park who have been driving for over 6months were included.

3.6 Instruments of Data Collection

Data was collected through administering semi-structured questionnaires to, and conducting eye examinations for the drivers.

Questionnaires were designed to be interviewer-administered (See Appendix 1) and contained both open-ended and close-ended questions. The semi-structured questionnaire was divided into five sections A – E. Section A comprised of nine (9) questions which sought information on the demographic characteristics including the gender, age, educational qualification, marital status, number of children, religion, ethnicity, vehicle type and number of years spent driving a tanker of the respondents. Section B comprised six (6) questions which elicited information on perception and uptake of eye examination services. These include questions bothering on respondents' history of eye examination and perceived benefits associated with routine eye examination. Section C comprised six (6) questions also, eliciting information on the utilisation of corrective lenses for driving. These include questions bothering on respondents' history of spectacle use, as well as, what the spectacles are utilised for. Section D sought information on barriers to uptake of eye examination services**,** and Section E which comprised seven (7) questions sought information on perceived barriers to utilization of corrective lenses for driving, and road traffic accident history.

Each participant had an ocular examination. The ocular examination comprised presenting visual acuity using the Snellen Visual Acuity chart (See Appendix 2),

external eye examination using the penlight and internal eye examination with the direct ophthalmoscope, and refraction.

3.7 Validity of the Research Instrument

A draft of the questionnaire was developed by the researcher. The questions were formed guided by the research objectives. The instruments were further validated by giving them out to peers and my supervisor in the department for review and corrections.

3.8 Reliability of the Research Instrument

Following review and approval by the project supervisor, the reliability of the instrument was determined by pre-testing the instruments using 10% of the sample size calculated. 10% of 235 (sample size) is 24. Therefore, the pre-testing was done among 24 fuel truck drivers in Ibadan, an area not selected for the study. Cronbach's Alpha Formula was applied to the pre-test data to determine the reliability co-efficient. This was found to be 0.7.

3.9 Data Collection Procedure

The data collection for the main study was conducted between 14th and 17th of September, 2014.

The questionnaire was interviewer-administered by four trained research assistants in Hausa and Yoruba where the respondents could not understand English. Eye examination forms were handed to respondents after questionnaires had been

completed and numbered. This was to ensure completeness and correctness, and to see that the numbers on the questionnaires and eye examination forms tallied.

The eye examination was carried out by six research assistants, three were eye care professionals (optometrists) assisted by three non-professionals who had been trained to assist during visual screenings. The visual acuity test was carried out at the standard test distance of six meters with the aid of measuring tapes. After this, external eye examinations using penlights and internal eye examinations using ophthalmoscopes was carried out on respondents, and finally, they underwent a refraction test. All eye examination results were recorded in the eye examination forms and collated along with questionnaires after the final test, which was refraction.

3.10 Data Processing and Analysis

Having checked for accuracy and completeness on the field, the copies of questionnaire and eye examination form were collated and sorted. Consistencies of serial numbers on copies of questionnaire and eye examination form were checked. After reviewing all open-ended portion of the questionnaire, codes were developed for coding responses. Data entry and management was done using Statistical Package for Social Science (SPSS) version 16 software. Frequency tables and proportions as well as means and standard deviations were used for data summarization. The relationship between variables was determined using Chi-square.

Normal vision for driving was defined as visual acuity ≥ 6/9 in the better seeing eye and this is in consonant with the standard specified by the FRSC for eligibility of commercial drivers to drive in Nigeria. Visual impairment was defined as a visual acuity < 6/18 to < 6/60 in the better seeing eye (WHO, 1984). Drivers requiring further evaluation were referred to the closest eye clinic.

3.11 Ethical Consideration

The following ethical considerations were addressed.

Informed Consent: Informed consent was obtained from subjects prior to study as well as from concerned association leaders.

Confidentiality of data: Privacy, confidentiality and anonymity was guarded. Scientific objectivity of the study was maintained with honesty and impartiality.

Beneficent to respondents: The outcome of the research was of benefit to all respondents, as they were told the status of their vision. Those found to have poor vision were referred for treatment to appropriate centres depending on the diagnosis, while some were given medications (anti-oxidants beneficial to improving eye health).

Voluntariness: The respondents were given the full detail concerning the research before taking part in it so as to ensure that they fully understood the research and were willing to take part in it. There was no coercion to participate and decision to take part was solely that of the participant.

Non-malfeasance to respondents: The study was relatively risk-free.

CHAPTER 4

RESULTS

The test results of a total of two hundred and seventeen (217) respondents were analysed alongside the interviewer administered corresponding questionnaires. Incompletely filled questionnaires and eye examination forms were rejected. The results are presented in six sections: Socio-demographic Characteristics of Respondents; Perception and Uptake of Eye Examination Services; Information on the Utilisation of Corrective Lenses for Driving; Perceived Barriers to Uptake of Eye Examination Services; Perception towards the Utilization of corrective lenses for driving; and Prevalence of Refractive Errors and other causes of Poor Vision for Driving.

4.1 Section A: Socio-Demographic Characteristics of Respondents

The socio-demographic characteristics of the tanker drivers are represented in Tables 4.1.1 and 4.2.2.

The respondents were all males (100%) and no female tanker driver was seen. The ages of the drivers ranged from 20 to 72 years with the mean age of 40.33 (±9.147) with majority of them (42.4%) between 30 and 39 years of age.

Most of the fuel truck drivers had their highest educational qualification to be primary schooling (44.2%) and secondary schooling (43.8%), with very few of them (1.8%) having tertiary education. 9.7% of them never went to school.

The majority (87.6%) of the respondents were married, while a few (12.4%) were single. Only a few (8.3%) of the respondents had no children. Most of them (53%) had 1-4 children, and 5.1% had more than 9 children. More than three quarters (78.8%) of respondents were Muslims and the remaining 21.2%, Christians. Most of

the respondents were either Hausas (42.9%) or Yorubas (45.2%), with a few of them being Ibos (8.3%) and Edos (3.7%).

Table 4.1.1: Socio-Demographic Characteristics of Respondents (N=217)

Variable	Frequency (n)	Percentage (%)
Gender		
Male	217	100
Female	0	0
Age groups (in years)		
20-29	21	9.7
30-39	92	42.4
40-49	72	33.2
50-59	26	12.0
60-69	5	2.3
70-79	1	0.5
Highest educational qualification		
Never went to school	21	9.7
Primary level	96	44.2
Secondary level	95	43.8
Tertiary level	4	1.8
Others	1	0.5
Marital status		
Single	27	12.4
Married	190	87.6
Number of children		
0	18	8.3
1-4	115	53.0
5-8	73	33.6
9 and above	11	5.1

Majority (81.6%) of the fuel truck drivers drive an articulated tanker, while some (16.6%) drive a rigid tanker. Very few (1.8%) drive a semi-trailer. Over half of the fuel truck drivers had been driving a tanker for 6-15years (6-10years, 30.9%; and 11-15years, 26.3%), a few of them (3.6%) had been driving a tanker for 31-40 years (31-35years, 1.8%; and 36-40years, 1.8%).

Table 4.1.2: Socio-Demographic Characteristics of Respondents (N=217)

Variable	Frequency (n)	Percentage (%)
Type of vehicle driven		
Religion		
Christianity	46	21.2
Islam	171	78.8
Ethnicity		
Yoruba	98	45.2
Hausa	93	42.9
Igbo	18	8.3
Others	8	3.7
Articulated	177	81.6
Rigid	36	16.6
Semi-trailer	4	1.8
Years spent driving a tanker		
1-5	34	15.7
6-10	67	30.9
11-15	57	26.3
16-20	28	12.9
21-25	10	4.6
26-30	13	6.0
31-35	4	1.8
36-40	4	1.8

4.2 Section B: Information on Perception and Uptake of Eye Examination Services

Almost one quarter of respondents (22.1%) said they had never heard about an eye examination, while the majority (77.9%) of them said they had heard about eye examinations.

About one quarter (24.4%) of the respondents said that eye examinations had no benefits, while 162 (74.7) said eye examinations were beneficial.

Table 4.2.1 Table showing number of respondents who have heard of an eye examination and number of respondents who say having an eye examination is beneficial.

Variable	Frequency (n)	Percentage (%)
Response of respondents on whether they had ever heard about eye examination		
Yes	169	77.9
No	48	22.1
Response of respondents on whether there are benefits associated with having routine eye examination		
Yes	162	74.7
No	53	24.4
No response	2	0.9

When asked to state one benefit associated with having eye examinations, of the 162 who claimed there were benefits associated with eye examinations, 6.8% (11) of them could not state any benefit.

Table 4.2.2: Response of respondents on benefits associated with having an eye examination

Variable	Frequency (n)	Percentage (%)
Benefits associated with having an eye examination stated by the respondents		
To know if the eyes are healthy	97	59.9
To prevent blindness	19	11.7
To care for the eyes if there are problems	15	9.3
To enhance good sight	12	7.4
To prevent light from disturbing eyes at night	4	2.5
To maintain good sight in old age	3	1.9
To collect drivers license	1	0.6
No response	11	6.8
TOTAL	162	100

Most (59.9%) of those who felt having eye examinations presented benefits said it was useful to know the state of the eyes, 11.7% of them said it was useful for blindness prevention, 9.3% said it was beneficial for the purpose of treating problems of the eye, 7.4% of them said eye examinations would enhance good sight, 2.5% of them said it would protect the eyes from disturbances such as light at night, 1.9% said it would help preserve good vision in old age, and one person (0.6%) said eye examinations are useful to obtain drivers licence.

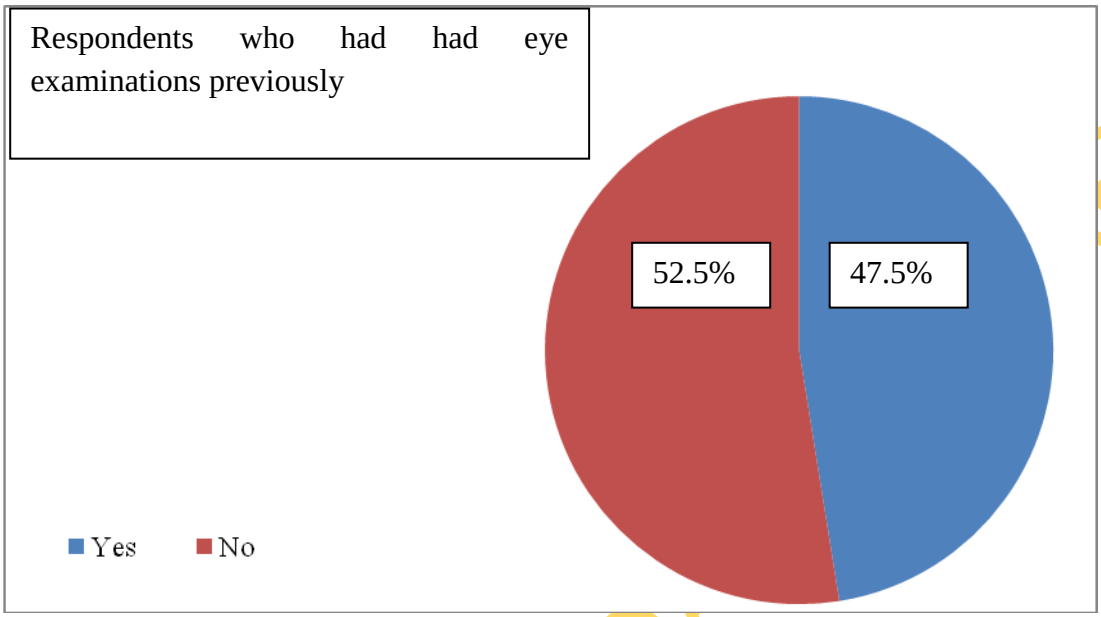


Fig. 4.2.3: Pie chart showing percentage of respondents who have had eye examinations

Less than half of respondents (47.5%) said they had had an eye examination before. 114 (52.5%) of them said they had never had eye examinations.

Of the 103 who claimed they had previously had eye examinations, most (43.7%) of them said they had only gone through it once. 34% said they had gone through it twice, 14.6% said they had gone through it thrice, five of the 103respondents (4.9%) who had their eyes examined previously said they had gone through eye examinations four times, two respondents (1.9%) said they had gone through it five time, and only one participant (1%) said he had gone through eye examinations six times. The details are presented in Table 4.2.3 below.

Table 4.2.3: List of times respondents have had previously has eye examination

Variable	Frequency (n)	Percentage (%)
Response of respondents to how many times they have had their eyes examined previously N=103		
Once	45	43.7
Two times	35	34.0
Three times	15	14.6
Four times	5	4.9
Five times	2	1.9
Six times	1	1.0

Of the 103 respondents who claimed they had previously had eye examinations, the last time most (43.7%) of them had an eye examination was three or more years ago, 18.4% of them last had an eye examination two years ago, 26.2% of those who had had an eye examination said they had it last year, and 11.7% said they had it this year. These values are presented in Table 4.2.4 below.

Table 4.2.4: Table showing when respondents' last had an eye examination

Response of respondents to when last they had their eyes examined N=103		
This year	12	11.7
Last year	27	26.2
Two years ago	19	18.4
Three or more years ago	45	43.7

4.3 Section C: Information on the Utilisation of Corrective Lenses for Driving

Table 4.3.1: Table showing frequency of utilisation of corrective lenses by respondents

Variable	Frequency (n)	Percentage (%)
Response of respondents to whether they were prescribed corrective lenses after eye examinations in the past N=217		
Yes	16	7.4
No	201	92.6
Response of respondents to whether they obtained the corrective lenses prescribed? N=16		
Yes	14	96.6
No	2	3.4
Total	16	100

Very few (7.4%) respondents said they have previously been prescribed corrective lenses for driving. Of all those previously prescribed corrective lenses for driving, 87.5% said they obtained the corrective lenses, while 12.5% failed to obtain them.

Table 4.3.2: Table showing frequency of utilisation of eye drops by respondents

Response of respondents to whether they were prescribed eye drops after eye examinations in the past		**N=217**
Yes	59	27.2
No	158	72.8
Response of respondents to whether they obtained the drugs prescribed? N=59		
Yes	57	96.6
No	2	3.4
Total	59	100.0

About a quarter of them (27.2%) said they had been previously prescribed drugs for eye problems. Of all those previously prescribed drugs for eye problems, 96.6% of the picked up the medications, while only 3.4% said they did not.

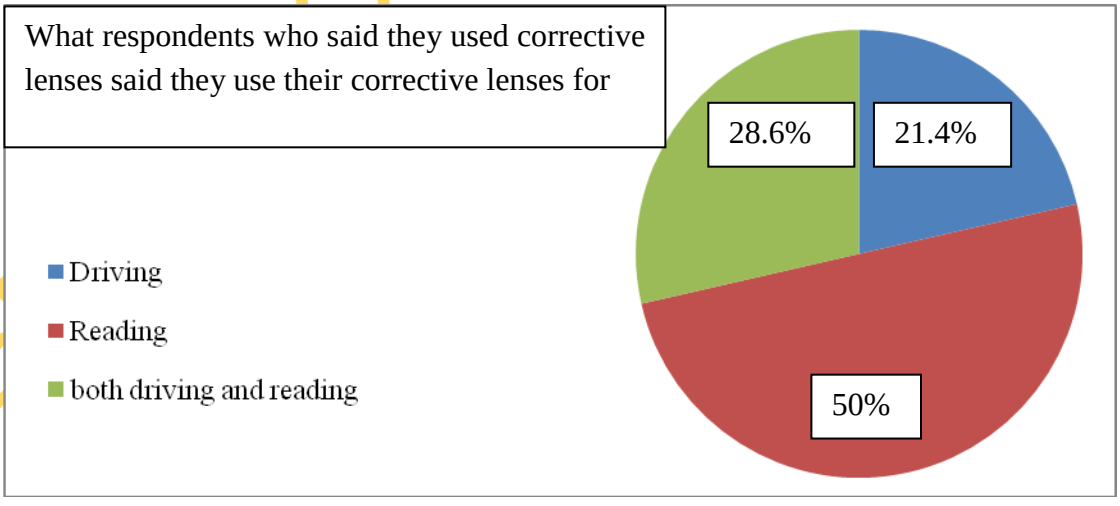


Fig. 4.3.1: Pie chart showing what respondents who utilise corrective lenses use the corrective lenses for

Half (50%) of the respondents who said they made use of corrective lenses said they used their corrective lenses for reading only. Less than a quarter (21.4%) of respondents who said they use corrective lenses said they used the corrective lenses for driving only, while another 28.6% said they used their corrective lenses for both sight and reading.

Table 4.3.3: Table showing what respondents felt the corrective lenses they use had on their vision

Variable	**Frequency (n)**	**Percentage (%)**
Response of respondents who use corrective lenses to what the corrective lenses did to their vision		
Improved	13	92.6
Same	1	7.1
Worsened	0	0
Total	14	100.0

When asked if the corrective lenses improves, worsens or makes no difference to their vision, most (92.6%) of the respondents who use corrective lenses said it improved their vision, only 1 participant (7.1%) who used corrective lenses said the use of the corrective lenses made no difference to his vision. None of the respondents said corrective lenses made their vision worse.

4.4 Section D: Perceived Factors influencing the Uptake of Eye Examination Services

Table 4.4.1: List of respondents response to factors influencing them having eye examinations in the past

Variable	Frequency (n)	Percentage (%)
What respondents who had never had an eye examination, perceive as factors that prevented them from going for an eye examination in the past		
I feel my eyes are okay	18	8.3
No time	29	13.4
fear that doctors will spoil my eyes	2	0.9
No time and fear that eyes would be spoiled	1	0.5
Never saw the need/value	31	14.3
No response	28	12.9
Nothing	5	2.3
Total	114	100

Respondents who had never had their eyes examined, most (14.3%) said they never saw the need or value to have their eyes examined, a large number of them (13.4%) attributed their failure to have their eyes examined previously to a lack of time, and another large number (15.2%) failed to state the reasons why they failed to have their eyes checked in the past. A good number of them (8.3%) said they felt their eyes were okay, a few (0.9%) said they feared their eyes would get damaged if they did. Table 4.9 shows a list of barriers highlighted by respondents.

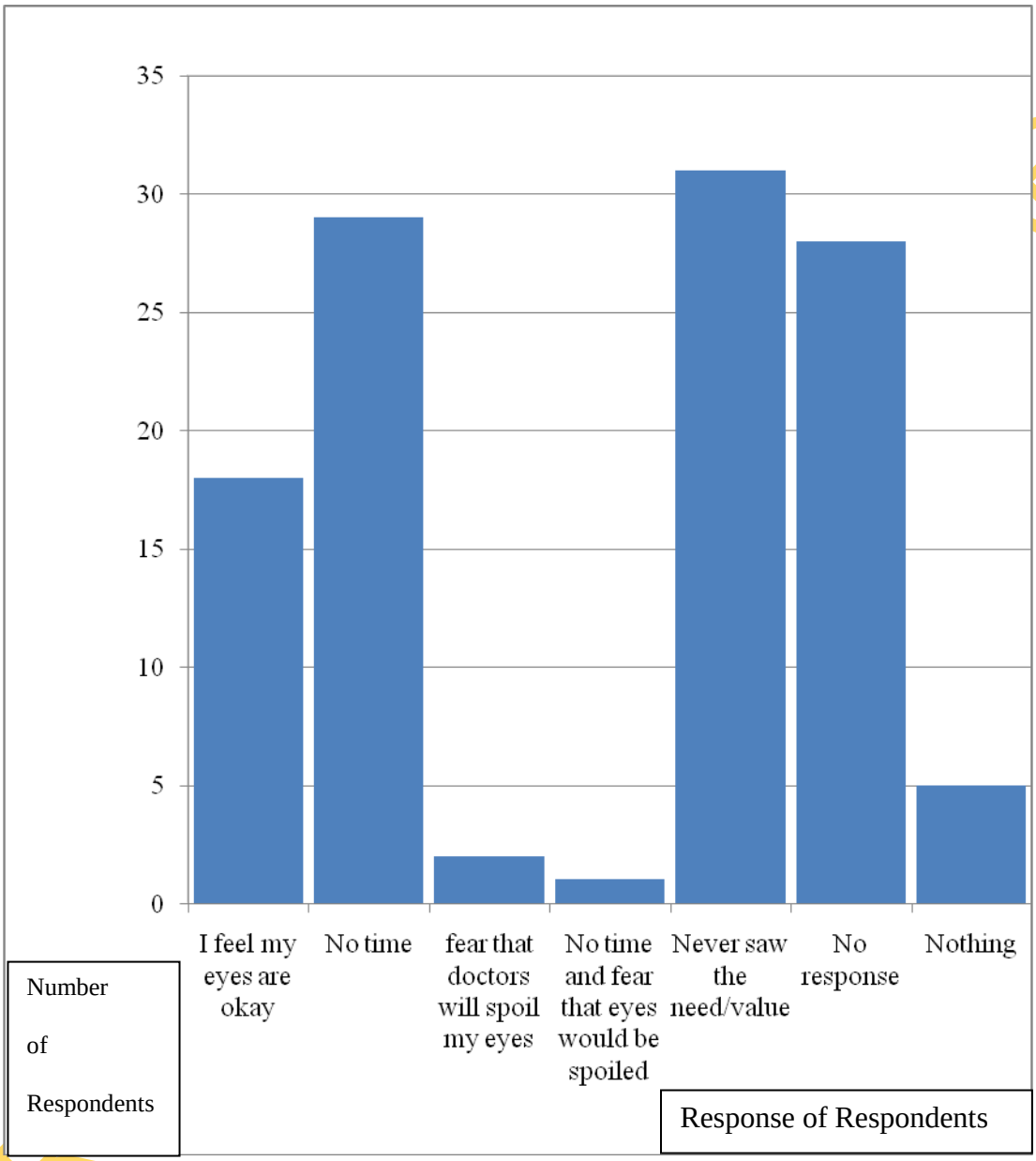


Fig. 4.4.1: Bar graph showing perceived reasons why respondents never had an eye examination previously

4.5 Section E: Perception towards the Utilisation of Corrective Lenses for Driving

Table 4.5.1: Perception of respondents towards fuel truck drivers wearing corrective lenses to drive

Variable	Frequency (n)	Percentage (%)
Respondents response to whether they had seen any tanker driver wearing corrective lenses while driving		
Yes	67	30.9
No	147	67.7
No response	3	1.4
Respondents response to what they thought of fuel truck drivers wearing corrective lenses while driving		
It is recommended	22	10.1
For fashion	16	7.4
It is either recommended or for fashion	22	10.1
Poor vision	53	24.4
For protection	4	1.8
No response	100	46.1

About two thirds (67.7%) of the respondents said they had never seen a tanker driver wearing spectacles before, about one third (30.9%) of them said they had, while a few (1.4%) failed to respond to the question. When asked about what they thought about drivers wearing spectacles for driving, most of them (46.1%) failed to provide a response, about a quarter (24.4%) of respondents said the drivers who drove with

corrective lenses must have poor vision or bad eyes, 10.1% said they would think the corrective lenses were recommended, 7.4% said they would think the corrective lenses were for fashion, another 10.1% said the corrective lenses worn by fuel truck drivers would either be recommended or for fashion, a few (1.8%) said they would think the corrective lenses were for protection.

Table 4.5.2: Perception of respondents towards spectacle utilisation

Variable	**Frequency (n)**	**Percentage (%)**
Response of respondents as to whether they would wear corrective lenses for driving if they were prescribed for your use?		
Yes	138	63.6
No	78	35.9
No response	1	0.5
If Yes, why?		**N=138**
For clearer/better vision	90	65.2
For corrective measures	22	15.9
To enjoy life/for fun	13	9.4
to protect the eyes	8	5.8
to prevent problem	2	1.4
No response	3	2.2
If No, why?		**N=78**
I just cannot see myself	7	9.0
Prefer drugs	13	16.7
I do not need corrective	29	37.2
I do not like corrective lenses	13	16.7
corrective lenses would	8	10.3
already have	1	1.3
No response	7	9.0

R

Respondents were asked if they would wear corrective lenses for driving if prescribed and more than a third of them (35.9%) said they would not, although majority of them (63.6%) said they would. Of the respondents who said they would pick up corrective lenses if they were prescribed, most (65.2%) of them said they would obtained prescribed corrective lenses for driving if the corrective lenses gave them clearer/better vision, 15.9% said they would obtain corrective lenses if they were for corrective measures, 9.4% said they would take it for fun or to enjoy life, 5.8% gave the reason why they would obtain the corrective lenses for driving as protecting their eyes, 1.4% said they would obtain the corrective lenses to prevent eye problems, while 2.2% failed to state any reason.

Of the respondents who said they would not pick up corrective lenses if they were prescribed, most (37.2%) of them said they do not need corrective lenses, 16.7% said they do not like corrective lenses, another 16.7% said they would rather take drugs, 10.3% said they believed that corrective lenses would damage their eyes, and 9% said they just do not see themselves wearing corrective lenses, and 9% failed to respond. One participant (1.3%) said he would not obtain corrective lenses prescribed because he already has one.

When respondents were asked if they had been involved in a road traffic accident, most (77.4%) of them said they had not, while almost one quarter (22.6%) said they had been involved in a road traffic accident.

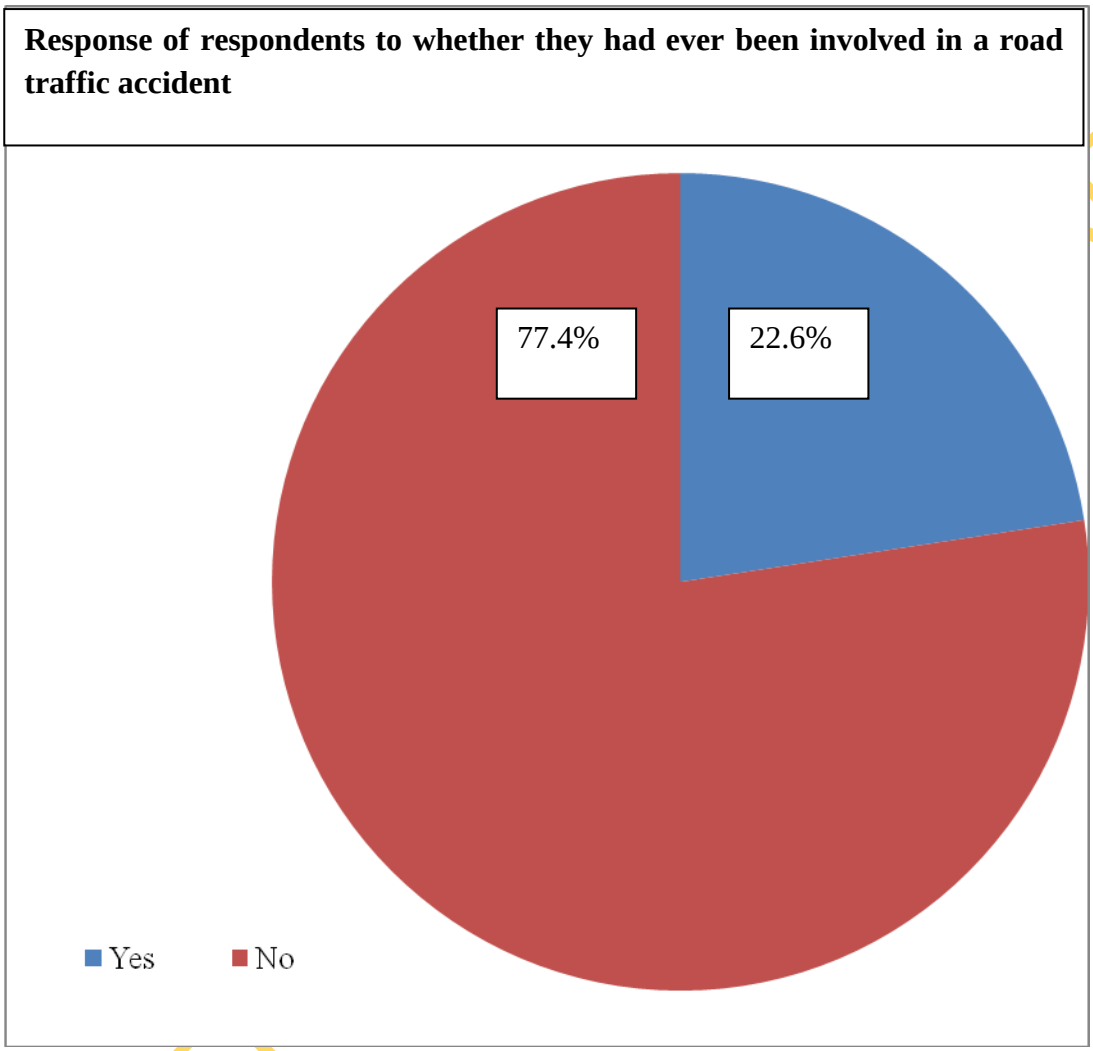


Fig. 4.5.1: Pie chart showing percentage of fuel truck drivers involved in road traffic accidents

4.6 Section F: Prevalence of Refractive Errors and other causes of Poor Vision for Driving

Table 4.6.1: Table showing prevalence of Refractive Errors

Variable	Frequency (n)	Percentage (%)
Refractive status of respondents		
Emmetropia	166	76.5
Myopia	8	3.7
Hyperopia	18	8.3
Astigmatism	25	11.5

Most (76.5%) of the respondents were emmetropes (had no refractive errors) while almost one quarter (23.5%) of respondents were found to have some form of refractive errors, 3.7% had myopia, 8.3% had hyperopia and 11.5% had astigmatism.

Table 4.6.2: Table showing prevalence of eye diseases

Variable	Frequency (n)	Percentage (%)
Disease		
No Anomaly Detected	174	80.2
Amblopia	3	1.4
Conjunctivitis	5	2.3
Pterygium	30	13.8
Cataract	5	2.3

Most (80.2%) respondents had no pathology (eye disease), 13.8% had pterygium, 2.3% had conjunctivitis, 2.3% had cataract, and 1.4% were found to have amblyopia.

Table 4.6.3: Table showing frequency of respondents visual acuities

Variable	Frequency (n)	Percentage (%)
Visual acuity of respondents		
6/6 in better eye	170	78.3
6/9 in better eye	34	15.7
less than 6/9 in better eye	9	4.1
less than 6/18 in the better eye	4	1.8

Most (78.3%) respondents had very good vision, and an additional 15.7% of respondents had fair vision which met the minimum standard required for driving, 5.9% were found to have visual acuity less than that required for driving (those whose visual acuity was found to be less than 6/9 in the better eye), 1.8% of the respondents were visually impaired.

4.7 Tests of Hypothesis

Null Hypothesis One

There is no significant association between the age of fuel truck drivers and poor vision.

The ages of the respondents were grouped using a 10-year range; the differences in visual acuities of the respondents were then tested using Chi-square. The differences were found to be statistically insignificant at 95% confidence interval (p=0.715).. Therefore, we fail to reject the above stated null hypothesis.

Table 4.7.1 A cross tabulation of age groups of respondents and respondents' visual acuities

		Visual acuity						
		6/6 in better eye	6/9 in better eye	less than 6/9 in better eye	less than 6/18 in the better eye	Total	Pearson Chi-Square	P Value
Age groups	20-29	17	2	2	0	21	11.516	0.715
	30-39	71	13	4	4	92		
	40-49	57	12	3	0	72		
	50-59	21	5	0	0	26		
	≥ 60	4	2	0	0	6		
Total		170	34	9	4	217		

Null Hypothesis Two

There is no significant association between the age of fuel truck drivers and the uptake of eye examination services.

The age of the respondents were grouped using a 10-year range; the differences in uptake of eye examination services of the respondents was then tested using Chi-square. The differences were found to be statistically significant at 95% confidence interval (p=0.017). Therefore, we reject the above stated null hypothesis.

Table 4.7.2 A cross tabulation of age groups of respondents and respondents who had previously had their eyes examined

		Respondents who had their eyes examined		Total	Pearson Chi-Square	P Value
		Yes	No			
Age groups	20-29	4	17	21	13.719	0.017
	30-39	45	47	92		
	40-49	32	40	72		
	50-59	17	9	26		
	≥ 60	5	1	6		
Total		103	114	217		

This means that the ages of fuel truck drivers significantly influenced their uptake of eye examination services.

Null Hypothesis Three

There is no significant association between the ethnicity of fuel truck drivers and the uptake of eye examination services.

The association between ethnicity of the respondents and their uptake of eye examination services was also tested using Chi-square. The differences were found to be statistically insignificant at 95% confidence interval (p=0.403). Therefore, we fail to reject the above stated null hypothesis.

Table 4.7.3 A cross tabulation of ethnicity of respondents and respondents who had previously had their eyes examined

		Respondents who had their eyes examined				
		Yes	No	Total	Pearson Chi-Square	P Value
ethnicity	Yoruba	52	46	98	2.925	0.403
	Hausa	38	55	93		
	Igbo	9	9	18		
	Others	4	4	8		
Total		103	114	217		

Null Hypothesis Four

There is no significant association between the educational status of fuel truck drivers and the uptake of eye examination services.

The association between educational status of the respondents and their uptake of eye examination services was also tested using Chi-square. The differences were found to be statistically insignificant at 95% confidence interval (p=0.532). Therefore, we fail to reject the above stated null hypothesis.

Table 4.7.4 A cross tabulation of educational status of respondents and respondents who had previously had their eyes examined

	Respondents who had their eyes examined				
highest educational qualification	Yes	No	Total	Pearson Chi-Square	P Value
Never went to school	8	13	21	3.157	0.532
Primary level	44	51	95		
Secondary level	48	48	96		
Tertiary level	3	1	4		
Others	0	1	1		
Total	103	114	217		

Null Hypothesis Five

There is no significant association between the uptake of eye examination services and the utilisation of corrective lenses for driving.

The uptake of eye examination services of the respondents and the utilisation of corrective lenses for driving was also tested using Chi-square. The differences were found to be statistically significant at 95% confidence interval (p=0.001). Therefore, we reject the above stated null hypothesis.

Table 4.7.5 A cross tabulation of uptake of eye examination services of the respondents and the utilisation of corrective lenses for driving

		What corrective lenses are used for						
		Driving	Reading	both driving and reading	Not applicable	Total	Pearson Chi-Square	P Value
Have you ever had your eyes examined?	Yes	3	7	4	89	103	16.564	0.001
	No	0	0	0	114	114		
Total		3	7	4	203	217		

This means that the uptake of eye examination services by the respondents significantly influenced their utilisation of corrective lenses for driving.

Null Hypothesis Six

There is no significant association between the visual acuity of drivers and the occurrence of road traffic accidents.

The association between visual acuity of drivers and the occurrence of road traffic accident was also tested using Chi-square. The association was found to be statistically insignificant at 95% confidence interval (p=0.506). Therefore, we reject the above stated null hypothesis.

Table 4.7.6 A cross tabulation of visual acuity of respondents and their involvement in road traffic accident

		Have you ever been involved in a road traffic accident?				
		Yes	No	Total	Pearson Chi-Square	P Value
Visual acuity	6/6 in better eye	42	128	170	2.336	0.506
	6/9 in better eye	5	29	34		
	less than 6/9 in better eye	1	8	9		
	less than 6/18	1	3	4		
Total		49	168	217		

CHAPTER 5

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

About a quarter of respondents (23.5%) were found to have refractive errors. This is higher than was found in similar studies conducted on professional drivers of the University of Ibadan (19.3%) (Bekibele et al., 2009), but lower than was found in similar studies conducted on commercial vehicle drivers in Osun state (31.3%). Majority of the respondents with refractive errors, were found to have astigmatism, and hyperopia, with only a few having myopia.

Some of the respondents (5.9%) did not meet up the standard vision required for driving and should not be involved in long distance driving without spectacle correction. This is less than that found in similar studies on commercial intercity drivers in Ilorin (Adekoya, Owoeye, Adepoju & Ajaiyeoba, 2009) where 11.5% had inadequate visual acuity using the Federal Road Safety Commission's requirement for commercial drivers (Federal Republic of Nigeria official Gazette (2004) National Road Traffic Regulations, 79th edn.).

A few of the drivers (1.8%) were found to be visually impaired by WHO standards, with visual acuity less than 6/18 to 6/60 in the better seeing eye (WHO Technical report 1984). This is similar to the findings in studies on drivers by Erikitola (Erikitola 1998), 1.7%, Abraham (Abraham 2007), 1.7%, and Pepple (Pepple & Adio, 2014a), 1.8%.

Among those with eye diseases, pterygium was found present in about two thirds of them, cataracts were found in some, and a few had amblyopia. This is consistent with similar studies where among ocular pathologies; pterygium was mostly found (Effiong 1993). This could be linked to the drivers' exposed to windy and dusty conditions (Nwosu1998).

Only very few (6.4%) respondents reported spectacle utilisation, and of these only half (50%) said they use them for driving (single vision lenses) or driving and reading (bifocal lenses), while the other half (50%) use them for reading only. This significantly low proportion is consistent with similar studies carried out on commercial vehicle drivers in Cape Coast, Ghana (Ovenseri-Ogomo & Adofo, 2011).

5.1. Socio-Demographic Characteristics

The respondents in the study were all males, and this is consistent with similar studies done on commercial drivers. Female commercial drivers are yet to be seen in any study. Most of the respondents were of ages between 30 and 49years with the mean age of 40.33 (±9.147). This is consistent with a similar studies on commercial drivers (Abraham, 2010) (Pepple & Adio, 2014).

Most of the fuel truck drivers had their highest educational qualification to be primary schooling and secondary schooling with very few of them having tertiary education. Almost 10% of them never went to school. This is higher than found in similar studies where less than 5% of drivers had no education (Pepple & Adio, 2014b) (Ovenseri-Ogomo & Adofo, 2011). A study had shown that higher educational attainment brings about knowledge of the traffic codes with resultant improvement in safety (Adogu & IIika 2006).

The majority of the respondents were married, while a few were single. Only a few of the respondents had no children. Majority of them had 1-8 children, and some had more than 9 children. More than three quarters of respondents were Muslims and the remaining Christians. This was not surprising as there were a good number of mosques around the study site.

Most of the respondents were either Hausas and Yorubas with very few of them being Ibos and Edos. And most of the fuel truck drivers drove an articulated tanker,

while some drove a rigid tanker, and very few drove a semi-trailer. Over half of the fuel truck drivers had been driving a tanker for 6-15years and a few of them had been driving a tanker for 31-40 years. The mean age spent driving a tanker was found to be 13.12 (±8.157).

5.2. Information on Perception and Uptake of Eye Examination Services

Almost a quarter of respondents had never heard about an eye examination, and almost a quarter of the respondents said that eye examinations had no benefits. No previous study was found to have enquired from drivers the benefits of eye examinations. Majority of respondents who said eye examinations had benefits said eye examinations helped one know if the eyes were healthy. Other benefits highlighted include, prevent blindness, treat eye problems, enhance good sight, protect the eyes, maintain good sight at old age, and obtain drivers license.

Over half of the respondents had never had eye examinations. Of the less than half of respondents who had their eyes examined previously, over three quarters only had it once or twice, and almost half had their last eye examination three or more years ago. The implication of this is that less than a quarter of the respondents had examined their eyes in the past two years. This was not surprising as a study on visual function on drivers found less than one third of licensed drivers had their eyes tested prior to issuance of driving license (Pepple & Adio, 2014b).

Although the present study found that amongst respondents with higher levels of education, a greater percentage of respondents were found to have had eye examinations than among respondents with lower levels of education, this association was not significant.

The association between age of fuel truck drivers and uptake of eye examination services was found to be statistically significant. Older drivers were found to be more likely to have had an eye examination than younger drivers.

Although about 50% of respondents of each of the other ethnic groups had previously had eye exams, and only the Hausa group had less than half of respondents having had an eye examination previously, the association between ethnicity of fuel truck drivers and uptake of eye examination was not found to be statistically significant.

5.3. Information on the Utilisation of Corrective Lenses for Driving

Only very few (7.4%) respondents had previously been prescribed corrective lenses for driving, and most of them obtained the corrective lenses for driving (6.5% of the total population), while 12.5% failed to obtain them. Of the respondents using spectacle corrections, half of them used their corrective lenses for reading only, and half of them claimed to drive with their spectacle correction (that is, 3.2% of the total population). This finding is similar to that found in similar studies on Commercial drivers in Cape Coast (Ovenseri-Ogomo & Adofo, 2011) where only 4.9% of respondents reported wearing corrective lenses, but significantly less than those in a study among public institution drivers in Nigeria (Bekibele et al., 2009) where 9.4% reported utilisation.

The awareness of spectacle use may be considerably higher among public institution drivers compared to fuel truck drivers as in the present study. And here there was a significant association between level of education and spectacle use. This implies the need to promote the use of corrective lenses by fuel truck drivers by providing health education.

All but one (7.1%) of the respondents who used corrective lenses said it improved their vision. The differing one said the use of the corrective lenses made no difference to his vision. None of the respondents said corrective lenses made their vision worse. A study on the belief and attitude towards spectacle in Osogbo also found good experiences with spectacles among most respondents utilising spectacle correction (Adeoti, 2009).

About a quarter of respondents had previously been prescribed drugs for eye problems, and almost all of them picked up the medications, with only very few (3.4%) not picking up their medications. Previous studies have found that drug use is preferred to the use of corrective lenses, and it was reported that drugs could be used as a method of correcting refractive error (Ebeigbe, Kio, & Okafor, 2013). This belief is wrong as refractive errors may be only corrected with corrective lenses, contact lenses or a refractive surgery (Gupta & Naroo, 2006).

5.4. Perceived Barriers to Uptake of Eye Examination Services

Ignorance was found to be the major barrier to the uptake of eye examination services. This is consistent with similar studies conducted amongst commercial vehicle drivers (Ovenseri-Ogomo & Adofo, 2011).

Other reasons for not taking up eye examination services highlighted were a lack of time, some said they were not aware that there was any problem with their eyes, and some feared that doctors would damage their eyes. These findings are similar to those in a similar study on public institution drivers where major barriers included ignorance of visual status, not having time to visit the eye clinic, cost of care and fear (Bekibele et al., 2009).

5.5. Perception towards the Utilisation of Corrective Lenses for Driving

About two thirds of the respondents had never seen a tanker driver wearing spectacles previously. About a quarter gave good impressions, saying they would think the corrective lenses were recommended, or for fashion, and very few said they would think the corrective lenses were for protection. Another quarter of respondents said the drivers who drove with corrective lenses must have poor vision or bad eyes. A previous study on attitudes and beliefs of Nigerian undergraduates to spectacle wear found that half of the respondents regarded people who wore corrective lenses as visually handicapped (Ebeigbe et al., 2013).

Most respondents said they would wear corrective lenses for driving if prescribed, but more than a third of them (35.9%) said they would not. A study reported a similar significant percentage (38.38%) of respondents will not use corrective lenses if prescribed. (Chawla and Rover, 2010).

On the reasons why they would wear corrective lenses, over three quarters of the respondents said they would obtain the prescribed corrective lenses for driving if the corrective lenses improved their vision. A few said they would take it for fun or to enjoy life, others said they would take it to protect their eyes or to prevent eye problems. In previous studies, significant percentages of respondents have been reported not to mind wearing corrective lenses if prescribed for them (Ebeigbe et al., 2013)

Of the respondents who said they would not pick up corrective lenses if they were prescribed, over a third of them said they do not need corrective lenses, about a quarter said they do not like corrective lenses, others said they would rather take drugs, over 10% believed that corrective lenses would damage their eyes. This does not come as a surprise as a study had shown that persons who wear corrective lenses have some sort of stigma imposed on them (Adeoti, 2009).

The significant association found between the uptake of eye examination services and the utilisation of corrective lenses for driving. This is expected as those who have not had their eyes examined are less likely to have corrective lenses prescribed. Again this emphasizes the need for health promotion for long distance drivers, which would result in increased uptake of eye examination services, and ultimately the utilisation of corrective lenses for driving.

5.6. Prevalence of Refractive Errors and other causes of Poor Vision for Driving

About a quarter (23.5%) of respondents were found to have refractive errors. This is less than similar studies on commercial vehicle drivers in Ghana which found the prevalence to be 32% (Ovenseri-Ogomo & Adofo, 2011) and in Osun State

(Isawumi, Adeoti, Ubah, Oluwatimilehin, & Raji, 2011) which found the prevalence to be 31.3%. However, it is higher than similar studies on professional drivers of a Nigerian university in Ibadan (Bekibele et al., 2009) which found the prevalence to be 19.3%.

Of those with refractive errors, besides those with astigmatism who constituted half the number, most were found with hyperopia and a few with myopia. Similar studies on public institution drivers in Ibadan found hyperopia more prevalent than myopia, and this found to be associated with advancing age of drivers (Bekibele et al., 2007). The present study showed no significant association between age of fuel truck drivers and poor vision for driving.

Of those with other causes of poor vision, about two thirds had pterygium, some had cataracts and a few had amblyopia. This is consistent with similar studies (Effiong 1993). This can be linked with the fact that long distance drivers are exposed to windy and dusty conditions (Nwosu1998).

Most of the respondents were found to have normal vision, using standards defined by the FRSC, 6/9 or better in the better eye. 5.9% were found to have visual acuity less than that required for driving (those whose visual acuity was found to be less than 6/9 in the better eye). This is less than has been found in a study on commercial vehicle drivers, such as 12.1% reported by (Ovenseri-Ogomo & Adofo, 2011). These findings emphasize the necessity of the FRSC to enforce laws that ensure such drivers are not licensed to drive.

1.8% of the respondents were visually impaired by WHO standards, with visual acuity less than 6/18 to 6/60 in the better seeing eye (WHO Technical report 1984). This is similar to the findings in studies on drivers by Erikitola (Erikitola 1998), 1.7%, Abraham (Abraham 2007), 1.7%, and Pepple (Pepple & Adio, 2014a), 1.8%.

About a quarter of respondents said they had been involved in a road traffic accident. The other three quarters said they had not. There was no significant association

between the visual acuity of drivers and the occurrence of road traffic accidents. This is consistent with similar studies (Adekoya, Owoeye, Adepoju and Ajaiyeoba, 2009). However, it is not consistent with other studies (Nwosu, Osuntokun & Ajayi, 1991).

Reasons proffered by Adekoya et al for lack of association between refractive errors and the occurrence of road traffic accidents (RTAs) was that it could be due to the multifactorial causation of RTAs. Also drivers with poor vision who might have been involved in RTAs may have died in the RTA or stopped driving thereafter and as such were not available for interview at parks.

5.7 Implications of findings for Health Promotion and Education

The findings of this study have serious implications for health promotion and education among fuel truck drivers. There is a crucial need for an increase in awareness among fuel truck drivers of the need to fulfil the safety requirements for driving as stipulated by the FRSC, which recommends that drivers undergo routine visual examinations. Also, since an increased uptake of eye examination services positively influences the level of utilisation of corrective lenses for driving, health promoters have to find a way to bridge the barriers preventing fuel truck drivers from utilising eye care services and corrective lenses for driving where necessary..

Health promoters have to put an end to the neglect suffered by Road Traffic Accidents and Injuries in developing countries in research and policy, which is as a result of low awareness to their contribution to the burden of disease, especially due to little study on road traffic collisions and their consequences. Health promoters make use of multi-disciplinary and multi-sectorial collaborations and would need to bring this to fore because the generally poor perception in developing countries is that RTIs should be the concern of the transport agencies rather than public health agencies.

Focusing on seat belt wearing alone for instance does not make road use safer in developing countries where many of the poor never drive vehicles, yet are still at considerable risk of being hit by vehicles. Where a driver's vision is compromised, other road users are definitely at risk of being hit, and it has been shown that the vast majority of RTAs in Nigeria involve tankers and trucks while less than 10% involve cars.

This study found major barriers preventing fuel truck drivers from taking control of their eye health to include ignorance, lack of time, a negative perception that doctors would damage their eyes and stigmatization of drivers who use corrective lenses as being visually handicapped. The Health Belief Model applied here has the concept

that health behaviour is determined by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Hochbaum, 1958).The approaches used by health educators are critical to dealing with these challenges.

By utilising the prevention approach, conducting eye screening for drivers before they are licensed and at license renewals is necessary. This would provide accurate and comprehensive epidemiological data on the population of drivers in Nigeria, increase uptake of eye examination services, as well as, the utilisation of corrective lenses for driving.

By utilising the behaviour change approach, the mass media may be employed to increase awareness on the benefits of spectacle utilisation for driving, for individuals whose visual status is below the standard for driving. This would also serve to correct wrong perceptions about person who drive with corrective lenses.

By utilising the educational approach, health information may be made available via health talks at parks, via leaflets/posters, via group discussions at parks, via role play at road transport workers meetings etc.

By utilising the empowerment approach, health educators may use community development and organisation skills to get unions to take decisions that would positively affect their health. This will enable people to gain control over their lives.

Utilising the societal change approach, lobbying and advocacy are critical to a successful outcome, which may be changes in laws/regulations and the enforcement of same.

5.8 Conclusion

This study looked into the prevalence of refractive errors and the utilisation of corrective lenses for driving among fuel truck drivers in Oyo. It found that all the respondents were males and most of them had some form of education, and majority were Hausas and Yorubas, mostly Islamic worshippers, and majority were married.

The study found that about a quarter of respondents had never heard about an eye examination, and over half of the respondents had never had eye examinations and less than a quarter of the respondents had examined their eyes in the past two years. The study reported that the association between level of education and uptake of eye examination services was not significant, although a greater percentage of respondents were found to have had eye examinations amongst respondents with higher levels of education, than among respondents with lower levels of education. The association between age of fuel truck drivers and uptake of eye examination services was found to be significant. Older drivers were found to be more likely to have had an eye examination than younger drivers. Ignorance was found to be the major barrier to the uptake of eye examination services, followed by a lack of time, and being unaware that there was any problem with the eyes.

The study found that the perception towards utilisation of corrective lenses for driving of about a quarter of respondents was negative, and they stigmatised drivers who drove with corrective lenses as being visually handicapped, while about a quarter of respondents had the right perception. Almost two thirds of respondents said they would wear corrective lenses for driving if prescribed, but more than a third of them said they would not. The perception that they do not need corrective lenses, do not like corrective lenses, would rather take drugs, and that corrective lenses would damage their eyes were found to be the major reasons why respondents would not obtain corrective lenses prescribed for driving, in that order.

The study found that only very few respondents obtained corrective lenses, and of the very few respondents using spectacle corrections, only half of them used their corrective lenses for driving. The study reported a significant association between level of education and spectacle use. This implies the need to promote the use of corrective lenses by fuel truck drivers by providing health education. None of the respondents said corrective lenses made their vision worse, and majority of the respondents who used corrective lenses said it improved their vision. The study reported a significant association between the uptake of eye examination services and the utilisation of corrective lenses for driving, and this emphasizes the need for health promotion for long distance drivers, which would result in increased uptake of eye examination services and ultimately the utilisation of corrective lenses for driving.

It also found that some respondents did not meet up the standard vision required for driving and should not be involved in long distance driving without spectacle correction, using the Federal Road Safety Commission's requirement for commercial drivers. A few of the drivers were found to be visually impaired by WHO standards. Amongst the other causes of poor vision for driving, pterygium was found among two thirds of respondents with eye diseases, followed by cataracts and amblyopia, and this was linked to the drivers' exposure to windy and dusty conditions.

The present study looking into the prevalence of refractive errors found that about a quarter of respondents had refractive errors, and only very few respondents reported spectacle utilisation, and of these only half said they used them for driving.

These findings show the critical need for health education interventions that would reduce ignorance by increasing knowledge, alter perceptions, and ultimately behaviour for health, that is, interventions that would result in an increased uptake of eye examination services by fuel truck drivers and increase their level of utilisation of corrective lenses for driving.

5.9 Recommendation

This study showed that very low proportion of fuel truck drivers had checked their eyes in the past two years and also reports an extremely low utilisation of spectacles for driving among fuel truck drivers due to ignorance, low uptake of eye examination services, low perceived benefits associated with spectacle use, barriers such as a lack of time and stigmatisation as being visually handicapped. The following recommendations are made based on this.

1 Eye health education and public enlightenment utilising the mass media, leaflets/posters, road safety and health chats, and group discussions with role play at parks to increase awareness on the need to utilise eye examination services, and the many benefits of spectacle utilisation for driving for individuals whose visual status is below the standard for driving, as well as, the dangers of not using them when needed.

2 Ensuring all drivers to be licensed and at license renewals undergo a basic eye examination, and documenting these records of the visual status of drivers. This would also fill the need for accurate and comprehensive epidemiological data on the population of drivers in Nigeria, increase uptake of eye examination services, and this by extension, the utilisation of corrective lenses for driving.

3 Much more is needed in the area of research and policy as Nigeria is a country where road transport is greatly relied upon and so many tankers ply the roads, and there are as yet little studies on fuel truck drivers, road traffic collisions and their consequences.

4 The enforcement of the laws/regulations which guide the activities of fuel truck drivers on Nigerian roads by the FRSC should include random visual tests, such as reading number plates at a standard distance to check the level of drivers' vision, and the penalisation of drivers who are caught driving without their spectacle correction when they need them for driving.

REFERENCES

Abraham E. G. (2007). Ocular Status of Commercial Motor Drivers in Uyo Metropolis. Fellowship dissertation National Postgraduate Medical College of Nigeria.

Abraham E. G. (2010). Causes of visual impairment among commercial motor vehicle drivers in Uyo metropolis, Akwa Ibom State, Nigeria, *Journal of Environmental and Occupational Science* 1, 34-41.

Adekoya B. J., Owoeye J. F. A., Adepoju F. G. and Ajaiyeoba A. I. (2009). Visual function survey of commercial intercity vehicle drivers in Ilorin, Nigeria. *Can J Ophthalmol*., 44:261–264.

Adeoti C. O. (2009). Beliefs and attitude towards spectacles. *Niger J Clin Pract.*, 12(4):359–361.

Adeoti C. O., Ubah, J. N., Isawumi, M. A., Ashaye, A. O., Oluwatimilehin, I. O. and Raji, R. A. (2007). Visual standards in commercial driving. *The Nigerian Postgraduate Medical Journal*, *14*(3), 199–203.

Adogu O. U., and IIika A. L. (2006). Knowledge of and attitude towards road traffic codes among commercial motorcycle riders in anambra state. *Nig Postgrad Med J*, 13:297–300.

Bekibele, C. O., Ajav, R. and Asuzu, M. C. (2009). Eye health of professional drivers of a Nigerian University. *The Nigerian Postgraduate Medical Journal*, *16*(4), 256–9.

Bekibele, C. O., Fawole, O. I., Bamgboye, A. E., Adekunle, L. V, Ajayi, R., and Baiyeroju, A. M. (2007). Prevalence of refractive error and attitude to spectacle use among drivers of public institutions in Ibadan, Nigeria. *Annals of African Medicine*, *6*, 26–30.

Bener A, Ahmad MD MF, El-Tawil MS, Al-Bakr S (2004) Visual impairment and motor vehicle accidents. *The Middle East Journal of Emergency Medicine* 4: 1-9.

Chawla K. and Rover J. (2010). Survey of Patient Opinions on Eye glasses and Eye Care in Rural and Slum Populations in Chennai. *Internet J Epidemiol*., 8(2):4–5.

Dare, A. A., Oke, S. A., and Olanrewaju, K. L. (2013) "Incidents of fire outbreaks during fuel truck accidents in Oyo State", Disaster Prevention and Management: *An International Journal*, 18(4):443 – 450.

Davison P. A. (1985). Inter-relationship between British drivers' visual abilities, age and road accident histories.*Ophthalmic Physiol Opt*., 5(5):195–20

Effiong B. (1993). Ocular Status of Taxi Drivers in Enugu. Nov: Fellowship dissertation National Postgraduate Medical College of Nigeria.

Emem G. and Abraham, I. N. U. (2013). Prevalence of visual impairment among commercial motor vehicle drivers in Uyo, South- South Nigeria. *Journal of Environmental and Occupational Science*, *2*(2), 55–60.

Erikitola B. U. (1998). Ocular status of Motor-Park drivers as seen in Mushin Local Government Area of Lagos State. May: Fellowship dissertation National Postgraduate Medical College of Nigeria.

Ezenwa A. O. (1986). Trend and characteristic of RTA in Nigeria. *J Roy Soc Health*, 1:27–9.

Glanz, K., Rimer, B. K. and Lewis, F. M. (2002). *Health Behavior and Health Education. Theory, Research and Practice.* San Fransisco: Wiley & Sons.

Hedin A. (1993). How important are visual deficiencies in driving? *J Traffic Med.*, 21:254–265.

http://www.roadsafetyNigeria.com/information/html website

Humphries D. (1987). Three South African studies on the relation between road accidents and drivers' vision.*Ophthalmic Physiol Opt*., 7:73–79.

Isawunmi, M. A., Adeoti, C. O., Ubah, J. N., Oluwatimilehin, I. O., and Raji, R. A. (2011). Ocular status of commercial drivers in Osun State, Nigeria. *African Journal of Medicine and Medical Sciences*, *40*(4), 405–11.

Ivers R. O., Mitchell P., Cumming R. G. (1999). Sensory impairment and driving: the Blue Mountains Eye Study. *Am J Public Health.;*89:85–87.

Jacobs G., Aeron-Thomas A. and Astrop A. (2000). *Estimating global road fatalities.* Crowthorne, Transport Research Laboratory (TRL Report, No. 445).

Kopits E. and Cropper M. (2003). *Traffic fatalities and economic growth.* Washington, DC, The World Bank, (Policy Research Working Paper No. 3035).

Kotecha A, Spratt A, Viswanathan A (2008) Visual function and fitness to drive. *Br Med Bull* 87:163-174.

Krug E. (1999) eds. *Injury. A Leading Cause of the Global Burden of Disease.* Geneva: World Health Organization, Violence and Injury Prevention.

Murray C. J. L. and Lopez A. D., (1996). eds. *The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries, and risk factors in 1990 and projected to 2020.* Boston, MA, Harvard School of Public Health.

Nantulya V. M. and Reich M. R. (2002). The neglected epidemic: road traffic injuries in developing countries. *British Medical Journal,* 324:1139 –1141

Nwosu S. N. (1999). Visual impairment and road traffic accident in Nigerian professional drivers. *Orient J Med*., 3:110–112.

Nwosu S. N. N. (1989). Vision survey of government motor vehicle drivers in Oyo State. Fellowship dissertation National Postgraduate Medical College of Nigeria.

Oladehinde M. K., Adeoye A. O., Adegbehingbe B. O. and Onakoya A. O. (2007). Visual function of commercial drivers in road accidents in Nigeria. *Indian J Occup Environ Med* 11:71-75

Oyemade A. (1973). Epidemiology of road traffic accidents in Ibadan and its environs. *Niger Med J* 3(4):174-177

Peden M., McGee K. and Krug E. (2000), eds. *Injury: a leading cause of the global burden of disease.* Geneva, World Health Organization, 2002 (http://whqlibdoc.who.int/publications/2002/9241562323.pdf, accessed 4th April, 2014).

Pepple, G. and Adio, A. (2014). Visual function of drivers and its relationship to road traffic accidents in Urban Africa. *SpringerPlus*, *3*(1), 47.

Silveira S., Jolly N., Heard R., Clunas N. J., and Kay L. (2007). Current licensing authority standards for peripheral visual field and safe on-road senior aged automobile driving performance. *Clin Exp Ophthalmol.*, 35:612–620.

Taylor J. F. (1982). Vision and driving. *Practitioner.*, 226:885–889.

WHO Study Group. New Approaches to Improve Road Safety. Geneva, Switzerland: World Health Organization, Technical Report Series 781.

WHO, author. Categories of visual impairment: Strategies for the prevention of blindness in National programs. Geneva: 1984. Technical report series. No.10.

Appendix I

QUESTIONNAIRE ON PREVALENCE OF REFRACTIVE ERRORS AND UTILIZATION OF CORRECTIVE LENSES FOR DRIVING AMONG TANKER DRIVERS IN OYO, NIGERIA

Identification Number ☐

Section A: Socio-Demographic Characteristics

1. Gender 1. Male **[ ]** 2. Female **[ ]**

2. Actual age in years (as at last birthday) _____.years

3. Highest educational qualification

1. Never went to school **[ ]** 2. Primary level **[ ]** 3. Secondary level **[ ]** 4. Tertiary level **[ ]**

5. Others (specify)_____

4. Marital status

1. Single **[ ]** 2. Married **[ ]** 3. Separated **[ ]** 4. Divorced **[ ]** 5. Others (specify) _____

5. How many children do you have? _____

6. Religion

1. Christian **[ ]** 2. Islam **[ ]** 3. African Tradition **[ ]** 4. Others (specify) _____

7. Ethnicity

1. Yoruba **[ ]** 2. Hausa **[ ]** 3. Igbo **[ ]** 4. Others (specify) _____

8. Which vehicle do you drive? 1. Articulated **[ ]** 2. Rigid **[ ]** 3. Semi-Trailer **[ ]**

9. How many years have you been driving a tanker? _____

Section B: Information on perception and uptake of eye examination services

Please mark the right option and clearly state where necessary for each of the questions below:

S/N	STATEMENTS	RESPONSE	
10.	**Have you ever heard about eye examination?**	YES	
		NO	
11.	**Are there any benefits associated with having routine eye examination?**	YES	
		NO	
12.	**What are some of these benefits?**		
13.	**Have you ever had your eyes examined?**	YES	
		NO	
14.	**How many times have you had your eyes examined?**		
15.	**When was the last time you had your eyes examined?**	This year	
		Last year	
		Year before last	
		Years ago	

Section C: Information on the utilisation of corrective lenses for driving

Please mark the right option and clearly state where necessary for each of the questions below:

S/N	STATEMENTS	RESPONSE	
16.	**Have you been prescribed glasses?**	YES	
		NO	
17.	**Have you been prescribed drugs?**	YES	
		NO	
18.	**Did you obtain the glasses prescribed?**	YES	
		NO	
19.	**Did you obtain the drugs prescribed?**	YES	
		NO	
20.	**What did the glasses do for your vision?**	Improved	
		Same	
		Worsen	
21.	**What do you use the glasses for?**	Driving	
		Reading	

Section D: Perceived barriers to uptake of eye examination services

22.	**If you have never had an eye examination, what are those things that have prevented you from going for an eye examination in the past?**	

Section E: Perceived barriers to utilization of corrective lenses for driving

23.	**Have you seen any tanker driver wearing spectacles while driving before?**	YES	
		NO	
24.	**What do you think about drivers who wear glasses while driving?**		
25.	**Would you wear glasses for driving if they were prescribed for your use?**	YES	
		NO	
26.	**If Yes, why?**		
27.	**If No, why?**		
28.	**What are those things that may prevent you from wearing glasses if prescribed?**		
29.	**Have you ever been involved in a road traffic accident?**	YES	
		NO	

Once again, thank you so much for your attention and time.

Appendix II

Snellen Visual Acuity Chart

Appendix III

INFORMED CONSENT FORM

Dear Respondent,

My name is ....., I am part of the team undertaking a research titled "Prevalence of Refractive Errors and Utilization of Corrective Lenses for Driving among Tanker Drivers in Oyo, Oyo State". The lead researcher is Uwadia Ifeanyichukwu, a Postgraduate student of the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan.

Participation is voluntary. The information gotten from this research may be used in developing Road Traffic Accident prevention programs. Please note that there are no right or wrong answers to the questions asked or the statements made; rather what is desired of you is your truthful and honest response.

The questionnaire attached has six sections (A to E); in each of these sections you are requested to please give honest responses to these questions as much as possible to ensure the validity of the findings from this research. Your identity, responses and opinions will be kept confidential and used for the purpose of this research only.

CONSENT

Now that the study has been well explained to me and I fully understand the extent of the research process and my role in the research, I HEREBY TAKE A VOLUNTARY DECISION TO PARTICIPATE IN THIS STUDY.

KINDLY TICK (√) 1. YES [ ] or 2. NO [ ]

_____ _____ OR _____

Date Sign Thumb print

Thank you,

Lead Researcher: Uwadia, Ifeanyichukwu (**fizzyuwadia@gmail.com**, 08060362471)

Appendix IV

Application of the Health Belief Model

Perceived Susceptibility	beliefs about the likelihood of getting a disease/condition	A driver believes he is at low risk of being involved in a road traffic accident.
Perceived Severity	beliefs about the seriousness/consequences of the condition	A driver 'trusts' his eyes and experience, and he thinks that driving with spectacle correction makes no difference.
Perceived Benefits	belief that a certain action will reduce risk / seriousness of impact	A driver has poor vision, but is sceptical that spectacle correction will actually help him be a better and safe driver.
Perceived Barriers	belief about costs/negative aspects of the action	A driver thinks that eye examinations are expensive and time-consuming, or spectacle corrections prescribed are expensive.
Cues to Action	instigators to readiness	A campaign by the FRSC or new regulations being enforced for eye examinations and spectacle correction where necessary as a prerequisite to renewal of driving licenses.
Self Efficacy	belief in one's ability to take action to produce desired outcomes	A driver with poor vision wants to obtain spectacle correction, but has little belief in his ability to always put it on whenever he is behind the wheel.