An analysis of the lifestyle risk factors for long-distance truck drivers

BK von Wielligh
23868287

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Supervisor: Prof RA Lotriet

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ABSTRACT

The Road Freight Industry accounts for 1 to 5 percent of most countries GDP (AECOM International Development, 2011). According to e-Natis there was 321 056 Trucks (Heavy load Vehicle GVM > 3500 kg) in South Africa by November 2009 (Arrive Alive, 2009). This relative big industry, according to the statistics, influences most other industries value chains. Vehicles are driven by trucks drivers, making driving trucks their living. These drivers have their own lifestyles and ways that they go about. This study focusses on the risk factors of truck drivers' lifestyles, especially long-distance truck drivers.

This mini-dissertation draws attention to the limited research done on lifestyle risk factors and occupational hazards of long-distance truck drivers in South Africa. Most of the legislation regulating road transport is old and outdated, and any existing legislation is not being enforced.

The goal of the study is to draw closer attention to the impact of certain lifestyle risk factors, social behaviours and occupational stressors on the lives of long-distance truck drivers, their close families and communities.

The research was based on a comprehensive literature review as well as an empirical investigation done in the Gauteng province. A total of 150 long-distance truck drivers participated in the empirical investigation, by completing anonymous questionnaires. It is the researcher's hope that this mini-dissertation will aid the betterment of long-distance truck drivers' lives, general health and to make South African roads safer for all road users.

Keywords: long-distance truck drivers, lifestyle, risk factors, health, occupation, road safety, vehicles, hazards

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List of Acronyms

GDP:	Gross domestic product
USA:	United States of America
SA:	South Africa
STI:	Sexually transmitted infection
WHO:	World Health Organization
HIV:	Human immunodeficiency virus
AIDS:	Acquired immune deficiency syndrome
ART:	Anti-retroviral treatment
DM:	Diabetes mellitus
BMI:	Body mass index
OSA:	Obstructive sleep apnoea
EEG:	Electroencephalogram
HDL:	High density lipoprotein
PDP:	Public driving permit
NBC:	National Bargaining Council of the Road Freight Industry
PAYE:	Pay As You Earn
UIF:	Unemployment Income Fund

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Chapter 1
Nature and Scope of the Study

1.1 Background

Driving while feeling tired and drowsy is a key factor in many motor accidents. The tiredness makes drivers less attentive, slows their reactions and impairs their judgment. Long-distance truck driving is a type of task known to be fatiguing and is repetitive but at the same time requires sustained attention. As the statement above describes it, driving is not an easy task and by making it ones' fulltime work, makes it even more difficult.

Personal lifestyle and working conditions are closely linked for long-distance truck drivers. The health of long haul truck drivers in industrialized countries has mainly attracted public interest in relation to traffic accidents. The driver's health conditions deserve attention in their own right (Dahl *et al.*, 2009). Long-distance truck drivers are exposed to whole-body vibration, heavy lifting, climbing on to heights, diesel fumes, dust and various other fumes and particles that can be inhaled. They work under stress arising from working long hours; demands to keep their work schedule despite traffic jams, irregular meals and sleep patterns. Long-distance truck driving is also characterized by working long hours at indifferent times, work away from home for long periods at a time and also their away at work living conditions.

These factors mentioned above, are called lifestyle risk factors and it is part of the everyday life of a long-distance truck driver. There are more lifestyle risk factors, like indifferent sexual behaviours, eating not only at irregular times, but also eating unhealthy food, being in the sitting position for long periods of time and from to time having to cope with life threating danger.

These lifestyle risk factors cause physical and psychological health problems for drivers.

This study aims to look at these consequences, what trigger these problems and what the study can teach the drivers and their employers to combat these problems.

1.2 Problem Statement

Long-distance heavy vehicles (trucks) are the cause or part of many accidents in South Africa. Long-distance truck driving is a strenuous and hazardous occupation and is part of the problem. Long-distance truck drivers' adapt to their occupational conditions with certain lifestyle patterns. These lifestyle patterns are accompanied by risks and hazards that influence drivers' physical and mental health and lead to judgment and other failures. This is a serious problem that needs to addressed, not only from a social responsibility perspective, but also taking into consideration the drivers' lives.

1.3 The objectives of the study

The research objectives are to determine which areas of the literature will be focussed on. The objectives serve as a checkpoint for validity in answering the research problem.

1.3.1 Primary objective

- To analyse long-distance drivers' lifestyle risk factors in South Africa.

1.3.2 Secondary objectives

- To profile the typical driver in this industry.
- To identify physical and psychological health risk factors within long-distance truck drivers' lifestyles.
- To analyse how these lifestyle risk factors affect long-distance truck drivers' physical and psychological health.
- To assess the findings from the research and make recommendations to alter and improve long-distance drivers' lifestyles.

1.4 Research Methodology

1.4.1 Literature Study

A comprehensive literature study will be the first part of the research study. This review is to investigate and analyse the long-distance truck driver's lifestyle risks and occupational hazards. The study material comprised from internet, books, journals and articles published relating to lifestyle risk factors of long-distance drivers. The study evaluates the work that already has been done and shows the relationships between the different work and how it relates to this research study. The research is not limited to South Africa, but all over the world and especially the USA. USA is the leaders in health and lifestyle research on long-distance truck drivers and most of the research found hails from the USA.

1.4.2 Empirical Study

An empirical study will be the second part of the research study and a quantitative method will be used. Quantitative methods are defined as: methods that emphasize objective measurements and numerical analysis of data collected through polls, questionnaires or surveys. Quantitative research focuses on gathering numerical data and generalizing it across groups of people (Babbie, 2014).

The measuring instrument used is a structured questionnaire which was generated from information extracted from the literature study. The questionnaire was structured with an array of questions focused on physical and psychological challenges and conditions long-distance truck drivers are exposed to. The aim of the questionnaire was to collect data from long-distance truck drivers themselves. The data collected provides proof of previous studies, information relating to previous studies and evidence of the lifestyle risk factors, their causes and their results. An anonymous questionnaire was completed and collected from 150 long-distance drivers based in South Africa, but whose nationalities are not limited to South Africa. The 150 questionnaires were completed by long-distances truck drivers in the Gauteng province.

Places visited and questionnaires completed:

- ✓ Tiger Milling parking and waiting yard.
- ✓ Meadow Feeds parking and waiting yard.
- ✓ Nola (Foodcorp) parking waiting yard.
- ✓ Grain Carriers, main depot, based in Randfontein.

The study was done based on a convenience sample, because drivers from all over SA load and off-load grain and grain related products from these sites. Convenience sampling is defined as: A statistical method of drawing representative data by selecting people because of the ease of their volunteering or selecting units because of their availability or easy access (Business Dictionary, 2014).

The Hypothesis statement will be tested, by investigating the relationship between drivers' lifestyles and their health consequences. Ethics: Drivers were explained verbally what the questionnaire and study is about and they gave their consent before they completed the questionnaire. No other drivers or management of the drivers would be present. An interpreter was used, to interpret and explain to the drivers' questions.

The methodology that was applied consisted of the following:

- The method used was a questionnaire applying both ratio - as interval (four and five point Likert scale) measurements. Other questions, the respondents only needed to choose one of various numerical options and/or dichotomous questions. This was to help the respondents only to choose and not to guess. This increased the accuracy of the respondent's answers.
- The data collected were given to the Statistical Consultation Services at the North West University, Potchefstroom.

1.5 Scope of the Study

The study focused on lifestyles, risk factors, occupational factors and health conditions of long-distance truck drivers in South Africa. Driving trucks as the way to earn a living, the study focusses on their specific lifestyles and the health risk factors their lifestyles' accompanies. The drivers work for several companies based in South Africa and perform long-distance truck driving work nationally and cross border. Nationality of drivers is mostly South African with a few Zimbabweans and Namibians as well. The drivers form part of the Road Freight Transport industry overall and is not limited to freight transport of a specific industry.

1.6 Limitations of the Study

The research study is limited to the following criteria:

- Long-distance truck drivers.
- Companies based in South Africa.
- Road freight transport industry.
- Physical and psychological health risk factors.

The research study is not limited to the following criteria:

- South African citizens.
- Specific industry that use road freight transport.
- Type of lifestyle factor.
- Literature from only South Africa.

A further limitation of the study sample and short-coming are drivers that transport tanker products, hazardous products, fresh produce (refrigerated) and abnormal loads.

1.7 Contribution of the Study

The USA is on the fore-front of research on truck drivers from what can be read from chapter 2. This study will show the similarities that exit between truck driver lifestyles

from all over the world. The study shows what psychological and physical stressors exist in being a long-distance truck driver. This study contributes, in depth knowledge, better understanding and recommendations for drivers, transport companies and the public how to lessen the risk factors targeting long-distance truck driver lives. There is little research done on the lifestyles of long-distance truck drivers and very little in South Africa. This study contributes significantly by serving as an update on current long-distance driver profiles and their psychological and physical lifestyle stressors. It will further show the difficulty and risk being a long-distance truck driver and bring respect to truck drivers that they deserve.

1.8 Layout of Study

The layout of this study will be divided into four chapters. Chapter 1 contains the nature and scope of the study. Chapter 2 is the discussion of the long-distance truck driver industry in South Africa and in the other countries. It is a focused study on the long distance truck driver industry and the effects on the trucks drivers and their health. Chapter 3 is based on the empirical investigation, where relevant date was gathered on a quantitative basis. The last part of the study in chapter 4 entails conclusions and recommendations based on information gathered.

1.9 Summary

Road transport in South Africa is of high economic importance and has its own value portion of South Africa's GDP. The question, however, is that, although the public not always appreciate heavy trucks on the roads, they do have an important role to play. Behind every one of these trucks is a driver, who in most cases has a family, they almost never see. Driving long hours in dangerous conditions and treacherous weather is no easy task. They spend most of their lives in a truck cab and sleep most nights in the truck. In short, their lifestyles are different and have certain risk factors. Hopefully this study can identify these risk factors and aim to help drivers towards a better lifestyle.

Chapter 2
THE LIFESTYLE RISK FACTORS OF LONG-DISTANCE TRUCK DRIVERS

2.1 Introduction

The literature review focusses on and is based on previously researched studies done by other researchers. The literature is not only based on South African studies, but studies from all other the world. The research also focused on the health conditions and risks in transport or truck related articles and not just on medical reviews.

According to Gauteng's provincial Minister of road transport, Mr. I. Vadi, Government is well aware of the dire situation concerning South Africa's exceptionally high number of road deaths. After all, road accidents cost the economy R 300-billion each year (Vadi, 2014).

In October 2014, a truck ploughed through traffic on the N12 in a shocking 47-car pile-up that injured sixteen and killed four people (Pather, 2014). Accidents like these are caused by numerous factors:

- The condition of the vehicle.
- The condition of the road and weather.
- The congestion on the South African roads.
- The lifestyle risk factors of the driver, together with his/her occupational hazards.

The question is what is being done to lessen and/or prevent these accidents. Vadi believes that greater public awareness, road safety advocacy and stronger law enforcement is required to strengthen road safety. But, he said at the root of the devastation, is a need for "an attitudinal and behavioural change" (Pather, 2014). These devastating results and problems on and off our roads is just the end result of problems

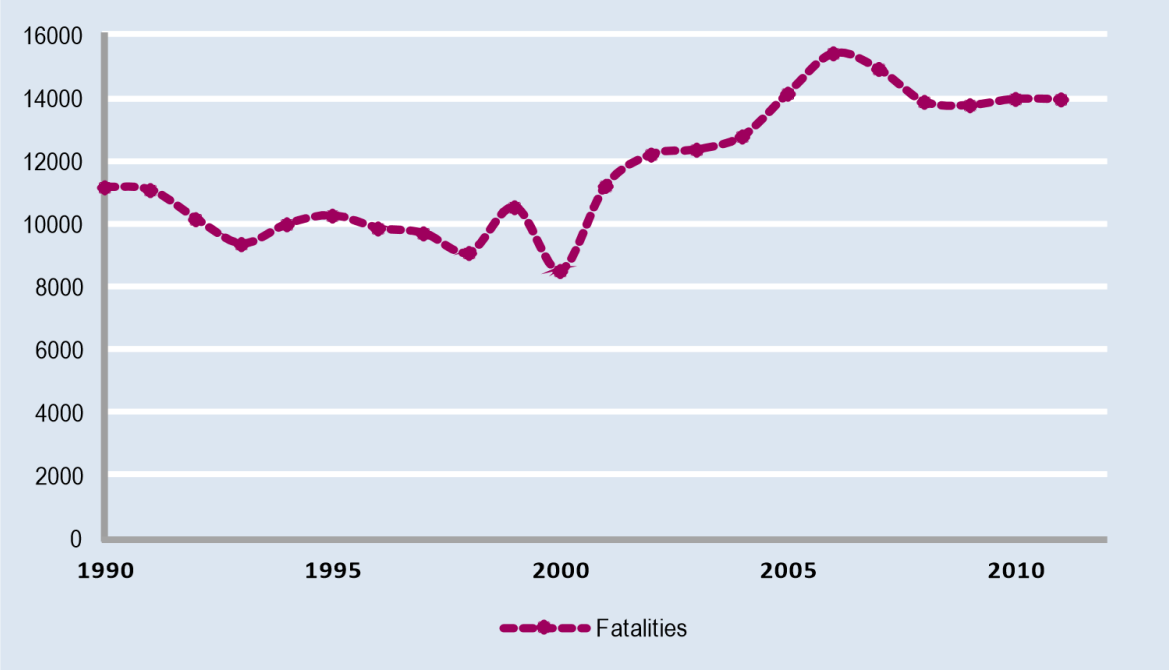
originating from other conditions and circumstances. This literature review and contribution of this study is to identify and analyze these circumstances and conditions. The study analyzes the long-distance truck driver industry, the occupational hazards and several health conditions that long-distance truck drivers lifestyles attract. These occupational circumstances and hazards, together with health conditions are integrated with each other and must be viewed together and not separately.

The challenge will start and focus on long-distances truck drivers. Private transport companies, government and the public will have to work together to change drivers' lifestyles, perspectives and the attitude towards trucks and their drivers.

2.2 Overview on the long distance transport industry

In South Africa the number of vehicles has almost doubled in the last 20 years. This is mainly due to a decrease in rail transport in all segments of their transport. Long-distance heavy vehicles increased from 8840 vehicles for period January to September 2012 to 9705 vehicles for the same period in 2013. This is an increase of almost 10% (Anon., 2013). Although Transnet has announced their 2019 plan to invest R 300bn to upgrade and increase their volumes, the trend of increasing numbers of heavy vehicles will persist.

Figure 2.1 Evolution in the number of annual road traffic deaths: 1991-2011



The above figure shows how number of road traffic deaths has increased from 1991 – 2011 (Figure 2.1).

According to Transport Minister Dipuo Peters, an estimated R 306bn is lost to the South African economy each year as a result of road accidents. Studies by Arrive Alive, showed that fatal crashes in South Africa between November 2011 and March 2012 were 5514 (Arrive Alive, 2012). This is a disturbing number that must be managed.

Truck drivers are expected to drive up to fourteen hours straight a day, receiving roughly ten hours off prior to the beginning of the next shift. Legislation regulating the amount of driving a trucker performs over the course of a day and week does exist, but these rules are commonly bent and broken (FA News, 2013). Truckers rarely receive more than one day of work off a week. The chance of dying on the job is extremely high, with deaths of truckers in auto-mobile accidents accounting for 12% of all work related deaths in the United States (Veronese, 2012). The revised South African draft which operators on

South African roads are expected to follow, is summarized as follows from the Government Gazette Amendment Draft of 8 June 2012:

- A maximum of five hours continuous driving time.
- A total maximum fifteen hours driving in a period of twenty four hours.
- A resting period of minimum fifteen minutes and minimum total thirty minutes accumulated during the period five hours and thirty minutes (Barry, 2012).

The transportation work environment is labour intensive, highly-sedentary, high stress, impacts truckers' physical/recreational activities and eating behaviors, which affect personal health and public safety (Apostolopoulus *et al*., 2011). In a study by Shattal *et al.,* 2010, participants reported many stressors rooted in the transportation environment, including time pressures, loneliness, boredom, financial pressures, fatigue and lack of sleep, being away from home, driving conditions (bad weather, accidents, highway construction), road rage, city traffic, violence (getting mugged/robbed, being a victim of assault), dangers around trucks stops and shipping and receiving warehouses, racism and discrimination, as well as negative perceptions of truckers believed to be held by the general public (Shattal *et al*., 2010).

2.3 Occupational Health and Safety for long-distance truck drivers

Long-distance truck drivers in Africa face multiple hazards during the execution of their jobs. Their two biggest threats come from the risks of having to operate heavy vehicles on sub-par road infrastructure over long-distances, and being exposed to various health risks, including sexually transmitted diseases (STIs). In a comparison of countries by the World Health Organization in 2009 road safety records of South Africa is one of the worst in the world. According to the Road Freight Strategy for South Africa (draft 2011), there were 55 trucks involved in crashes per 10,000 registered trucks in 2008 (NSEWA, 2012). Accidents can be fatal not only to truck drivers, but also to third parties involved in the accident. This is not only in South Africa but also in first world countries as the United State of America. According to Saltzman and Belzer, (2007 cited by

Apostolopoulos *et al*., 2010), nearly 15 million truck drivers who travel the continental United States are particularly susceptible to a wide array of occupationally induced health conditions, exemplified by high morbidity and mortality rates (Apostolopoulos *et al*., 2010).

Workplace conditions are attributed to the transportation environment, including trucking operations in loading areas, warehouses, terminals, truck stops and even truck cabs (Apostolopoulos *et al*., 2010:290). This environment has occupational, institutional, organizational, physical, social, and governmental dimensions, including the policies and regulations that govern these (Apostolopoulos *et al*., 2010,291). These dimensions as mentioned are influences on the truck driver that can be total out of their control or under their control, but maybe difficult to control. Although modifiable, the transportation environment critically affects trucker's lives – from the air they breathe and the food they eat to their sleep patterns and opportunities for physical activity (Apostolopoulos *et al*., 2010:291). Truckers spend significant time in these settings, their built environment must be efficient, comfortable, spacious, user friendly, and safe and, above all, must offer opportunities for truckers to make healthy food and physical activity choices during non-working hours. However, the spatial and physical attributes of typical truck stops and terminals are not conducive to healthy lifestyles and are filled with obstacles to healthy living that are difficult to overcome. The combination of poor design and layout of truck stops that discourage walking, lack of healthy food choices, difficulty assessing community recourses, and extremely poor air quality makes it difficult for truckers to sustain healthy behaviours (Apostolopoulus *et al*., 2010:289).

Adding to the above Apostolopoulos *et al*. (2010:289) is a study by the National Institute for Occupational Safety and Health on the effects lengthy work shifts had. It concluded that extended work days and weeks, exceeding 40 hours and 8 days, respectively, appeared to be associated with diminished health and increased injury, morbidity, and mortality rates (Apostolopoulus *et al*., 2010:288). Individuals who work longer hours are

generally at greater risk for unhealthy weight gain, alcohol use, smoking, other health complaints, and injuries while working; inferior neuropsychological performance: reductions in vigilances on task measures, cognitive function, and overall job performance; increased fatigue; decreased alertness; and slower work, particularly in the first nine -to twelve hours of the shift (Apostolopoulos *et al*., 2010).

In South Africa there are many types of equipment used for long-distance transport. Some equipment is self-discharging but still requires drivers to get out of the vehicle, climb of platform to open tarpaulins first. Other equipment is much more labour intensive, where the driver is required to pull big heavy tarpaulins from their loads and in most cases for this to be successful, they need to climb on their loads. This all just after they drove for several hours without stopping. Recent epidemiological studies have shown that there is a clear need for efforts to prevent non-traffic occupational injuries among truck drivers. The objective of the present study was to establish the hazard scenarios for truck drivers during loading/unloading through analyses of text descriptions of accident processes. The focus was on accidents that were primarily related to movement/operation on and around the truck, which are particular to truck drivers. Special emphasis was placed on falls from heights, as this was shown to be the most frequent type of accident and a major cause of fractures among truck drivers. Analyses of text descriptions of 136 accidents, including 63 cases of fall from height, collected in one company over a period of three years, revealed that: (a) the major triggering factors for falls from heights on and around the truck were stepping off the edge at height (33.3%), wrong footing (27.0%), and loss of balance/control of wagon (15.9%); (b) the major triggering factors for accidents on and around the truck in general were slip/trip (44.1%) and defect/malfunction (14.7%) (Shibuya *et al.,* 2010).

Government influences or lack of influence is evident in the transport industry. The National Road Traffic Act (no 93 of 1996), was last updated in 1996 and also a lot more other policies were not updated. The National Bargaining Council of the Road Freight

Industry has recently had the most influences on the road transport, delegating what driver's should be paid, and negotiating wage increases with SATAWU (South African Transport Allied Workers Union). Government's lack of involvement to make roads safer, driver roadside conditions safer and easier and lack of positive influences is evident.

Table 2.1 Stakeholders in the transport industry:

Stakeholder	Description
Department of Transport	Governmental department – specific transport (all sectors)
Department of Labour	Governmental department – specific focus on the relationship between employer and employee, protecting employee rights with number of acts
National Bargaining Council of the Road Freight Industry	Bargaining Council and legislator on drivers minimum remuneration and benefits
Satawu (South African Transport and Allied Workers' Union)	Biggest and most recognized union in transport industry
Teta	Transport Seta – Skills development in transport industry
Transport Companies	Privately owned transport companies

2.4 Lifestyle Risk Factors of Long-distance truck drivers

2.4.1 Sexual behavioural risks

Long-distance truck drivers have long been identified as the primary dispersers of HIV/AIDS in Sub-Saharan Africa. Truck drivers lead difficult lives with frequent overnight stays away from home, fewer social controls and excessive waiting periods in ports and border crossings, where the availability of commercial sex increases their vulnerability to infectious diseases and other health problems (Irwin, 2013). Their mobility in and of itself does not increase their risk of HIV acquisition or transmission directly. However, separation from families and communities, loneliness, and lack of access to HIV prevention, treatment, and care services makes this mobile population particularly vulnerable to HIV, potentially favouring the spread of HIV into other lower-risk sexual networks (Gomez *et al*., 2013). Also it is noted that this is by far the main reasons for infections.

It is important to acknowledge the role that long-distance truck drivers play in the transmission of HIV/AIDS. A study of truck drivers/assistants in Southern India found that prevalence of HIV, syphilis and hepatitis B were 15.9%, 13.3% and 21.2%, respectively (Malta *et al*., 2006;). The sexual behaviour of long-distance truckers has been linked with transmission of sexually transmitted infections and HIV in India and elsewhere in Asia, Africa, South America and the United States (Pandey *et al*., 2010).

The difference between HIV and AIDS needs to be understood. HIV is differentiated in-to four different stages and means that one is infected with the Human Immunodeficiency Virus. Only when a person reaches certain disease criteria, will a diagnosis of AIDS be made (see annexure A). The virus affects multiple organs leading to a cascade of disease. To name a few that can be debilitating to drivers are HIV neuropathy, chronic diarrhoea, severe weight loss and myopathy, meningitis and psychosis.

Studies found that most truckers claimed to understand the risk for HIV transmission associated with unprotected sexual intercourse and the importance of condom use to prevent HIV/STI's (Malta *et al*., 2006). However, reading from this study that the main criteria from which truck drivers selected a "safe" sex partner was based on her "looking healthy".

While engagement of truck drivers in an early Anti-Retroviral Treatment (ART) programme has the potential to benefit both the individual (increasing access and retention in care for a mobile population) and the population (decreasing transmission to either lowered risk or higher risk networks), there is an important need to address stigma and avoid discrimination and any characterization of this population as a "vector for HIV transmission," thereby exacerbating already existing health inequalities (Gomez *et al*., 2013).

Avert (2014) states that AIDS-related stigma and discrimination refers to prejudice, negative attitudes, abuse and maltreatment, directed at people living with HIV and AIDS. Stigma not only makes it more difficult for people to come to terms with HIV and manage their illness on a personal level, but it also interferes with attempts to fight the HIV and AIDS epidemic as a whole. On national level, the stigma associated with HIV can deter governments from taking fast, effective action against the epidemic, while on a personal level it can make individuals reluctant to access HIV-testing, treatment and care (Avert, 2014).

From Avert (2014) we read the following factors that contribute to HIV/AIDS related stigma:

- HIV/AIDS is a life-threatening disease and therefore people react to it in strong ways.
- HIV infection is associated with behaviours (such as homo-sexuality, drug addiction, prostitution or promiscuity), that are already stigmatised in many societies.
- Most people become infected through sex, which carries moral baggage.

- There is a lot of inaccurate information about how HIV is transmitted, creating irrational behaviour and misperceptions of personal risk.
- HIV infection is often thought to be the result of personal irresponsibility.
- Religious or moral beliefs lead some people to believe that being infected with HIV is the result of moral fault (such as promiscuity of 'deviant sex') that deserves to be punished.
- The effects of anti-retroviral therapy on people's physical appearance can result in forced disclosure and discrimination based on appearance.

Prevention programs advocate the use of condoms to prevent HIV transmission and that of sexually transmitted diseases. Despite their high risk behaviour very few truck drivers' believe themselves to be at risk of contracting HIV, and married drivers putting their wives at risk (Ford, 2007)

.

The physical impact of HIV on a person can be debilitating and often lead to death if not treated. Thus it's very important to understand how truck drivers perceive HIV and STD related conditions, their understanding thereof and their willingness to obtain information and protect themselves from contracting these conditions.

2.4.2 Obesity and Diabetes Mellitus

Road transport drivers are one of the groups whose activities have a strong impact on public safety. In view of the natural activity, the drivers are at a higher risk of obesity, hypertension and hyperlipidaemia, and carbohydrate metabolism disorders such as diabetes mellitus. Diabetes mellitus (DM) refers to a group of common metabolic disorders in which a person has high blood sugar, either because the pancreas does not produce enough insulin, or because cells do not respond to the insulin that is produced. 90-95% of diabetics, those who are diagnosed after the age of 30 are affected by type 2 diabetes. Research has shown that the prevalence of type 2 diabetes is increasing more

rapidly, a trend which is claimed to be caused by the increased rate of obesity, sedentary lifestyle, and aging population according to Harrisons' cited by Izadi *et al*., 2013; Canadian Diabetes Association, 2003).

Truckers are at high risk for excess weight-gain, obesity, and associated comorbidities. Exposure to the transportation work environment and obesity are driving forces behind disease and injury for truck drivers. Elevated Body Mass Index (BMI) and associated comorbidities negatively impact work performance (Apostolopoulos *et al*., 2011).

Cross-sectional studies have corroborated these risks and there were found that 85% of truckers are overweight or obese. 83% of truckers have unhealthy eating patterns, that causes the overweight or obesity. Further results are 54% include that hypertensive and 8% exercise regularly (Apostolopoulos *et al*., 2011).

In modern traffic, the increasing age of drivers and their medical conditions can be risk factors for traffic incidents and accidents. The mounting prevalence of diabetes also leads to an increased number of diabetic drivers. Driving by diabetic patients may be impaired by three factors:

- Hyperglycaemia – defined as an abnormally high blood glucose (blood sugar) level. This is a hallmark sign of diabetes (both type 1 diabetes and type 2 diabetes) and pre-diabetes (Stoppler, 2014).
- Hypoglycaemia – Hypoglycaemia in diabetes mellitus is recognised when the plasma glucose levels falls to <4.0 mmol/L. Symptoms may occur at higher values when glucose levels decrease rapidly. Symptoms include hunger, sweating, palpitations, tremor, tingling sensation, anxiety, weakness, faintness and headaches. Signs of hypoglycaemia include change in behaviour, confusion, seizures and coma (JEMDSA, 2012).

- Diabetic complications – Although long-term complications of diabetes develop gradually, they can eventually be disabling life-threatening. Some of the potential complications of diabetes include:
  - **Heart and blood vessel disease.** Diabetes dramatically increases the risk of various cardiovascular problems, including coronary artery disease with chest pain (angina), heart attack, stroke, narrowing of arteries (atherosclerosis) and high blood pressure.
  - **Nerve damage (Neuropathy).** Excess sugar can injure the walls of the tiny blood vessels (capillaries) that nourish your nerves, especially in the legs. This can cause tingling, numbness, burning or pain that usually begins at the tips of the toes or fingers and gradually spreads upwards. Poorly controlled blood sugar can eventually cause you to lose all sense of feeling in the affected limps. Damage to the nerves that control digestion can cause problems with nausea, vomiting, diarrhoea or constipation. For men, erectile dysfunction maybe an issue.
  - **Kidney damage (Nephropathy).** The kidneys contain millions of tiny blood vessel clusters that filter waste from your blood. Diabetes can damage this delegate filtering system. Severe damage can lead to kidney failure or irreversible end stage kidney disease, which often eventually requires dialyses or a kidney transplant.
  - **Eye damage.** Diabetes can damage blood vessels of the retina (diabetic retinopathy), potentially leading to blindness. Diabetes also increases the risk of other serious vision conditions, such as cataracts and glaucoma.
  - **Foot damage.** Nerve damage in the feet or poor blood flow to the feet increases the risk of various foot complications. Left untreated, cuts and blisters can become serious infections which may heel poorly. Severe damage might require toe, foot or leg amputation.
  - **Hear impairment.** Hearing problems are more common in people with diabetes.

- **Skin conditions.** Diabetes may leave patients more susceptible to skin problems, including bacterial and fungal infections (Mayo Clinic, 2014b).

According to Alexander *et al*. (2006), it has become apparent that acute hyperglycemia, and possibly also chronic hyperglycemia, maybe associated with cognitive function loss. However, the cognitive dysfunction occurring during hypoglycemia is most striking. A single episode of hypoglycemia leads to impaired hypoglycemia awareness (Veneman *et al*., 1991). An article by Dinsmoor, (2014), describes hypoglycemia as a condition in which a person with diabetes does not experience the usual early warning symptoms of hypoglycemia (low blood sugar). Ordinarily, when a person's blood sugar levels drop, the body tries to raise it by releasing the hormones glucagon and epinephrine. Glucagon spurs the liver to release stored glucagon. Epinephrine (or adrenaline) signals the liver to produce more glucose. It also causes the typical early warning signs of hypoglycemia, which include sweating, trembling, butterflies in the stomach, tingling, numbness and rapid pulse. People with hypoglycemia unawareness don't experience these symptoms. Instead, without warning, they lapse into severe hypoglycemia, becoming confused or disorientated or falling unconscious. These individuals have lost the epinephrine response to low blood sugar, along with the symptoms epinephrine usually brings on (Dinsmoor, 2014).

Chronic complications of diabetes, which may impair sensory of motor function, may adversely affect a drivers' performance. These complications are divided into micro- and macrovascular complications. An article in the Healthy Living Magazine explains that micro-vascular complications affect small blood vessels, creating problems with their eyes (retinopathy), nerves (neuropathy) and kidneys (nephropathy). Macrovascular complications, which affect the larger blood vessels affects, take their toll on the heart and the brain (The Healthy Living Magazine, 2013).

Publicity Update states that the conditions under which truck drivers' work lend themselves to unhealthy practices, which can escalate to chronic illnesses over time. By

the very nature of their work, truck drivers spend long hours sitting with little physical exercise and poor sleep cycles. They also tend to eat unhealthy convenience food, snacks and drinks containing high levels of salt or sugar. Over time, these factors increase their risk of weight gain, high blood pressure and type 2 diabetes (Publicity Update, 2014).

2.4.3 Fatigue and sleep deprivation

Fatigue is one of the most critical problems for drivers. They operate heavy vehicles which require them to have excellent judgement and good reaction time in critical driving conditions such as congested traffic and poor weather conditions. Proving this statement is an article (Tucker, 2013) which states that being fatigued significantly increases the risk of a crash. It makes people less aware of what is happening on the road and impairs our ability to respond quickly and safely if a dangerous situation arises. Driver fatigue is believed to contribute to more than 30% of road crashes (Tucker, 2013).

Tucker (2013) also stated that there are a number of factors that influence the likelihood that a driver will become fatigued:

- How long have you been awake?
- Time of day: your body and brain have a biological clock (circadian rhythm) that influences how alert or how drowsy we are at certain times of the day.
- The quantity and quality of your last period of sleep.
- Your level of physical or mental activity at the time (for example long boring stretches of road make it difficult to maintain alertness and vigilance).
- The presence of untreated sleep disorders such as obstructive sleep apnoea or narcolepsy).
- Sedative drugs.
- Nobody is immune to the effects of driver fatigue; however some groups of people are more at risk than others.

- Young drivers: The combination of inexperience and night driving.
- Shift workers and those working extended ours: Shift workers are six times more likely to be in a fatigue-related crash, whoever that be at work (operating machinery or vehicles) or commuting.
- Commercial drivers: Long-distance driving, often at night.
- Business travellers: drivers suffering from jet-lag and crossing time zones often suffer from restricted and /or poor quality sleep.

According to Tucker (2013), it is very difficult for drivers to accurately assess their own level of fatigue. The ability to self-assess becomes increasingly impaired as you get more fatigued; however, the self confidence in this ability remains. Nevertheless, there are some warning signs to look out for, including:

- Trouble focussing, or narrowing of attention;
- Head nodding, or inability to keep the eyes open;
- Not remembering the last few minutes;
- Poor judgement, slower reaction time;
- “Zoning out”;
- Daydreaming and wandering thoughts;
- Constant yawning or rubbing your eyes; and
- Drifting in the lane.

2.4.3.1 Obstructive sleep apnoea

As evident in the next section of the literature review, obstructive sleep apnoea is one of the main contributing factors causing driver fatigue. Obstructive sleep apnoea (OSA) consists of episodes of partial or complete closure of the upper airway that occur during sleep and lead to breathing cessation (defined as a period of apnoea > 10 sec). Anatomic risk factors include obesity, an oropharynx “crowded” by a short or retracted mandible, a prominent tongue base or tonsils, a rounded head shape and a short neck, a neck circumference > 43 cm, thick lateral pharyngeal walls, or lateral para-pharyngeal

fat pads. Because obesity is a common risk factor for both OSA and obesity-hypoventilation syndrome, the conditions frequently coexist. Inspiratory efforts against a closed upper airway cause paroxysms of inspiration, reductions in gas exchange, disruption of normal sleep architecture, and partial or complete arousals from sleep. These factors may interact to cause the characteristic symptoms and signs, including hypoxia, hypercapnia, and sleep fragmentation. Most cases remain undiagnosed and untreated and are often associated with hypertension, atrial fibrillation and other arrhythmias, heart failure, and injury or death due to motor vehicle crashes and other accidents resulting from hyper-somnolence (Kingman, 2013).

2.4.3.2 Effects of Sleep Apnoea on heart and circulation

Sleep-disordered breathing is very common among patients with heart problems such as high blood pressure, heart failure, stroke, heart attack, and atrial fibrillation. They may be linked because both cardiovascular conditions and sleep apnoea share the common risk factor of obesity. However, increasing evidence suggests that severe obstructive sleep apnoea is an independent risk factor that may cause of worsen a number of heart related conditions (Harvey *et al*., 2013).

- High blood pressure: Moderate to severe sleep apnoea definitely increases the risk for high blood pressure even when obesity is not a factor.

- Coronary artery disease and heart attack: Sleep apnoea appears to be associated with heart disease regardless of the presence of high blood pressure or other coronary risk factors.

- Stroke: Sleep apnoea may increase the risk of death in patients who previously had a stroke.

- Heart failure: Up to a third of patients with heart failure also have sleep apnoea. Obstructive sleep apnoea can cause heart damage that worsens heart failure and increases the risk for death.

- Atrial fibrillation: Sleep apnoea may be a cause of atrial fibrillation (irregular heart beat).

Other adverse effects on health that may affect long-distance truck drivers include (Harvey *et al*., 2013):

- ✓ Diabetes Mellitus Type 2: Once known as adult-onset or noninsulin-dependent diabetes, is a chronic condition that affects the way your body metabolizes sugar (glucose), your body's important source of fuel (Mayo Clinic, 2014b).

- ✓ Obesity: When it comes to sleep apnoea and obesity, it is not always clear which condition is responsible for the other. Obesity is often a risk factor and possibly a cause of sleep apnoea, but is also likely that sleep apnoea increases the risk for weight gain.

- ✓ Pulmonary hypertension (High pressure in the arteries of the lungs)

- ✓ Asthma: Sleep apnoea may worsen asthma symptoms and interfere with the effectiveness of asthma medications.

- ✓ Headaches. Sleep disorders, including apnoea, may be the underlying cause of some chronic headaches.

According to Miller (2013), when monitoring a patient for obstructive sleep apnoea, the following will be monitored:

- ➢ The stages of sleep.

- Heart rate.
- Eye movement.
- Body position.
- Brain waves (EEG).
- Breathing effort and rate.
- Blood oxygen levels.
- Air flow in and of the lungs during breathing.

In a recent survey by the Federal Motor Carrier Safety Administration (FMCSA), it was found that obstructive sleep apnoea affects more than 40% of commercial trucks drivers in the United States today. One of every three 18-wheelers you see on the highways has a driver that suffers from obstructive sleep apnoea. This not only puts each of these drivers at risk but also increases the risk of those that share the highways with them (Miller, 2013).

According to Harvey *et al*. (2013), symptoms of sleep apnoea is:

- Excessive daytime sleepiness
- Morning headaches
- Impaired emotional or mental functioning
- Snoring.

2.4.3.3 Stimulant use

Driver fatigue is a major factor in commercial driver's lives as discussed in above literature. Reuters Health (2013), further reported that truck drivers have challenging jobs and too often they put their own health and safety, as well as others', in danger by taking stimulants and other drugs to get through a shift, a new study suggests. Researchers' analyzed evidence from around the world to get a sense of how much is known about how frequently truck drivers use legal and illegal "psychoactive" substances like alcohol, marijuana, amphetamines and cocaine (Doyle, 2013). Alcohol

and driving is a dire combination, and the case for marijuana is similar; both increase sleepiness, decrease concentration and could lead to accidents, Girotto and his colleagues write in Occupational and Environmental Medicine. Amphetamines and cocaine may help drivers stay awake, the authors add, but can cause vertigo, agitation, hallucinations and change perceptions and reactions (Girotto *et al*., 2013).

Research conducted by Girotto *et al.* (2013), including 36 previous studies in his review, including mostly large countries that relies heavily on trucking, like Brazil, the US and Australia. The studies mostly relied on drivers completing surveys, a dozen based on physical drug tests and two using both sources of data (Girotto *et al*., 2013). Doyle (2013), found that half of the drivers admitted to drinking and driving and 30% admitted to using amphetamines. The numbers varied greatly from country to country. Although they admitted most frequently to drinking alcohol, that was the substance found least often when they were given drug test. About 8% of drivers tested positive for amphetamines, compared to between 3% and 4% for alcohol on average. Many drivers also tested positive for the stimulants caffeine and ephedrine, though these have not been linked to impaired driving (Doyle, 2013).

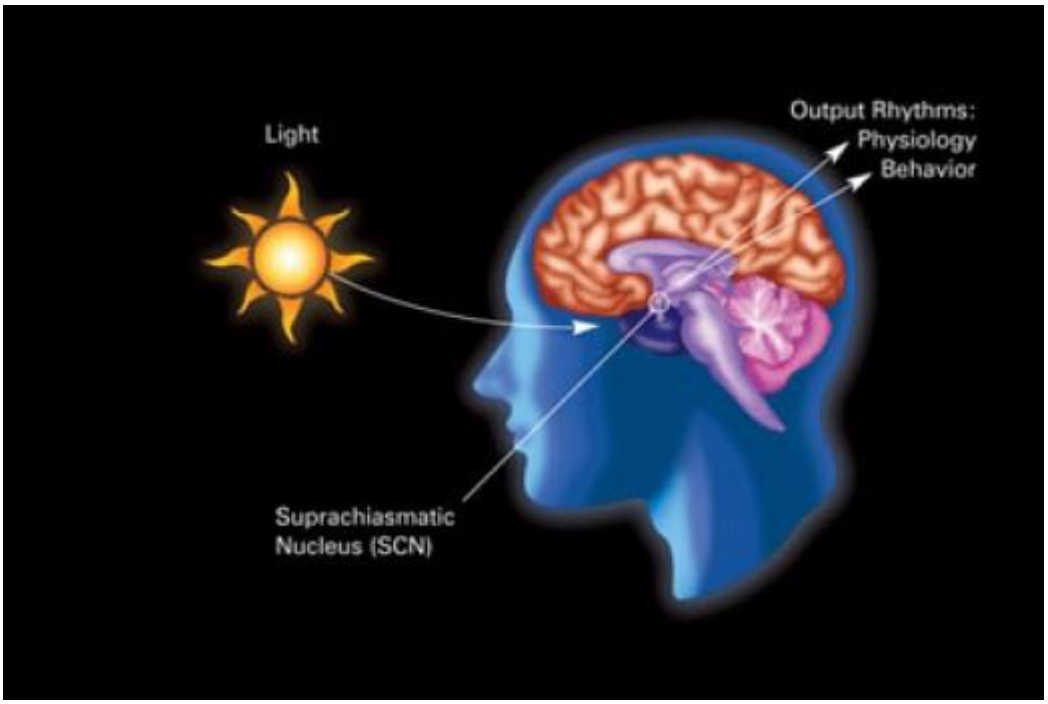
Girotto *et al.* (2013) stated that the consumption of psychoactive substances is an important risk factor for the individual and collective health, thus they believe that use of these substances could affect the steering capacity. It could also give companies the impression that drivers can handle longer trips than they actually can, leading to more accidents. Some of the studies linked drug use to lifestyle factors, where drug use is part of drivers' everyday lifestyle. The nature of a driver lifestyle may also increase reason for drug use. Drug users were more likely to be young, inexperienced, to make more money, to have longer routes that often involved nighttime driving, to work for small or medium-sized companies and to have previously been in an accident (Girotto *et al*., 2013).

2.4.3.4 Circadian rhythm and sleep breaks

According to Atkinson et al., as cited by Cardinali and Scacchi (2010), there is evidence that job performance is negatively impacted by night shift work, especially when the hours of work include the period when melatonin is normally at its peak of production (the “circadian trough”). The resulting decrements in alertness and performance are further exacerbated by poor quality sleep, another condition which often afflicts night shift workers (Cardinali and Scacchi, 2010). According to Horne *et al*. cited by Cardinali and Scacchi (2010), long-distance truck drivers and others who must do extended highway driving are similarly affected. It has been found that sleep related motor vehicle accidents are about 20 times greater at 6h00 am than at 10h00 am (Cardinali and Scacchi, 2010).

According to Pandi-Perumal *et al*. cited by Cardinali and Scacchi (2010), plasma melatonin begins to increase steadily after 19h00 to 23h00 and reaches its peak value between 02h00 and to 04h00. The levels then decline reaching the lowest values during day time hours (Cardinali and Scacchi, 2010).

Figure 2.2: Secretion of Melatonin by Suprachiasmatic Nucleus (SCN).



Research by Cardinali and Scacchi (2010), stated that once melatonin is formed by the pineal gland it is not stored but immediately secreted into the blood stream. In plasma, melatonin binds mostly to albumin. It then passes through the choroid plexus to the cerebrospinal fluid. Endogenous melatonin, whether measured in saliva or in urine, is often referred to as a “hormonal finger print”, having a profile which is both unique and yet consistently predictable (on a daily and weekly basis) within the individual (Cardinali and Scacchi, 2010).

Concluding from the above literature review, long-distance truck drivers have a high risk of suffering from shift work disorder. Shift work disorder occurs in people who change their work hours frequently or who work at night. Their work schedules are not in sync with their sleep and wake cycle (Rangan, 2014). Long-distance truck drivers frequently drive through the night or will only sleep two –to four hours in the twenty-four hour cycle to meet with operators loading and off-loading schedule.

Physical and psychological effects of circadian rhythm disruption (Rangan, 2014):

- Mood disorder: The disruption of circadian rhythm by lighting conditions (for example ICU) and lifestyle predisposes the individuals to a number of mood disorders, such as impulsivity, mania and depression.
- Metabolic disorders: The adverse effects of disturbance in circadian rhythm include development of type 2 diabetes and obesity after age, BMI and other various variables are taken into account.
- Cardiovascular disorders: It has been recognised that chronic circadian disruption increases susceptibility to adverse cardiovascular events, including myocardial infarction, sudden cardiac death, pulmonary embolism, limb ischemia and aortic aneurysm rupture. Thus shift work is associated with 1.6 and 3.0 fold increased risk of cardiovascular disease for 45 – 55 years old men and women respectively.
- Hepatic function disorder: The clock disruption may impact multiple components of hepatic lipid homeostasis, affecting both bile acid and apo-lipoprotein biosynthesis.
- Immune system disorder: Sleep disturbance deregulates monocyte production of several pro-inflammatory cytokines including interleukin-6 and tumour necrosis factor alpha, thereby increasing inflammation in the body.
- Reproductive organs disorder: Melatonin blocks the secretion of gonadotropins – luteinizing hormone and follicle stimulating hormone – from the anterior pituitary gland, which are responsible for proper development and functioning of ovaries and testes.
- Cancer: Male night shift workers have been found to have an increased risk of prostate cancer. Colorectal cancer may in part be the consequence of altered intestinal microbiota, caused by the disruption of the circadian rhythm.
- Rheumatoid arthritis: Patients with rheumatoid arthritis have disturbances in the hypothalamic-pituitary-adrenal axis, which are reflected in altered circadian rhythm of circulating serum cortisol, melatonin and interleukin-6 levels.

2.4.4 Depression

Depression is a real medical condition that impacts about 6 % of men in general and has been shown to impact upwards of 15% – 20% of professional truck drivers (Robinson, 2014).

Truck drivers, especially those who drive long-haul routes, are faced with a multitude of mental health-related risks attributed to the transportation environment (Apostolopoulos *et al*., 2010). In a study by Shattel *et al.* (2010), of occupational stressors and the mental health of truckers with a sample of 59 male truck drivers located in an urban setting, job-related factors such as constant time pressures and social isolation were found to not only lead truckers to engage in risky behaviors (for example: drug use and sex with sex workers) but caused them psychological strain and emotional distress (Shattel *et al.*, 2010).

Depression in truck drivers is a worldwide mental illness. Risk factors for depression were examined among 300 male truck drivers at a local truck stop in Fortaleza, Brazil (Pereira da Silva-Junior, *et al*., 2009). Results revealed that 13,6 % of truck drivers suffered from depression; further, multivariate analysis showed that low educational level, truckers' use of stimulants, and low wages, increased risk for depression. Research suggests that drugs misuse often serves as a means to combat fatigue and help truckers meet their delivery deadlines (Shattel *et al*., 2010). High psychological demands and lowered perceived control over one's job were found to be related to mental health problems in a sample of 1811 male and female participants of the general German population (Dragano *et al*., 2008). Longer and more frequent road trips were linked with increases in depressive symptoms among a sample of 1200 truckers in China (Wong *et al.*, 2007 as cited by Shattell *et al.*, 2012).

According to the Mayo Clinic (2014a), depression is characterized by the following

symptoms:

- Feelings of sadness;
- Irritability;
- Loss of interest or pleasure in normal activities;
- Sleeping too much, too little;
- Tiredness and lack of energy;
- Unintentional weight loss, or weight gain;
- Anxiety, agitation, or restlessness;
- Slowed thinking, speaking, or body movements;
- Feelings of worthlessness or guilt, or blaming yourself for things that are not your responsibility;
- Trouble thinking, concentration, making decisions, and remembering things;
- Frequent thoughts of death, suicidal thoughts, suicide attempts, or suicide; and
- Unexplainable physical problems, such as back pain and headaches.

For some people, depression symptoms are so severe that it is obvious something is not right. Other people feel generally miserable or unhappy without knowing why (Mayo Clinic, 2014).

2.4.5 Cardiovascular disease and Metabolic Syndrome

A study by Chen *et al*. (2013) state that the health of drivers greatly impacts on public safety. Occupational drivers have been reported to have higher health risks in metabolic syndrome, undiagnosed diabetes mellitus, and cardiovascular disease, low back pain, sleep disorders, obesity and peptic ulcer. The study further states that occupational drivers are particularly at risk of excessive metabolic syndrome due to substantial changes in lifestyle habits (alcohol consumption, cigarette smoking, less exercise), poor working environment (irregular and long working hours, unhealthy diet, working in a fixed position, physical inactivity) and psychological reasons (being highly stressed due

to hazardous working conditions, having irregular sleep habits).

Metabolic syndrome is the name for a group of risk factors that raise one's risk for heart disease and other health problems, such as diabetes and stroke. The five conditions below are metabolic risk factors. A person must have at least three risk factors to be diagnosed with metabolic syndrome.

- An increased waist line. Excess fat in the stomach area is a greater risk factor for heart disease than excess fat stored in other parts of the body.
- A high triglyceride level (a type of fat in the body)
- A low HDL level. HDL is a type of good cholesterol and aids to remove cholesterol from a person's arteries. A low HDL level raises the risk for heart disease.
- High blood pressure
- High fasting blood sugar/ diabetes mellitus (National Heart, Lung and Blood Institute, 2011).

According to a study by Sangaleti *et al.* (2014), the main finding was that long-distance truck drivers have a prevalence of multiple factors that put them at risk for cardiovascular events. The prevalence of hypertension in this study was 45.2% and that of abnormal glucose levels 16.4%. There was a high prevalence of high BMI's. Sangaleti *et al.* (2014), further state that abdominal obesity (accumulation of visceral fat), is an important risk factor within a cluster of cardiovascular risk factors such as metabolic syndrome. Visceral adipose tissue has increases endocrine and paracrine activity and is related to the secretion of pro-inflammatory factors (cytokines) and other substances that contribute substantially to the development of vascular injury and other hemodynamic and metabolic changes.

A study by Chen *et al*. (2013), found that occupational drivers had an increased risk for albuminuria, and albuminuria was associated with metabolic syndrome. Endothelial dysfunction is likely to be involved in the initiation and development of albuminuria,

followed by the development and progression of atherosclerosis, further resulting in adverse cardiovascular outcomes. The reason for the positive association between occupational drivers with albuminuria and cardiovascular risk might be related to high blood pressure, obesity, high fasting glucose, dyslipidaemia (higher total cholesterol, lower HDL cholesterol and high triglycerides) and similar factors associated with metabolic syndrome in occupational drivers (*that is,* unhealthy lifestyle habits, poor working environment, psychological reasons).

Moreover, obesity is one of the main risk factors for other non-transmissible illnesses like type 2 diabetes mellitus and should be considered a chronic illness and a public health problem. In this sense, the earlier arterial hypertension and obesity are detected the better pharmacological and non-pharmacological measures can be put in practice. Professional truck drivers can be more exposed to cardiovascular risks due to the peculiar characteristics of their profession. In general, these professionals eat in restaurants that mostly offer high-calorie and low-nutrition foods, and the association between an inadequate diet and sedentary life turn these people more exposed to obesity and its consequences (Cavagioni *et al*., 2010).

A study done by Cavagioni, found that in drivers with systolic blood pressure levels equal to or more than 140 mmHg and/or diastolic levels equal to or more than 90 mmHg, prevalence of arterial hypertension was 37%. The higher prevalence of pressure levels compatible with arterial hypertension maybe influenced by the psychological and physical stress these professionals are exposed to in their work, due to scheduled load transportation, large distances driven and long daily work journeys. These aspects can also contribute to the use of sleep inhibitors and, consequently, to the high traffic accident levels on the highway (Cavagioni *et al*., 2010).

Sangaleti *et al.* (2014), stated that the control of hypertension is critical to the prevention of injuries in target organs such as the heart, brain and kidneys. This study

demonstrated that a large proportion of truck drivers who already had been diagnosed with hypertension or diabetes mellitus did not regularly use their prescribed medications. Lack of information, long travel times, lack of access to appropriate health services, the absence of characteristic symptoms of hypertension and the general profile of self-care in the male population are possible explanations for this finding.

When discussing chronic illnesses, arterial hypertension, obesity, diabetes mellitus, hypercholesterolemia show similar characteristics: they are chronic, need treatment across the lifespan and often show no specific signs. Research shows that changes in life habits need to be stimulated, characterized by regular physical activity, body weight control, lower alcoholic beverage consumption and abstinence from smoking (Cavigioni *et al*., 2010).

2.4.6 Organ distress and diseases

Kidney problems can affect anyone but truckers appear to have a higher incidence than the general American population. This refers, in particular, to the bruising or damage of kidneys. Like many other health issues, problems with the kidneys are related to the overall occupational environment in which truckers work every day. Truckers lead a sedentary life. They drive long haul and have time constraints. This affects their ability to "unload" their urinary tract in a timely fashion. When a trucker does not empty the bladder with the frequency it requires, the result is kidney and bladder problems. If a truck driver already has diabetes or becomes diabetic, this will increase the likelihood of multiple problems, including ones affecting the kidney's (OTR Driver Health, 2012).

Truck drivers need to heed any warning signs of kidney problems. The most common of these is high blood pleasures and cardiovascular problems. In addition high blood pressure, poor eating habits and a lack of exercise can increase the risk of type 2 diabetes. This too, will affect the kidney's resulting in diabetic kidney problems (OTR

Driver Health, 2012).

A malfunctioning kidney is noticeable. Kidney stones and bladder infections are common and results with obvious indications. Diabetic kidney problems, while severe, may take as long as ten years before they are evident (OTR Driver Health, 2012).

Common indicators of kidney problems (OTR Driver Health, 2012):

- Discomfort during urination, this may include burning or other pain;
- Swelling may occur – notably the ankles, feet, eyes, face;
- Urge to urinate more often;
- Urination becomes less controlled;
- Blood is found in the urine; and
- Fever.

A driver with kidney problems faces potential issues with governing bodies. The more serious the problem, the greater the possibility of disqualification is from driving. A driver with diabetic kidney problems or one on dialysis is not disqualified automatically OTR Driver Health, 2012). In South Africa however the current Public Driving Permit (PDP) medical information document does not contain any questions related to kidney health.

2.4.7 Musculoskeletal disorders

The Bureau of Labour Statistics (2006), cited by Benstowe, (2008), data on injury and illness show that the drivers of heavy trucks and tractor-trailers in the US are associated with the second highest number of occupational illnesses and injuries for the past three years (Benstowe, 2008). Over 60% of fatal fall-related occupational injuries occur in the long haul freight trucking industry. Exposure to whole-body vibration from driving or operating vehicles has been shown to negatively affect balance and may contribute to falls when entering or exiting the vehicle. Fall related injuries are eight times more likely to occur upon exiting the vehicle than entering (Halverson, 2013).

Professional drivers of heavy road vehicles have a high relative risk of being hospitalized with spinal disorders, mono-neuropathies of the upper limb, especially lesions of the ulnar nerve, and of shoulder lesions (Jensen *et al*., 2007). Jensen's study shows the following results:

- Spinal disorders (cervical disc disorders other intervertebral disc disorders and dorsalgia) were more common among all drivers compared to the general population.
- Mono-neuropathies of the upper extremities were more common in all drivers compared with the general population.
- Carpal tunnel syndrome had the highest hospital admission for long-distance truck drivers, when compared to bus drivers.
- Hospital admission for synovitis and bursitis (especially olecranon and pre-patellar bursitis) were significantly elevated among long-distance drivers, comparable to the general population (Jensen *et al*., 2007).

Hedge (2014), explains the mechanism of driving and its effect on the body. Unlike regular sitting, while a vehicle is in motion the body is subject to different forces: to accelerations and decelerations, to lateral swaying from side to side and to whole-body up and down vibrations. Also, when driving the feet are actively being used, the right foot on the accelerator pedal, the left on the break, and in a stick-shift also on the clutch. When the feet are active they cannot be used to support and stabilize the lower body as normally happens when they are placed on the floor during normal sitting in a chair. The combination of these factors, coupled with the design of the seat itself, can increase the chance of back problems (Hedge, 2014).

2.4.7.1 Whole-body vibration

Whole-body Vibration in truck drivers is the result of motions created by translating engine components and the vehicle traveling over various types of road surfaces—

correspondingly, factors such as age and maintenance of the vehicle along with environmental conditions can cause varying levels and frequencies of vibration even between the same models of vehicle (Halverson, 2013). According to Pope, (1992), cited by Halverson (2013), occupational whole body vibration (WBV) has been linked to lower back injuries, visual and vestibular imbalances, as well as internal disturbances.

According to Lockhart (2008), as cited by Halverstone (2013), gait irregularities resulting from disorientation and altered visual perceptions are major factors resulting in falls. According to Murtezani (2011), other potential injury mechanisms include the amplification of vibrations at certain frequencies traveling up and down the back leading to spinal disc degeneration and spinal muscle fatigue due to the cyclic activity (Halverson, 2013).

According to Halverson (2013), posture and duration of vibration exposure have been evidenced to constitute the primary risk factors for back pain and imbalance among agricultural tractor drivers and truckers. However, the links between whole-body vibration, back injury, and disrupted somatosensory and visual systems remain poorly understood and researched.

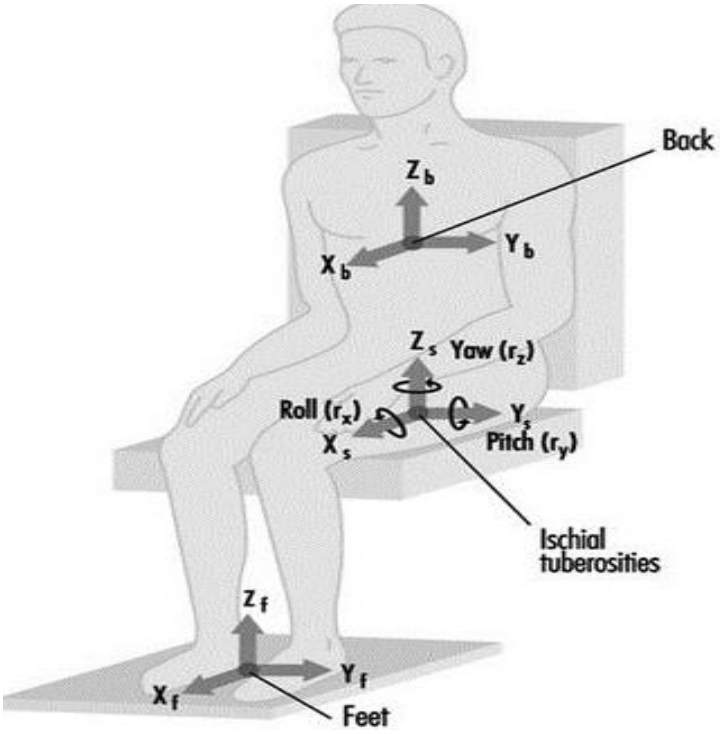
The Occupational Health Clinics for Ontario workers released a study stating that vibration from the road is often in the body's resonant frequency range (3-5Hz). Exposure to vibration at the resonant frequency increases the risk of injury. Whole-body vibration stimulates bursts of back muscle activity. This causes neck and back muscles to tire more quickly, and decreases the support these muscles provide to the spine. Even if the muscles are working very lightly, activity for an extended time without rest will lead to fatigue and increase the risk of back injury. Long term exposure to whole body vibration is a common way to herniate a disc in your back. The increased disc pressure from sitting speeds up this process (Occupational Health Clinics for Ontario Workers, 2009).

Epidemiological studies of long-term exposure to whole body vibration have also shown that it causes or exacerbates other medical conditions such as (Safework Australia, 2012):

- Cardiovascular, respiratory, endocrine and metabolic changes;
- Digestive problems;
- Reproductive organ damage;
- Impairment of vision, balance or both; and
- Interference with activities and discomfort that could lead to accidents.

Safework Australia (2012), states that whole body vibration measurements should be collected and analysed by a competent person such as an appropriately trained occupational health and safety professional, occupational hygienist, maintenance technician or engineer, or human vibration specialist (Safework Australia, 2012).

Figure 2.3: Whole body vibration.



According to Safework Australia (2012), whole body vibration is measured as illustrated in figure 2.3 (above) by placing a vibration sensor on the seat of a vehicle. The sensor detects vibration in three axes: x (forward to back movement), y (side to side) and z (up and down). After analysis, the vibration exposure can be assessed against health, fatigue or comfort risk criteria in standards for whole body vibration (Safework Australia, 2012).

2.5 Summary

The literature review clearly demonstrates how single disease entities can affect the health, safety and lives of long-distance truck drivers. Although some drivers will only be affected by a single disease it is more common that the drivers will suffer from more complicated diseases/syndromes as one chronic illness can more than often lead to another or share certain complications with other chronic illnesses. Long-distance truck

drivers perform their daily duties in an environment that is detrimental to their health and increases their risk to develop the discussed chronic medical conditions/syndromes.

Working environments of drivers play a role in development of metabolic syndrome. Drivers work longer than forty-five hours per week. They also work complicated shift systems due to irregular working hours, which lead to inadequate opportunities for recovery and unwinding. Unhealthy diet and physical inactivity are common in long distance drivers. High carbohydrate meal consumption is related to hyper-insulineamia, postprandial hyperglycaemia, and hypertriglycaemia that are well known to predict an increase of body fat in working individuals. The increase in BMI was accompanied by a parallel increase in the prevalence of metabolic syndrome. This may indicate the role of unhealthy diet and physical inactivity in developing metabolic syndrome in long distance drivers (Mohebbi *et al.,* 2012).

In the article Truck Driver Health (2014), the chief operations officer at Isuzu Truck South Africa says that the well-being of truck drivers and road users in general is of critical importance to Isuzu Trucks. They urge drivers and companies operating in the transport sector to take charge of this rapidly growing health and safety risk through simple measures such as routine testing. Professional blood tests for glucose level monitoring must be conducted at least annually among all drivers. If drivers are found to be diabetic, the condition can be controlled by ensuring each driver has his or her own glucometer in order to test and record his or her own blood glucose levels daily, and be guided on managing the condition by Diabetes SA. By helping manage truck driver health, we can improve their personal well-being and that of their families and contributing to improved safety on South Africa's roads (Publicity Update, 2014).

The above lifestyle risk factors discussed, was analyzed with the empirical investigation in Chapter 3. The investigation was aimed to find a correlation between the literature study and empirical investigation.

Chapter 3
Empirical Investigation

3.1 Introduction

The long-distance truck driver industry is a versatile, tough and enduring industry, full of unique challenges. Not everyone is born to be a truck driver, especially not a long distance truck driver. Truck drivers must endure all sorts of challenges every day, these challenges include physical and mental challenges that may get the better of the strongest of any human being. Chapter 2 described these challenges, as well as other risk factors truck driver lifestyles attract. With Chapter 2 as base and issues researched through a broad literature study, a questionnaire was constructed and designed to support evidence on long-distance truck driver profiles, how do they see their occupation and how occupational hazards affect the drivers, their likes and dislikes as well as describing their habits and proof of illnesses. Chapter 3 will lead the empirical study.

3.2 Research Methodology

The research methodology consists of the following: a research design and a study sample design. The research methodology further addresses the limitations of the sample design and displays the research techniques for data collection.

3.2.1 Research Design

The research design was constructed as a quantitative structured questionnaire as measuring instrument (see Annexure B). The questionnaires were anonymously completed by 150 long-distance truck drivers. The study sample is a convenient sample, with the sample size of 150 participants that is part of a target population with an

unknown amount of long-distance truck drivers. Truck drivers re-allocated between transport companies and some are registered with the National Bargaining Council of Road Freight industry, but there are many that is not registered and there-fore unaccounted for. Reasons for some drivers to be registered and others not, with the National Bargaining Council of Road Freight Industry (NBC), is because some smaller transport companies find the cost and minimum salary and other benefits enforced by NBC too high and cannot afford it. A further reason is that some smaller transport companies also do not have proper management and administration systems, nor do they have the skills to manage all the regulations set out by the NBC. The questionnaire was tested or a pilot run was performed with the help of Grain Carriers', driver manager, Mr Isaac Ramaile. All 150 questionnaires that were handed out were completed, thus there was a response rate of 100%, but unfortunately some participants failed to complete some of the questions. Luckily the amount of them not answering a question was a small amount and is shown per question.

The structured questionnaire contained 58 questions, in Likert scale format, as well as open ended questions to clarify some responses. Questions consisted of both categorical- and numerical variables where the participant only had to choose one. This made the completion of the questionnaire easier and increased accuracy. The questionnaire was divided into five sections. Section A focused on the biographical profile of the participant's, while Section B focused more on occupational questions. Section C and D concentrated more on the participant's health and health related questions. Section D specifically pointed to their sexual behaviours. Section E only consisted of three questions and was aimed to help the participant believe that the questionnaire was for betterment on their behalf and upliftment.

3.2.2 Study sample design

The long-distance truck drivers were the study's target population. Long-distance truck

driving is a large industry with an unknown number of long-distance drivers. The study population was a convenient sample of 150 long-distance truck drivers that were targeted in the Gauteng province. Thus, no random sampling was done and interpretation of results will be given by descriptive statistics and effect sizes. Randfontein as a primary focus area for purposes of the study is a main hub for grain and grain related products in South Africa, and South Africa's inland SAFEX based price are fixed on Randfontein as distance in kilometers differential. The sample were taken with the help of Grain Carriers' management and their depot and parking yard (waiting area's) of Tiger Milling, Meadow Feeds and Nola were used to source participants. Randfontein made an ideal destination, because grain and grain related products are sourced and distributed from and to all over South Africa and Southern Africa. Products are imported from Southern African countries and some products are exported to Namibia, Zimbabwe and Botswana. A further determinant factor was that Randfontein is a comfortable and convenient destination to complete questionnaires.

3.2.3 Limitations of the data collection

Drivers that completed these questionnaires arrayed from bulk (grain and minerals) products that is loaded on self- and non-self-discharging trailers, to the flat decks and tautliner trailers. Drivers were from different nationalities and hail from all over SA. Limitations of the study sample are drivers that transport tanker products, hazardous products, fresh produce (refrigerated) and abnormal loads.

3.2.4 Research techniques for data collection:

The research was conducted logically and scientifically. The broad literature review and study's title, problem statement and objectives guided the formulation of the 58 questions.

The 150 questionnaires were processed by the North West University's Statistical Consultation Services in Potchefstroom. Statistical data analysis were conducted to find relationships and several variables for the research.

3.3 Research Findings:

The research finding are grouped together in sections, the sections are categorize in the same manner as the questionnaires' sections.

3.3.1 Section A: The Biographic profile of respondent drivers:

The biographical profile of drivers is described in the statistical analysis obtained from the 150 respondents. In Table 3.1 it shows that 97.9% of the respondents were males, thus the study confirms that the study population is male dominated.

Table 3.1 Gender of respondents

Question A1.		Frequency	Valid %
Valid	Male	141	97.9
	Female	3	2.1
	Total	144	100.0

Most of the respondents are African (Black) with a percentage of 72.1% and it is safe to say that the bulk of drivers completing the questionnaire are black males (Table 3.2).

Table 3.2 Race Group

Question A2.		Frequency	Valid %
Valid	White	28	20.0
	African	101	72.1
	Indian	5	3.6
	Coloured	6	4.3
	Total	140	100.0

Figure 3.1: Chart illustrating the race percentages of the study population.

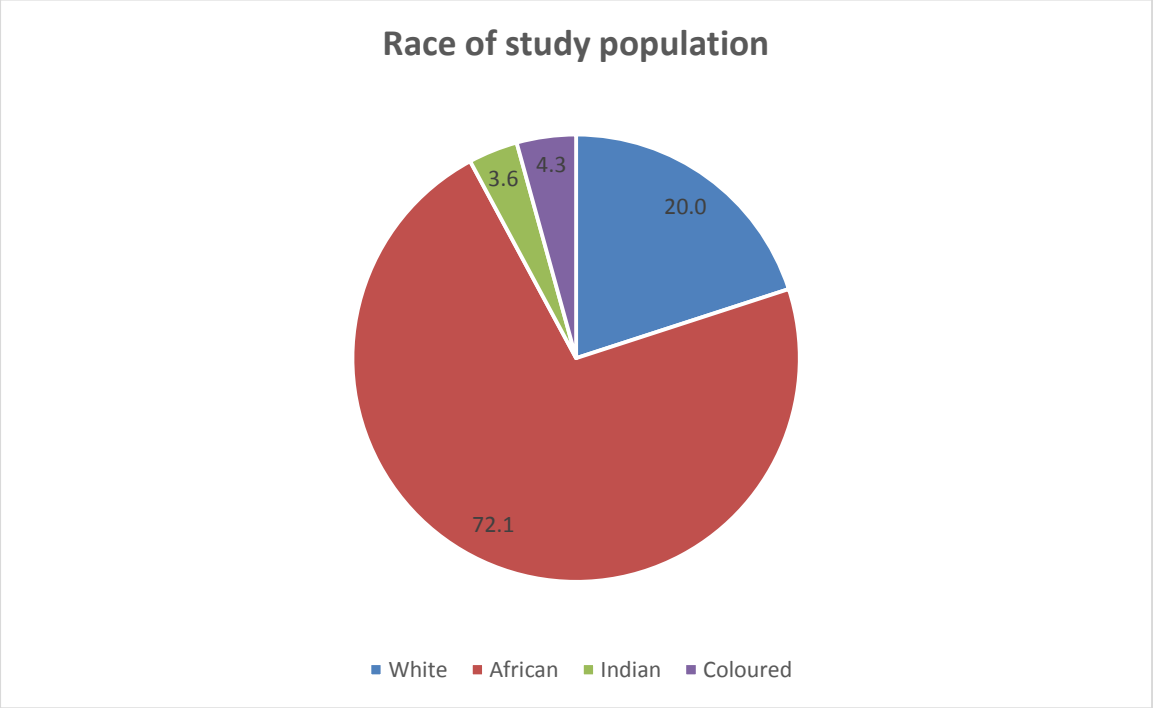


Figure 3.2 confirm the evidence that the majority of the respondents and study population are black African's.

Most of the drivers hail from South Africa with a percentage of 91% and in second place are drivers from Zimbabwe with 5.5% (Table 3.3). Reasons for Zimbabwe being in second place are due to the economic circumstances of Zimbabwe. Zimbabwe's unemployment rate is 85%, that is extremely high and thousands of Zimbabweans found refuge in South Africa (Chiumia, 2014). Smaller transport companies employ Zimbabwean drivers, not to register them at the NBC or for Pay as You Earn (PAYE) or Unemployment Income Fund (UIF). Transporters as in any business, want to save cost, but this cost saving should not be influencing the driver's basic rights or contribute towards the lifestyles of the truck drivers.

Table 3.3 Country of birth

Question A3.		Frequency	Valid %
Valid	South Africa	132	91.0
	Zimbabwe	8	5.5
	Namibia	1	0.7
	Mozambique	1	0.7
	Other(Specify)	3	2.1
	Total	145	100.0

Figure 3.2: Country of birth of the study population.

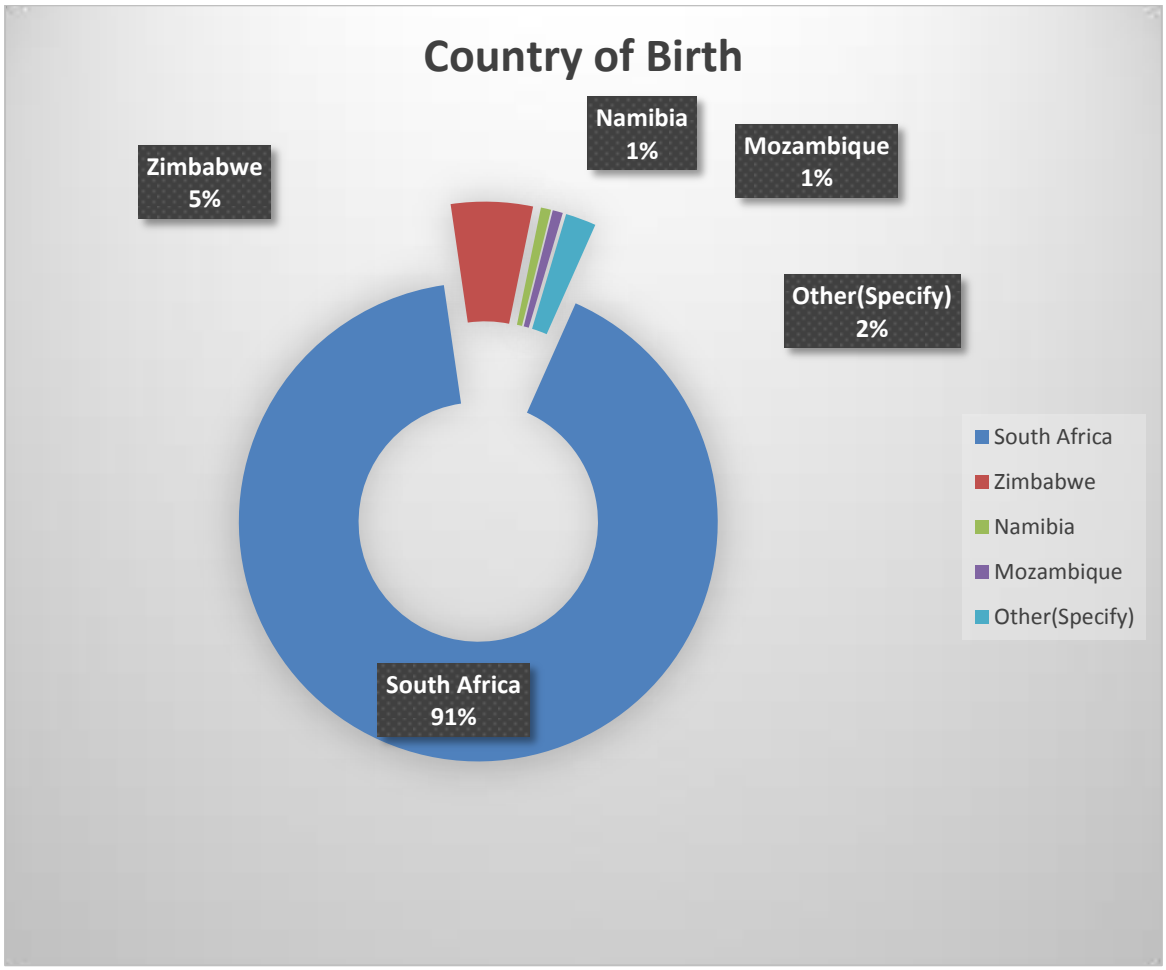


Figure 3.2 shows the big percentage of the study population hail from South African as country of birth. It is evident from the first three questions that the majority of the

respondents are black African males that were born in South Africa.

Table 3.4 indicates that 64.3% of the respondents are married and 23.8% are single and alone without a partner. This is a high percentage, and influences the drivers stress factor on the levels of family life and remuneration received. The reason for the above statement is that if a person is married, his responsibility increases and emotional factors change.

Table 3.4 Marital status of respondents

Question A4.		Frequency	Valid %
Valid	Married	92	64.3
	Unmarried	15	10.5
	Single	34	23.8
	Partner	2	1.4
	Total	143	100

Respondents' ages were mainly between 25 and 55 years old, Table 3.5. Most of the respondents are between 36 – 45 years old with a percentage of 31.5%, followed by age of drivers between 25 – 35 years old with 28.7% and 46 – 55 years old with 23.1%.

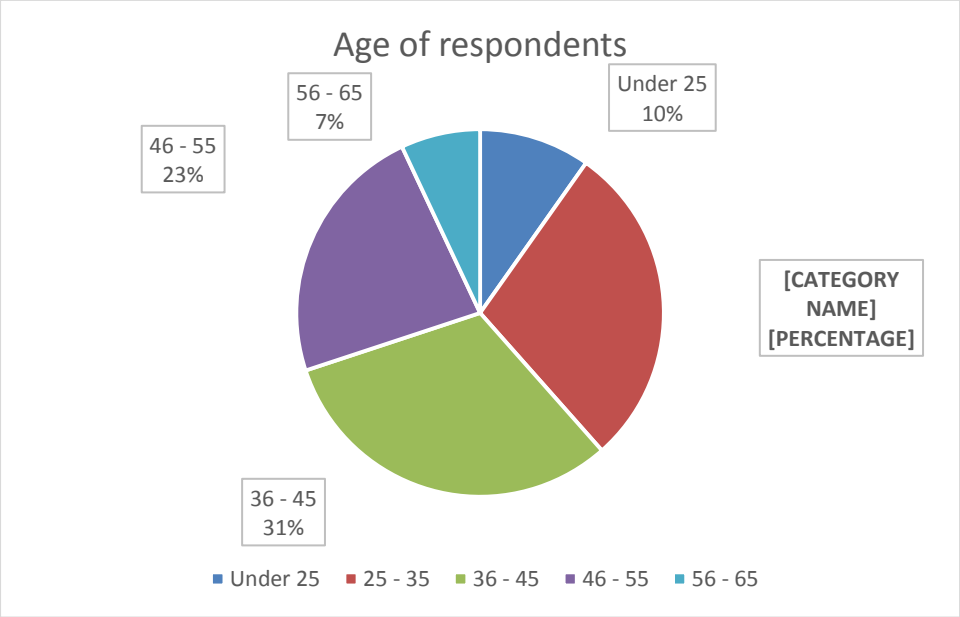
Table 3.5 Age of respondents

Question A5.		Frequency	Valid %
Valid	Under 25	14	9.8
	25 - 35	41	28.7
	36 - 45	45	31.5
	46 - 55	33	23.1
	56 - 65	10	7.0
	Total	143	100.0

Correlating with the drivers' age is their years of experience as a truck driver. Table 3.6 shows that 33.1% of respondents have 5 – 9 years of experience and 21.4% have 10 – 14 years of experience as a driver. Taking into consideration that most insurance companies have extra excess amounts if the driver is 25 years and younger, thus

transport companies are reluctant to employ long-distance driver's under the age of 25.

Figure 3.3: Age of respondents:



The chart in Figure 3.3 illustrates the age groups more visually and it is evident that the majority percentage of the respondents is aged between 25 year and 45 years old. Together with age of the respondents is the number of years' experience, illustrated in Table 3.6. Table 3.6 also shows that there is a decrease in the number of drivers with longer experience. This can be a direct relation to driver's lifestyles and the risk factors that accompany it.

Table 3.6 Years' experience as truck driver

Question A6.		Frequency	Valid %
Valid	1 - 4	20	13.8
	5 - 9	48	33.1
	10 - 14	31	21.4
	15 - 19	17	11.7
	20 - 24	11	7.6
	25 - 29	8	5.5
	30 - 34	10	6.9
	Total	145	100.0

Table 3.7 shows that 62.2% of respondents that completed the questionnaires have a qualification of Grade 10 and higher, with 25.7% that have a matric certificate. To become a truck driver, Grade twelve or matric is not a prerequisite, and the basic read and write is normally minimum requirement. This unfortunately can be a problem, because drivers do not learn or obtain other information and knowledge that is part of their everyday life. Knowledge that can lack is for example: basic financial skills, what food and eating patterns is better and what health risks exist. The problems are risk factors that forms part of decision making formulation.

Table 3.7 Highest level of qualifications of respondents

Question A7.		Frequency	Valid %
Valid	Grade 7	15	10.7
	Grade 8	17	12.1
	Grade 9	17	12.1
	Grade 10	26	18.6
	Grade 11	25	17.9
	Grade 12	36	25.7
	Other(Specify)	4	2.9
	Total	140	100.0

Most of the drivers that completed the questionnaire have children, and the number of children range between 2 – 4 children, with 4 being the highest with a percentage of 29.6% (Table 3.8)

Table 3.8 Number of children of respondents

Question A8.		Frequency	Valid %
Valid	1	22	16.3
	2	39	28.9
	3	34	25.2
	4	40	29.6
	Total	135	100.0

The average length of respondents is between 1.6 meters and 1.8 meters tall, with a combined percentage of 60.7% (Table 3.9). Their weight average is between 60 kg and 90 kg with a combined percentage of 69.9% (Table 3.10). The highest percentage was between 70 – 80kg with 28.1%.

Table 3.9 Respondents length

Question A9.		Frequency	Valid %
Valid	Under 1.5m	3	2.1
	1.5m – 1.6m	35	25.0
	1.6m – 1.7m	42	30.0
	1.7m – 1.8m	43	30.7
	1.8m – 1.9m	10	7.1
	1.9m – 2.0m	7	5.0
	Total	140	100.0

BMI calculation is calculated by dividing weight into length multiplied by length. Any BMI between 20 and 25 is accepted as normal weight. From averages taken in Table 3.9 and Table 3.10, a high percentage of the drivers do not have a normal BMI, thus the average of the respondents have a BMI that is not acceptable. This correlates to the answer to below question on the amount of times, the respondents exercise per week.

Table 3.10 Respondents weight

Question A10.		Frequency	Valid %
Valid	Under 60kg	6	4.1
	60kg – 70kg	33	22.6
	70kg – 80kg	41	28.1
	80kg – 90kg	28	19.2
	90kg – 100kg	22	15.1
	100kg – 110kg	13	8.9
	110kg – 120kg	2	1.4
	120kg – 130kg	1	0.7
	Total	146	100.0

Most of the drivers that completed the questionnaire exercise only once per week (with a percentage of 40%) (Table 3.11).

Table 3.11 Number of times per week, respondents exercise

Question A11.		Frequency	Valid %
Valid	once	52	40.0
	twice	36	27.7
	three times	29	22.3
	four times	13	10.0
	Total	130	100.0

Table 3.12 shows that 67.6% of respondents agree and strongly agree on the fact that they always wanted to be a truck driver. This is good news, regarding all other factors and influences that have to cope with on the road.

Table 3.12 Respondents answer if they always wanted to be a truck driver?

Question A12.		Frequency	Valid %
Valid	Strongly agree	42	29.6
	Agree	54	38.0
	Disagree	31	21.8
	Strongly disagree	15	10.6
	Total	142	100.0

Thus, describing a typical long-distance according to the sample population by setting up the following driver profile:

- Male – 97.9%
- Black African – 72.1%
- South African born – 91%
- The black African male, born is South Africa is married – 64.3%
- Their age is between 25 – 55 years old - 83.3%
- They have got experience as a long-distance driver between 5 – 19 years – 66.2%
- Most of them does not have Matric (Grade 12) – 71.4%
- 135 of the 150 driver have got children, with 83.7% that have more than one.
- Their average length is between 1.6m – 1.8m – 60.7%, with an average weight of between 60kg – 90kg – 69.9%
- Working with averages, their calculated BMI is +/-26, that is above the normal of below 25, thus, this correlates that the average driver only exercise once per week – 40%
- 59% of drivers always wanted to a truck driver

Thus, our typical long-distance driver profile is: a black African male, that is between 1.6m – 1.8m tall, that weighs between 60 – 90kg, was born in SA, is married, with children (more than one), is between the age of 25 – 55 years old with between 5 – 19 years of experience as a long-distance truck driver, who always wanted to be a truck driver and exercise once a week.

3.3.2 Section B: Occupation aspects

Questions B1 – B17 focusses on long-distance driving as occupation. The questions provide facts and circumstances what the work requires of a driver and under what circumstances the driver must continuously perform their duty. The question further deals with the emotional feelings, from the driver, towards their occupation.

Question B1 – B3 was measured using the Likert scale. Table 3.13 shows that the majority of the respondents are happy in their work. 20.3% strongly agrees and 40.6% agree, that they are happy, showing a majority percentage of 60.9% that are happy.

Table 3.13 Respondents statistics on if they are happy in their work?

Question B1.		Frequency	Valid %
Valid	Strongly agree	28	20.3
	Agree	56	40.6
	Disagree	26	18.8
	Strongly disagree	28	20.3
	Total	138	100.0

Table 3.14 contradicts statistics of table 3.12 to a certain point, which shows that 52.8% of the respondents feel that their employer treats them well, and 47.2% feel that their employers does not treat them well. Analyzing the statistics individually the biggest percentage agree that their employer treats them well, with a 35.2%.

Table 3.14 Does your employer treat you well?

Question B2.		Frequency	Valid %
Valid	Strongly agree	25	17.6
	Agree	50	35.2
	Disagree	37	26.1
	Strongly disagree	30	21.1
	Total	142	100.0

Table 3.15 shows a further contradiction to Table 3.13, where 70.8% of respondents are not happy with their salary. 38.9% disagree and 31.9% strongly disagree that they are happy with their salary.

Table 3.15 Are you happy with your salary?

Question B3.		Frequency	Valid %
Valid	Strongly agree	11	7.6
	Agree	31	21.5
	Disagree	56	38.9
	Strongly disagree	46	31.9
	Total	144	100.0

Long-distance truck driving is also a dangerous occupation, many factors that can harm and/or put the driver's life in danger. One of these factors is truck accidents. Table 3.16 shows that only 24.1% of the respondents have been in an accident. These three questions will be discussed further on and taken as a whole to form a new question, if the respondents have job satisfaction.

Table 3.16 Have you ever been in an accident?

Question B4.		Frequency	Valid %
Valid	Yes	35	24.1
	No	110	75.9
	Total	145	100.0

These truck accidents may be caused by numerous factors. The table below shows a few of the most common reasons for these accidents. The most common reasons include, falling asleep behind the wheel, the condition of the road, the condition of the vehicle or trailer/'s and default from another party. According to the respondents, falling asleep behind the wheel (33.9%) and the actions of a third party (30.4%) are the biggest percentage of reasons for these truck accidents (Table 3.17).

Table 3.17 Factors causing truck accidents.

Question B5.		Frequency	Valid %
Valid	Fell asleep	19	33.9
	The road condition	16	28.6
	The condition of the vehicle	4	7.1
	Another party	17	30.4
	Total	56	100.0

Table 3.17 showed that falling asleep behind the wheel is the biggest percentage cause for truck accidents. Questions B6 – B12 focused on how many hours per day long-distance drivers are driving, for how many hours they sleep and other factors that can affect a driver's physical and mental state of health.

Concurring with the biggest reason for accidents, which is falling asleep behind the wheel of a truck, can be seen in Table 3.18, where it shows that 53.6% of the respondents drive 13 – 16 hours per day and of these 38.6% drive 15 – 16 hours per day, thus the combination between the constant concentration when driving long distances and the hours that they work, affect the drivers and from the literature study, this leads to fatigue and drowsiness.

Table 3.18 How many hours are you driving per day?

Question B6.		Frequency	Valid %
Valid	6 - 7 hours	8	5.7
	8 - 10 hours	35	25.0
	11 - 12 hours	22	15.7
	13 - 14 hours	21	15.0
	15 - 16 hours	54	38.6
	Total	140	100.0

Table 3.19 shows that 72.3% of the respondents are driving between 2 – 6 hours without stopping. 54.6% are driving 3 – 6 hours without stopping to rest. The biggest concern is that 11.3% of the respondents are driving 10 hours and more without stopping. According to Mr T.M. Terblanche, Managing Director of Grain Carriers (Pty) Ltd, operators and fleet controllers should let drivers decide when they are tired and want to sleep, rather to force times and indifferent situations on them. To explain this, for example, some drivers sleep better from 11 pm – 4 am and some sleep better from 12 pm – 6 am. He further explained, that although the driver must decide when he wants to rest, his operator or fleet controller, must always keep close watch on them, and if the driver had a big week, hours and distance wise, the fleet controller must plan the next

trip that the driver is forced to be at home or at least to rest and get a good night's sleep (Terblanche, 2014).

Table 3.19 Time of driving without stopping?

Question B7.		Frequency	Valid %
Valid	2 - 3 hours	25	17.7
	3 - 4 hours	30	21.3
	4 - 5 hours	27	19.1
	5 - 6 hours	20	14.2
	6 - 7 hours	12	8.5
	7 - 8 hours	3	2.1
	8 - 9 hours	8	5.7
	10 and more	16	11.3
	Total	141	100.0

Adding to the above statistics is the number of days that long-distance driver work per month. Table 3.20 shows that 59.6% of the respondents work 26 days and more per month.

Table 3.20 Days working per month?

Question B8.		Frequency	Valid %
Valid	21 days	15	10.6
	22 days	19	13.5
	23 days	5	3.5
	24 days	10	7.1
	25 days	8	5.7
	26 days	22	15.6
	More than 26 days	62	44.0
	Total	141	100.0

Figure 3.4: Number of days respondents work per month

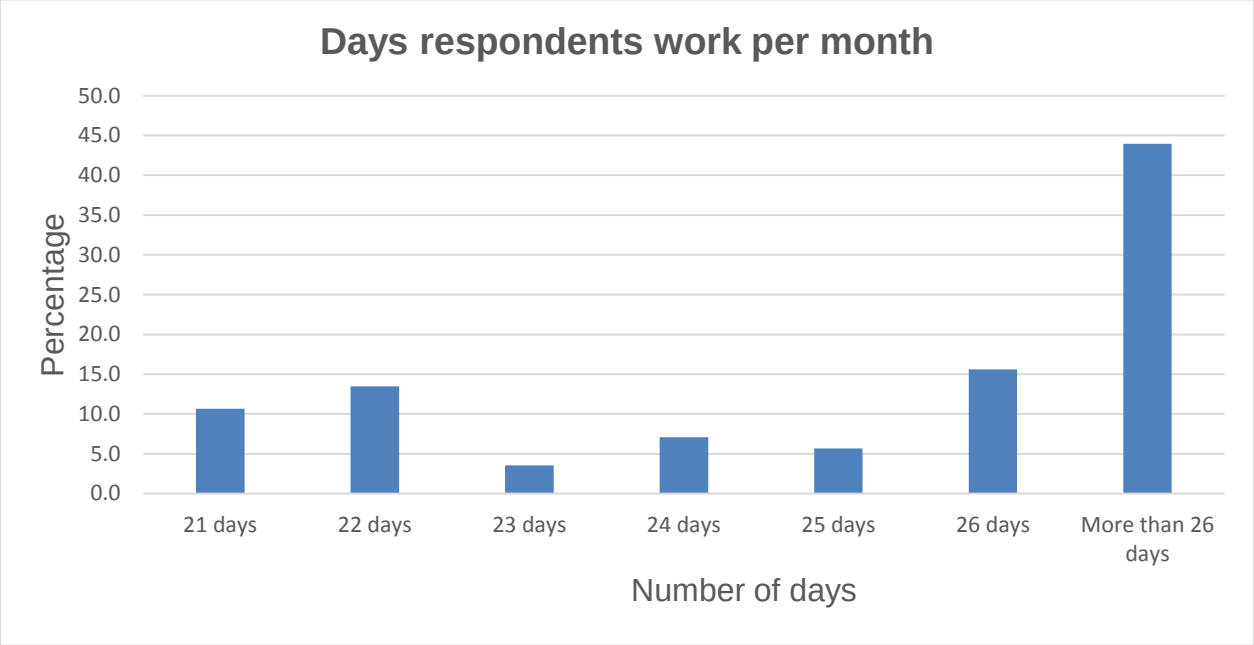


Figure 3.4 shows an alarming illustration of how many days the respondent long-distance drivers work per month. This must not be seen alone, together with the number of days, is the hours per day and the amount of kilometers done per month, which requires extensive concentration. Following the statements, is another contributor to fatigue, the number of hours respondents sleep on average per day. From the literature study, it was evident that most drivers sleep in their trucks at trucks stops or next to the road. Thus, it is not only that they sleep very little per day, but also, that the respondents sleep in confined space and with all night noise, coming from trucks coming and going. Table 3.21 shows that 55% of respondents sleep between 4 – 5 hours per day and 34% sleep an hour of these hours during day time (Table 3.22).

Table 3.21 Hours sleep per day?

Question B9.		Frequency	Valid %
Valid	3 hours	24	17.1
	4 hours	42	30.0
	5 hours	35	25.0
	6 hours	19	13.6
	7 hours	20	14.3
	Total	140	100.0

The hour slept during day time, is another problem. Figure 2.1 in the literature study showed, that if you sleep during day time a person's pineal gland does not secrete higher levels of melatonin, to ensure good sleep.

Table 3.22 Amount of hours sleep during day time of total sleep?

Question B10.		Frequency	Valid %
Valid	1/2 hour	19	15.8
	1 hour	41	34.2
	1.5 hours	9	7.5
	2 hours	21	17.5
	2.5 hours	2	1.7
	3 hours	28	23.3
	Total	120	100.0

Corresponding to statistics in table 3.20, Table 3.23 shows that 74.7% of the respondent drivers spend 1 – 4 days at home per month, of which the biggest percentage spend 2 days at home per month with 26.1%. This increases stress on family life and can be harmful to long-distance driver's emotional and mental health. From the literature study, this constant emotional stress, can lead to depression.

Table 3.23 Days spent at home per month?

Question B11.		Frequency	Valid %
Valid	1 day	24	16.9
	2 days	37	26.1
	3 days	19	13.4
	4 days	26	18.3
	5 days	11	7.7
	6 days	6	4.2
	7 days	6	4.2
	8 days	13	9.2
	Total	142	100.0

Adding to the fact of the amount of days a driver is working, they work hard as well. Table 3.24 shows that 61.4% of the respondent drivers do 15 000 – 19 000 and more kilometers per month.

Correlating Table 3.17, which shows that the biggest cause of accidents are falling asleep behind the wheel, with Table 3.18, which shows the amount of hours respondents are driving, with Table 3.19, which shows how many hours drivers are driving without stopping, with Table 3.20, which shows the number of days driver are working per month, with Table 3.21, which shows how little sleep respondents get per day on average, with Table 3.24, which shows the amount of kilometers respondents are driving, and reading from literature study, what the causes of fatigue, sleep apnoea and drowsiness while driving is, it is evident that most of the respondents is suffering from fatigue and sleep apnoea. Further this may cause drivers to get drowsy and fall asleep behind the wheel, causing accidents that can't only cost the driver his/her life, but also other innocent road users.

Table 3.24 How many kilometers do you drive per month?

Question B12.		Frequency	Valid %
Valid	5000 - 7000 km	9	6.4
	7001 - 9000 km	4	2.9
	9001 - 11000 km	12	8.6
	11001 - 13000 km	16	11.4
	13001 - 15000 km	13	9.3
	15001 - 17000 km	22	15.7
	17001 - 19000 km	22	15.7
	More than 19000 km	42	30.0
	Total	140	100.0

Being in a truck accident is not the only danger long-distance truck drivers have to cope with. Other injuries while on duty, such as working from heights, when opening the tarpaulins over their trailers or just closing the tarpaulin, getting into the bin of the trailer, to help of loading the trailer, can also be harmful and cause serious damage to a long-distance truck driver. Table 3.25 shows that 65.2% of the respondents have never had an injury while performing their duty. However, 27.7% fell off the trailers and 6.4% even fell when they climbed out of their vehicles.

Table 3.25 Have you had an injury on duty?

Question B13.		Frequency	Valid %
Valid	Never	92	65.2
	Feel of trailer	39	27.7
	Fell getting out of the truck	9	6.4
	Other(Specify)	1	0.7
	Total	141	100.0

Question 14 consists of 8 sub-questions, all focusing on factors that cause the long-distance driver the most stress. A five point Likert scale was used to measure these 8 questions. The first stressor tested was the layout of the truck's cabin, where 44.1% of the respondents claims that this is a stressor for them.

Table 3.26 The in-side and layout of the truck give me stress?

Question B14.1.		Frequency	Valid %
Valid	Strongly agree	27	18.9
	Agree	36	25.2
	Not sure	50	35.0
	Disagree	12	8.4
	Strongly disagree	18	12.6
	Total	143	100.0

From the in-side of the truck to the open road, Table 3.27 showed that 60.2% of the respondents claim that other road user give them stress. Interviewing Mr. S. Faber, Grain Carriers Fleet Manager, he claims that there are a lot of third party accidents or incidents where other vehicles, do not realize that a truck can't brake as fast as a car or that the driver can't see a car if it is driving next to the truck on its left hand side. He feels that other road users must be more cautious and also respect the truck and its driver (Faber, 2014).

Table 3.27 Other road users give me stress?

Question B14.2.		Frequency	Valid %
Valid	Strongly agree	43	31.2
	Agree	40	29.0
	Not sure	31	22.5
	Disagree	14	10.1
	Strongly disagree	10	7.2
	Total	138	100.0

Taking the road further, the study tested, the long hours on the road gave the drivers stress. This is an important stress test, because the study shows in Table 3.18 the quantity of hours the respondents spend on the road per day. Table 3.28 shows that only 47.1% of the respondents are stressed by the hours on the road. This can be because of their experience or just because they enjoy being a truck driver.

Table 3.28 The hours I drive give me stress?

Question B14.3.		Frequency	Valid %
Valid	Strongly agree	28	20.3
	Agree	37	26.8
	Not sure	27	19.6
	Disagree	33	23.9
	Strongly disagree	13	9.4
	Total	138	100.0

The respondent drivers do not agree that their operator or manager gives them stress, with only 37.9% (Table 3.29), agreeing.

Table 3.29 The way my manager/operator treats me, gives me stress?

Question B14.4.		Frequency	Valid %
Valid	Strongly agree	27	20.5
	Agree	23	17.4
	Not sure	34	25.8
	Disagree	24	18.2
	Strongly disagree	24	18.2
	Total	132	100.0

Table 3.4 shows that 64.3% of respondents are married, and in conjunction with Table 3.23 that shows how little time they spend at home, the stressors on family life are high at 43.4% (Table 3.30).

Table 3.30 My family life give me stress?

Question B14.5.		Frequency	Valid %
Valid	Strongly agree	28	20.6
	Agree	31	22,8
	Not sure	26	19.1
	Disagree	20	14.7
	Strongly disagree	31	22.8
	Total	136	100.0

Relating to Table 3.28 that shows that the long hours on the road only gave 47.1% of the respondents stress, 41.8% of the respondents are stressed by the long boring road (Table 3.31).

Table 3.31 The boring long road gives me stress?

Question B14.6.		Frequency	Valid %
Valid	Strongly agree	24	17.0
	Agree	35	24.8
	Not sure	37	26.2
	Disagree	23	16.3
	Strongly disagree	22	15.6
	Total	141	100.0

Table 3.32 shows that 45.7% of the respondents are stressed by the loading and the off-loading of their vehicles. Most of the stressors are just below the 50% mark, but when the study tested the more personal stressors as seen in Table 3.33, 55% of the respondents claimed that their salary gave them stress.

Table 3.32 The loading and off-loading give me stress?

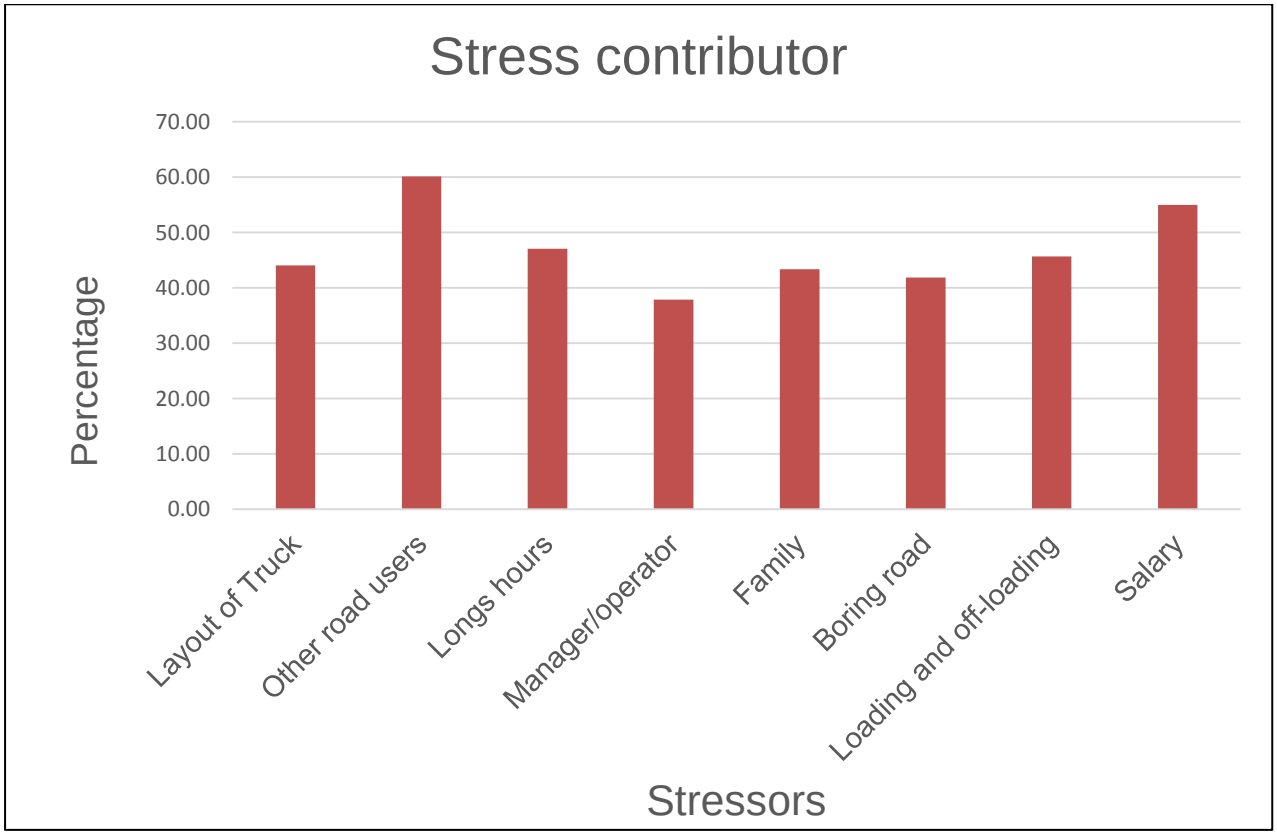
Question B14.7.		Frequency	Valid %
Valid	Strongly agree	34	24.3
	Agree	30	21.4
	Not sure	34	24.3
	Disagree	18	12.9
	Strongly disagree	24	17.1
	Total	140	100.0

Table 3.33 My salary gives me stress?

Question B14.8.		Frequency	Valid %
Valid	Strongly agree	37	26.4
	Agree	40	28.6
	Not sure	24	17.1
	Disagree	19	13.6
	Strongly disagree	20	14.3
	Total	140	100.0

Taking into consideration the respondents that answered that they are not sure or that is undecided on what factors gave them stress and taking it from the calculation, it is evident that all of the above factors give the majority of respondents stress. This is evident in the Cronbach Alpha coefficients, as illustrated in Figure 3.5 below.

Figure 3.5: Stress factors



Analyzing the above bar chart (Figure 3.4), the following summary is made. Working with the 2 points (Strongly agree and agree) that confirm that the different factors give the respondents stress, the following inferential statistics were generated:

- 44.1% of the respondents, which is less them 50% say that the truck layout give them stress, with 35% that are not sure (Table 3.26).
- 60.2% of the respondents are stressed by other road users, with 22.5% that are not sure or undecided (Table 3.27)
- 47.1% of respondents, again less than 50%, claims that long hours of driving give them stress, with 19.6% that are not sure (Table 3.28).
- Even a lessor percentage of 37.9% of the respondents are stressed by their manager/operator, with 25.8% that are not sure (Table 3.29).
- Seeing from Table 3.23 that the biggest percentage of respondents only spends 1 - 4 days at home, no wonder that 43.4% of respondents claims that their family lives give them stress, with 19.1% that are not sure (Table 3.30).
- 41.8% of respondents claim that the long boring road give them stress, with 26.2% that are not sure (Table 3.31).
- 45.7% of respondents claim that the loading and off-loading give the respondents stress, with 24.3% that are not sure (Table 3.32).
- From Table 3.15 it was evident that the majority of the respondents are not happy with their salaries, no wonder that 55% of respondents show that their salary give them stress, 17.1% that are not sure or undecided (Table 3.33).

Table 3.34 shows that 58.6% of the respondents never feel drowsy, which is hard to believe after reviewing the hours per days and the amount of days they work per month.

Table 3.34 How often do you feel drowsy while driving?

Question B15		Frequency	Valid %
Valid	Almost never	75	58.6
	Seldom	17	13.3
	Often	22	17.2
	Almost always	14	10.9
	Total	128	100.0

Table 3.35 contradicts answers on Table 3.34 even more, because almost all drivers take some form of action when they are feeling drowsy, that according to the above statistics confirms that they do feel drowsy from time to time. To counter the drowsy feeling, 65.9% of the respondents stop and walk around the truck as action plan when they are feeling drowsy (Table 3.35).

Table 3.35 When feeling drowsy, which of the following actions do you do to stop drowsiness?

Question B16		Frequency	Valid %
Valid	Take power nap	5	3.8
	Open your window	10	7.6
	Turn up the radio	7	5.3
	Turn up the air conditioner	16	12.1
	Stop and walk around the truck	87	65.9
	Non mentioned	7	5.3
	Total	132	100.0

Another occupational hazard of being a long-distance truck driver is being hijacked or robbed when sleeping at truck stops or when they go away from their vehicle to buy food.

Almost a third, with 27.9% of the respondents' claim that they have been robbed (Table 3.36).

Table 3.36 Have you ever been robbed from your truck?

Question B17		Frequency	Valid %
Valid	Yes	39,00	27.9
	No	101,00	72.1
	Total	140,00	100.0

Analyzing Section B, it is significant to the study to emphasize the following:

- The Cronbach Alpha value (0.81) and mean value (2.62) on the construct of Job Satisfaction (B1 – B3), is evident that the respondents are not satisfied in their work.
- Respondents show, that 24.1% have been in an accident and 34.8% have had an injury on duty.
- The main contributors to the above regarding accidents are falling asleep while driving (33.9%), which is evident sign of fatigue.
- Fatigue, sleep apnoea, metabolic syndrome and other lifestyle risk factors from literature study are evident as a result of the following data:
  - Drivers' work between 11 – 16 hours per day (69.3%) and between 24 – 26 days and more per month (72.4%)
  - Drivers' drive from 13000 km to 19000km and more per month (70.7%), between 11 – 16hours per day (69.3%) and between 3 – 6 hours without stopping to rest (54.6%)
  - Drivers' only sleep between 3 – 5 hours per day (72.1%), while 50% of respondents' sleep between half an hour and an hour of total sleep during day time affecting the secretion of melatonin into their blood stream (2.6.4 – Chapter 2)
- The Cronbach Alpha value (0.68) and mean value (2.74) on the construct of Stress (B14.1 – B14.8), is evident that the respondents' are stressed
- This fact above is significant to the study. It is further evident that 74.7% of respondents' only spent 1 – 4 days at home per month. This is a stress

contributor due to the fact that according to driver profile, most of the respondents' are married with children and does not feel satisfied with their jobs.

3.3.3 Section C: Health issues:

The study's main objective is to analyze lifestyle risk factors of long-distance truck drivers. After analyzing the respondent's profiles and occupational factors in the above statistics, the following questions focused on the respondents' health and health factors.

Table 3.37 shows that 40.4% of the respondents smoke. Even though it is not 50%, 40.4% is still a large percentage.

Table 3.37 Do you smoke?

Question C1		Frequency	Valid %
Valid	Yes	57,00	40.4
	No	84,00	59.6
	Total	141,00	100.0

Snoring is a symptom of sleep apnoea, as evident from the literature study. From the completed questionnaires, 24.8% of the respondents snore. Taking the amount of days spend alone on the road, the changes are that some drivers will not know that they do snore (Table 3.38).

Table 3.38 Do you snore?

Question C2		Frequency	Valid %
Valid	Yes	34,00	24.8
	No	103,00	75.2
	Total	137,00	100.0

Alcohol use is a lifestyle factor and must be analyzed. 55.8% of respondents' claim that they do not consume alcohol at all and 44.2% admits that they do consume alcohol. 31.2% of total respondents only consume alcohol on weekends (Table 3.39).

Table 3.39 How regular do you consume alcohol?

Question C3		Frequency	Valid %
Valid	Never	77,00	55.8
	Everyday	3,00	2.2
	Once a week	13,00	9.4
	2- 3 times per week	2,00	1.4
	Weekends only	43,00	31.2
	Total	138,00	100.0

According to respondents in Table 3.39, more than half of the respondents' claim that they do not consume alcohol, in contrast, only 37 from 150 did not answer on the question that relates to the amount of alcohol they consume per occasion. 45.1% says that they only consume 1 drink per occasion. 5.3% consume 8 – 9 drinks per occasion and 7.1% consume all there is to consume, that is still alarmingly not good to hear (Table 3.40). Smoking and consuming of alcohol is bad for long-distance drivers and as evident from the literature study, these two habits, together with other health conditions add to the development of metabolic syndrome, which occurs in a lot of drivers (Section 2.8 Cardiovascular disease and Metabolic Syndrome).

Table 3.40 The amount of alcohol consumed per occasion?

Question C4		Frequency	Valid %
Valid	1	51,00	45.1
	2 – 3	20,00	17.7
	4 – 5	10,00	8.8
	6 – 7	11,00	9.7
	8 – 9	6,00	5.3
	Everything	8,00	7.1
	Other(Specify)	7,00	6.2
	Total	113,00	100.0

The following question tested the fact that most drivers as from the literature study use some sort of stimulant or more than one. Respondents had to make a choice on what stimulant they use, but was not limited to one choice. Most of them however just mark

one of the six choices. Coffee, 50.7% and energy drinks, 41.7% were by far the most used stimulants, but 4.2% was honest and confirmed that they use Dagga/Marijuana and - 0.7%, use Cocaine (Table 3.41).

Table 3.41 Which of these stimulants do you use?

Question C5		Frequency	Valid %
Valid	Coffee	73,00	50.7
	Energy Drinks	60,00	41.7
	Dagga	4,00	2.8
	Cocaine	1,00	0.7
	Marijuana	2,00	1.4
	Other(Specify)	4,00	2.8
	Total	144,00	100.0

The following question is the same format as the previous one, where respondents must choose one or more. This time it was on what physical and mental conditions they suffer from. The study shows, 40.6% have high blood pressure, 31.6% have Diabetes, 10.5% have Lower Backache, 6% suffer from Depression, 5,3% have low blood pressure and 6% suffer from another sort of condition (Table 3.42).

Table 3.42 Do you suffer from one or more of the following?

Question C6		Frequency	Valid %
Valid	High Blood pressure	54,00	40.6
	Diabetes	42,00	31.6
	Lower backache	14,00	10.5
	Depression	8,00	6.0
	Low blood pressure	7,00	5.3
	Other(Specify)	8,00	6.0
	Total	133,00	100.0

Using the five point Likert scale to measure how many respondents feel off-balance sometimes. Table 3.42 shows that 27.3% was not sure if they sometimes feel off-balance, but 31.4% do agree and strongly agree that they sometimes do feel off-balance

and 41.3% claims they never feel off-balance.

Table 3.43 Do you ever feel off-balance?

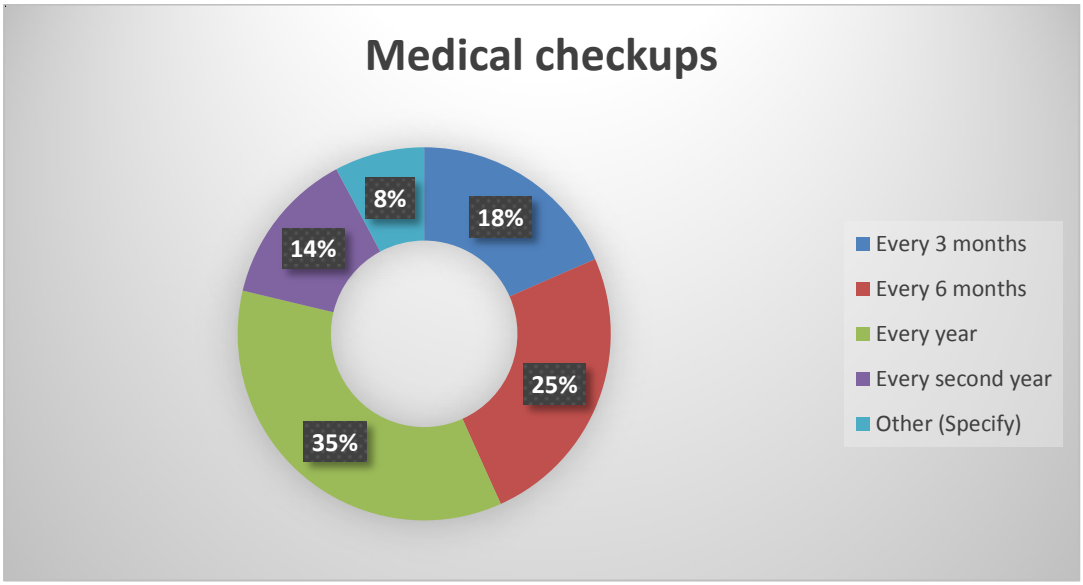
Question C7		Frequency	Valid %
Valid	Strongly agree	12,00	9.9
	Agree	26,00	21.5
	Not sure	33,00	27.3
	Disagree	20,00	16.5
	Strongly disagree	30,00	24.8
	Total	121,00	100.0

Medical checkups are very important for long-distance drivers and 35.5% of respondents go once a year for medical check, and 24.8% go every six months for medical check-ups.

Table 3.44 How often do you have a medical check?

Question C8		Frequency	Valid %
Valid	Every 3 months	26,00	18.4
	Every 6 months	35,00	24.8
	Every year	50,00	35.5
	Every second year	19,00	13.5
	Other (Specify)	11,00	7.8
	Total	141,00	100.0

Figure 3.6: Medical checks



The above chart graphically illustrates how often the respondents' go for medical checks. It is significant to the study to encourage drivers to go more regularly and the study recommends that all drivers must go for medical check at least once per year.

The following question although still relating to the respondents' health, focused on their rhythm in their work and their work stamina. Table 3.45 shows that 31.7% almost never and 42.4% almost always set their alarm clocks to wake up in the morning. Therefore there is a big percentage that wakes up by themself and have a form of a biological clock.

Table 3.45 Do you set your alarm clock to wake up?

Question C9		Frequency	Valid %
Valid	Almost never	44,00	31.7
	Seldom	20,00	14.4
	Often	16,00	11.5
	Almost always	59,00	42.4
	Total	139,00	100.0

Table 3.46 shows that 37.9% of respondents is not tired when they wake up and feel that they had sufficient sleep.

Table 3.46 Do you still feel tired when you wake up?

Question C10		Frequency	Valid %
Valid	Almost never	53,00	37.9
	Seldom	25,00	17.9
	Often	25,00	17.9
	Almost always	37,00	26.4
	Total	140,00	100.0

Table 3.47 shows 32.6% of respondents stop driving between 9pm and 11pm, 39% of respondents stop driving between 11 pm and 12 pm, with 71.6% of respondents stop driving between 9 pm and midnight (Table 3.47). Of the respondents 56.4% start driving between 4 am and 6 am, with 45.1% starting between 4 am and 5 am and 24.6% that starts between 5 am and 6am (Table 3.48). This correlates with Table 3.21 on the amount of hours the respondents sleep per day.

Table 3.47 Time stop driving?

Question C11		Frequency	Valid %
Valid	6pm – 8h59pm	11,00	7.8
	9pm – 10h59pm	46,00	32.6
	11 – 11h59pm	55,00	39.0
	00am – 01am	21,00	14.9
	Other (specify)	8,00	5.7
	Total	141,00	100.0

Table 3.48 Driving start time

Question C12		Frequency	Valid %
Valid	3am – 3h59am	27,00	19.0
	4am – 4h59am	64,00	45.1
	5am – 5h59am	35,00	24.6
	6am – 8am	16,00	11.3
	Total	142,00	100.0

It is significant to the study regarding the respondents' that:

- 40.4% of respondents' smoke
- Alcohol is consumed by 44.2% and 92.4% of respondents' use a form of stimulants
- Respondents' have the following health conditions, that correlates with the literature study, 40.6% have high blood pressure, 31.6% have diabetes, 10.5% suffer from lower backache and 6% of the respondents' suffer from depression
- Respondents' often go for medical checks, but 21.3% go fewer than once a year, that is still a problematic figure.

3.3.4 Section D: Sexual Behaviors:

With regards to this sensitive subject, there were only four questions asked. Although sensitive, this subject is very important to understand and to analyze this part of a long-distance driver's lifestyle.

Table 3.49 shows that 81.7% of the respondents know their HIV status. 32.8% of respondents have had intercourse with a sex-worker, with 22.6% having it while they were married and 10.2% while they were unmarried (Table 3.50). Figure 3.7 and Figure 3.8 graphically illustrates the 81.7% of respondents' that know their HIV status and 32.8% that confirmed that they have had sexual intercourse with sex-worker.

Table 3.49 Do you know your HIV status?

Question D1		Frequency	Valid %
Valid	Yes	116,00	81.7
	No	26,00	18.3
	Total	142,00	100.0

Figure 3.7: HIV Status

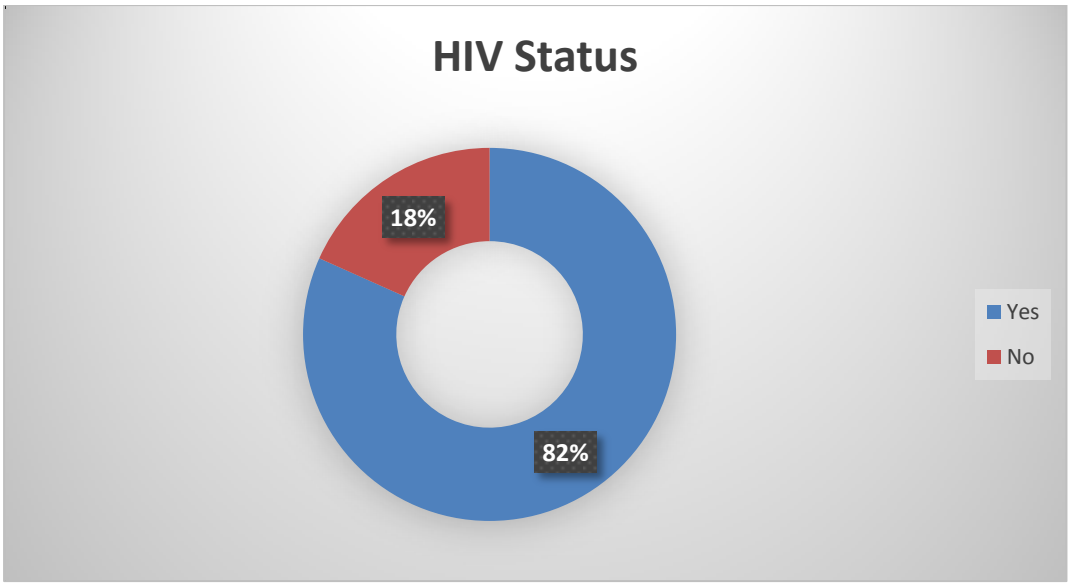


Table 3.50 Have you had intercourse with a sex-worker?

Question D2		Frequency	Valid %
Valid	Never	92,00	67.2
	While married	31,00	22.6
	While unmarried	14,00	10.2
	Total	137,00	100.0

Figure 3.8: Sexual intercourse with sex-worker

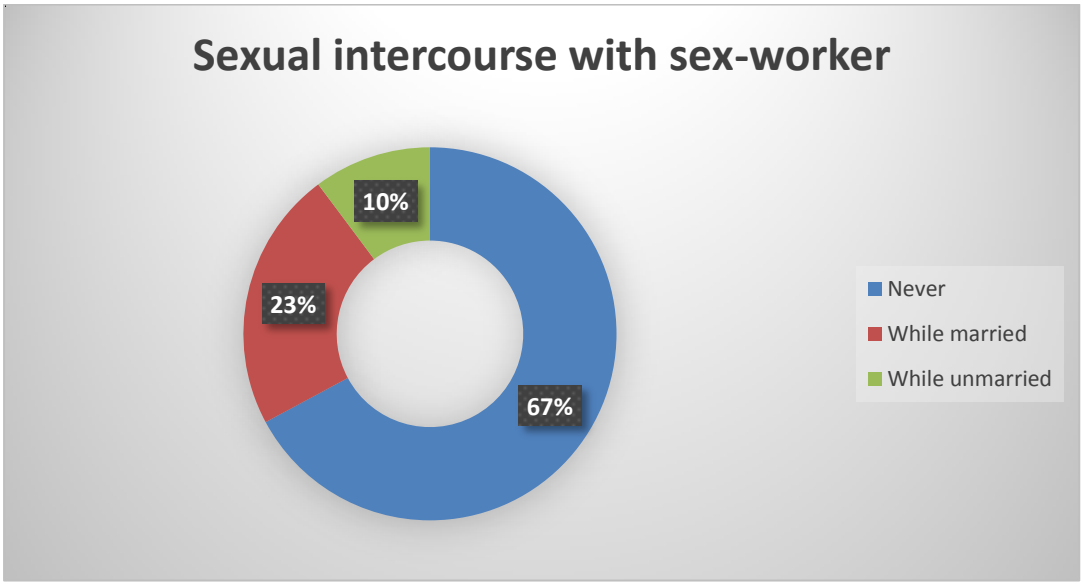


Table 3.51 shows that 38.8% of respondents used a condom when they had intercourse with sex-workers and 3.6% did not use a condom while they had intercourse with sex-worker.

Table 3.51 When you have intercourse with sex-worker?

Question D3		Frequency	Valid %
Valid	Never	80,00	57.6
	With a condom	54,00	38.8
	Without a condom	5,00	3.6
	Total	139,00	100.0

Figure 3.9: Use of a condom while with sex-worker

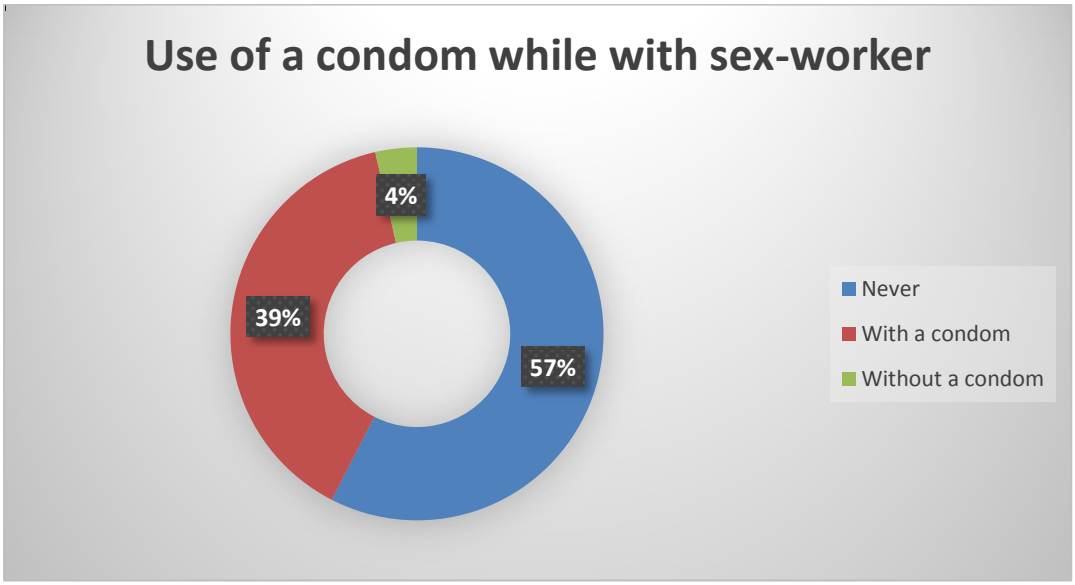
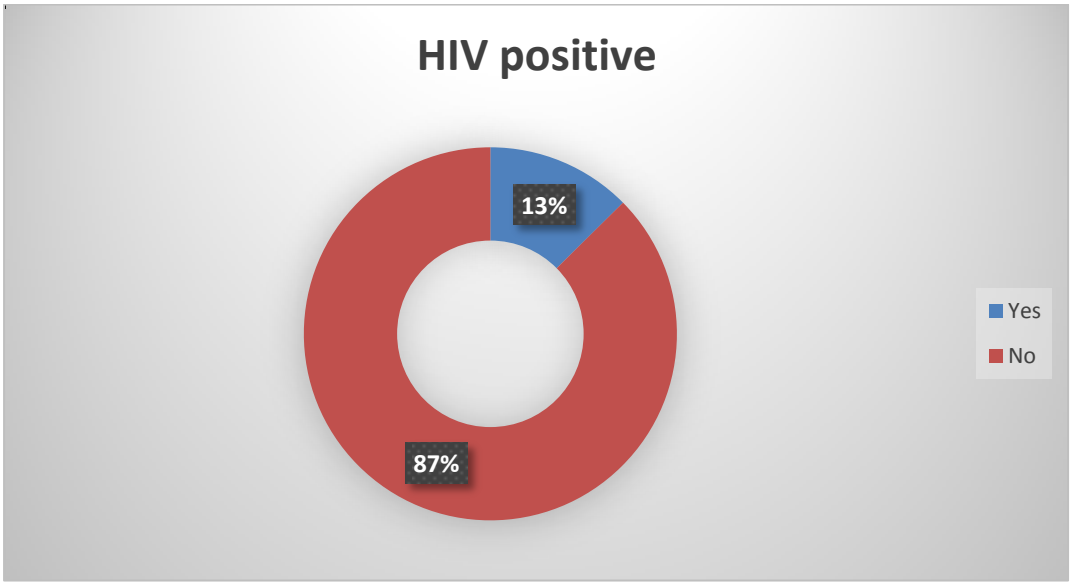


Table 3.52 shows that 12.6% of respondents have HIV and 87.4% is HIV-negative. This is graphically shown in Figure 3.10.

Table 3.52 Do you have HIV?

Question D4		Frequency	Valid %
Valid	Yes	18,00	12.6
	No	125,00	87.4
	Total	143,00	100.0

Figure 3.10: HIV positive



3.4 Reliability and Validity

3.4.1 Reliability

The reliability of a test refers to the consistency of scores obtained by the same person when they are re-examined with the same test on different occasions, or with a different set of equivalent items, or under other variable examining conditions (Anastasi & Urbina, 1997:84).

In this study Cronbach Alpha coefficients were calculated to determine internal consistency. In Table 3.53 the Cronbach Alpha coefficients are given, Job satisfaction (Combination of question B1 – B3) at 0.81 and Stress (Combination of question B14.1 – B14.8) at 0.68.

Table 3.53: Cronbach Alpha reliability test

Construct	Cronbach Alpha
Job Satisfaction (Combination of question B1 – B3)	0.81
Stress (Combination of question B14.1 – B14.8)	0.68

According to Field these two constructs are reliable, because the Cronbach Alpha values are above 0.6.

3.4.2 Validity

The validity of a test concerns what the test measures and how well it does so (Anastasi & Urbina 1997: 113). If valid it measures then what it is supposed to measure.

According to Table 3.54 the MSA for the construct Job Satisfaction confirmatory analysis was 0.81 which is acceptable. The MSA for stress (which is 0.68) is also acceptable (Hair *et al.,* 1998). Furthermore both of the variances explained were above 50%.

Table 3.54: Confirmatory factor analysis

Construct	Number of factors	MSA	% Variation	Communalities
Stress	3	0.66	62.7	0.55 – 0.75
Job Satisfaction	1	0.64	72.4	0.54 – 0.83

To determine whether a factor analysis may be appropriate, Kaiser's measure of sample adequacy (MSA), which gives an indication of the inter correlations among variables, should be computed (Tabachnick & Fidell, 2001). This index ranges from 0 to 1, reaching 1 when each variable is perfectly predicted by the other variables.

Table 3.55: Guidelines to measure and interpreted Reliability and Validity

The measure can be interpreted with the following guidelines:
≥0.80: meritorious
0.70: middling
0.60: mediocre
0 50: miserable
< 0.50: unacceptable (Hair *et al.*, 1998).

In the case of Stress, 3 factors were retained, but as a result of the fact that the Cronbach Alpha value for stress was above 0.6, the decision was made to form just one stress construct.

Table 3.56 shows the mean of the two constructs. Job satisfaction was measured on a 4-point Likert scale. A 4-point Likert scale average is 2. A mean below 2 shows that the respondents do have job satisfaction and a mean above 2 means that the respondents do not have job satisfaction. The mean of the construct job satisfaction was measured at 2.62, which is evident that the respondent drivers do not have job satisfaction.

A 5 point Likert scale's average is 3, and the construct stress was measured with a 5 point Likert scale, thus if the mean of the construct stress is lesser than 3, it shows that the respondents have stress and if the mean is above 3, it shows that the respondents does not have stress.

Table 3.56: Means of the two constructs

Construct	Number of respondents	Mean	Standard Deviation
Job Satisfaction	145	2.62	0.84
Stress	145	2.74	0.77

Table 3.56 shows that the construct stress' mean was 2.74, which is below 3, thus the respondents' show that they have stress.

3.5 Summary

Although the study is not representative of the general South African long-distance truck driver, it certainly gives indications of important trends. These trends are evident in the literature study as well and correspond very well with trends in the empirical study.

Chapter 4
Conclusion and Recommendations

4.1 Introduction

During the research study it was evident that road transport plays a highly significant part in the South African economy. There has been a significant increase in road transport over the last few years, with the main reason being the deterioration of the rail infrastructure in South Africa. As evident from the study, one of the core ingredients for road transport is the driver. This research specifically focused on long-distance truck drivers and the risk factors that accompany their lifestyles on the road. With the increase in road transport and South Africa being a developing country, chances are that road transport will play an even more significant role in the future and long-distance truck driving as occupation will become more popular. Taking the above into consideration, the importance of the study can add value to long-distance truck drivers and companies in the transport industry.

4.2 Main findings from the study

According to Mr TM Terblanche, Managing Director of Grain Carriers, the old transporters of South Africa did not give enough attention to driver training and development of the occupation, professional driver. According to Terblanche "*after all, transport is 80% easier with a fully trained and educated driver behind the wheel"* (Terblanche, 2014).

4.2.1 Section A: Driver profile

Important and significant to the study was to retrieve a profile of what a typical long-distance driver looks like, using data collected from respondents. The average long-distance driver is a South African born black African male, married with children. The

driver is between 1.6m and 1.8m tall and weigh between 60kg and 90kg. The driver age between 25 and 55 years old with between 5 and 19 years of experience as a long-distance truck driver, who always wanted to be a truck driver and exercise once a week. Most of the respondents do not have Matric (Grade 12).

Thus, the average long distance driver has not a formal certificate to show. This is significant to the study and enhances the fact that drivers' need more formal training and education on healthy living.

4.2.2 Section B: Occupational conditions and hazards

Correlation between the literature study and empirical study shows that drivers work excessive hours and days without enough rest and sleep. It is therefore evident that drivers easily suffer from fatigue and develop obesity leading to sleep apnoea (as from literature study). This can cause drivers to feel drowsy and fall asleep behind the wheel. This is significant to the study due to the fact that the highest percentage (33.9%) of factors causing an accident is falling asleep behind the wheel of the truck.

It is important to show from the empirical study that drivers drive numerous hours without stopping and thousands of kilometers per month and therefore remain in a seated position for an extent time duration. From the literature study it is evident that they may develop cardiovascular problems, because of not sufficient blood circulation. It is further evident that sitting for long periods at a time, the drivers' body is at risk for whole body vibration that can also cause cardiovascular problem and musculoskeletal problems.

Mentioning the time a driver spends on the road, they are unable to prepare or buy healthy meals. Quick food and takeaways are much more convenient, but from the literature study it shows that this creates health problems for drivers in the longer run.

Providing evidence is the statistics from the empirical study, that shows that 40% of respondents suffer from high blood pressure and 31% suffer from diabetes. The average of the respondents' have a higher BMI, which shows signs of obesity that increases chances of developing, high blood pressure, diabetes and all other factors of the metabolic syndrome.

Drivers' answers showed in Table 3.53 a Cronbach Alpha value of above 0.81 on the construct Job Satisfaction, occurred, which confirm that the majority of the respondents do not have job satisfaction. The other construct, stress, confirms with a Cronbach Alpha value of 0.68 that drivers' have stress.

Thus, the average long-distance truck driver have stress, does not feel job satisfaction, eat unhealthy, must endure endless working hours and tremendous kilometers behind the wheel of the truck. These occupational conditions or aspects develop a certain lifestyle for drivers and the lifestyle, brings risk and hazardous factors for the driver as mentioned above.

4.2.3 Section C: Health of drivers

Stimulants have their own harmful effects, and all the respondents make use of some form of stimulant, from caffeine in coffee and energy drinks to even dagga/marijuana. It is evident from literature study that drivers' using stimulants increase heart rate and blood pressure. Thus, stimulants are especially bad for drivers' with high blood pressure or that have any form of heart disease or chronic illness.

Significant to the study and correlates to literature study is the fact that most of respondents' as has got some form of illness or disease. As mentioned in Chapter 3, 40.6% of respondents have high blood pressure, 31.6% suffer from diabetes, 10.5% have got lower backache and 6% suffer from depression. It is thus evident that most of

the respondents' have some form of disease that correlates with other studies done and mentioned in literature study, that indicates that these diseases or illnesses is part of long-distance truck drivers' lifestyles and is the result of their lifestyles.

A few of the respondents acknowledge that they do suffer from depression, but it is evident from the literature study, that more often long distance truck drivers suffer from depression but do not even know it. This can be seen in Figure 3.5, which shows the high level of stress that most of the respondents feel. The construct: stress showed a mean of below 3, thus most of the drivers experience stress. The highest stress indicator was the drivers' salary. This correlates to the profile of the average long-distance truck driver, who is married and have children, therefor salary is important to provide for family.

4.2.4 Section D: Sexual behaviours of drivers

A worrying factor is the driver's sexual behaviours. Respondents confirming that they have had intercourse with a sex-worker amounted to 33%, while 12% of respondents confirm that they have HIV. Drivers spend between 1 – 4 days at home per month due to their occupational obligation. Loneliness is part of their everyday emotional feelings and may contribute to drivers' resorting to sex-workers on the roads.

On the positive side: The fact that 81% of respondents know their HIV status is a sign that the effort to grow awareness helped and is working.

Another positive is the fact that the biggest percentage of respondent drivers always wanted to be a truck drive.

4.3 Evaluation of the study:

4.3.1 Primary Objective:

The primary objective of this study was to analyze long-distance driver's lifestyles in South Africa. The literature study, although most research was based on studies done in the USA, set a proper foundation to perform the empirical research. Although literature was from all over the world, there were many similarities found, through the empirical research that was South African based. A full analysis was done through both the literature and empirical research. Reading the research and considering the above, the primary objective has been met.

4.3.2 Secondary Objectives:

The following secondary objectives were set:

- To profile the typical driver in this industry.
- To identify physical and psychological health risk factors within long distance truck driver's lifestyles.
- To analyse how these lifestyle risk factors affect long distance truck driver's physical and psychological health.

From both the literature and empirical research, these above set objectives were met. Key findings were presented and a correlation between the literature and empirical study could easily be confirmed.

The typical driver profile has been drawn in the study and most psychological and physical health risk factors have been identified in literature and tested in the empirical study. The identification was not only met, but it was also analyzed and discussed.

4.3 Recommendations

The purpose of this mini-dissertation was to identify daily factors that influence the physical and mental health of long-distance truck drivers, therefore recommendations will be made on the discussed issues.

When investigating the daily routine of drivers it is imperative to take into account the attitude and knowledge of the management and operation management of the companies they drive for. They will form an integral part of the change that needs to happen to better the circumstances that are detrimental to the physical and mental health of long-distance truck drivers.

- Operations managers/fleet operators need to adhere to the set maximum allowed driving hours as set out in the Government Gazette Amendment Draft of 8 June 2012, 35413. This will have an effect on their scheduling and deadlines to deliver goods. This effective date will only be implemented from 2015.
- Companies should refrain from incentive bonuses on overtime driven. The empirical study done for this dissertation shows that 70.8% of drivers are not happy with their salaries. Incentive bonuses will only motivate them to drive longer hours.
- Companies should implement policies that require the drivers to have a yearly routine medical examination by a medical practitioner. Should there be any pre-existing medical conditions a 6 monthly review should be implemented. At this stage legislation forces drivers only to have a medical when applying for the Public Driving Permit. This is required every second year.
- Quarterly information days should be held on the premises of the companies. These information days should cover health and emotional aspects for example, signs and symptoms of diseases, the importance of diet changes, exercise, enough rest and HIV. The company can invest in obtaining the temporary

services of a qualified occupational health sister to visit the information day and assist with any questions or refer drivers to a medical practitioner.

- Above named information days can also be used by the occupational health sister to educate drivers about sexually transmitted diseases, HIV/AIDS, do voluntary counselling and testing and discuss the use of anti-retroviral treatment and its side-effects.
- Companies should implement strict policies regarding testing for substances and alcohol.
- Operators/fleet controllers must learn to respect the driver as important individual, that are responsible for equipment cost millions.
- Operators/fleet controllers must learn to understand and earn the drivers' trust, this will eliminate conflict and the driver will feel that he/she is supported in another way.
- Mentioning the two previous statements, it is also significantly important that there must be a clear set of rule and regulations, regarding drivers' and his operator actions.

Government should also appreciate the impact that long distance trucks have on our roads. Therefore they also need to assist in the reduction of any hazards that long-distance trucks/ an unhealthy driver, may hold to the general public while driving on our roads.

- Public driving permits are by law, only required to be renewed every two years. Legislature should be implemented to have drivers undergo yearly routine medical examinations by a qualified medical practitioner.
- The National Road Traffic Act (93 of 1996) was last reviewed in 1996. This needs to be reviewed, amendments made and new legislature reinforced.

In general, companies using road transport must get better understanding of what transport is all about. Letting drivers' wait in cue's to load or off-load, because of ineffective planning play a huge part in drivers' lives.

Although the drivers' did not mention this as a big stressor, it has other complications. If drivers' are held up for too long their operators push them to off-load or the driver pushes himself to reach destination to have off-weekend for example.

4.4 Conclusion:

The general public needs to be made more aware how to "share the road with long distance trucks" and have more patience when driving behind or beside them. They need to take into account the time a loaded truck needs to break and cannot move in, into a truck's lane at an intersection. They also need to take into consideration the space a truck needs when turning at an intersection especially with a link.

Individual drivers need to take responsibility for their physical and mental well-being. Even if all these recommendations can be met, certain lifestyle choices still need to be made by a long-distance driver. Providing them with more information and opportunities to make better choices can only lead to the betterment of their physical and mental health.

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Annexure A: WHO Clinical Staging of HIV/AIDS for Adults & Adolescents

Primary HIV Infection
• Asymptomatic • Acute retroviral syndrome
Clinical Stage 1
• Asymptomatic • Persistent generalized lymphadenopathy
Clinical Stage 2
• Moderate unexplained weight loss (<10% of presumed or measured body weight) • Recurrent respiratory infections (sinusitis, tonsillitis, otitis media and pharyngitis) • Herpes zoster • Angular cheilitis • Recurrent oral ulceration • Papular pruritic eruptions • Seborrheic dermatitis • Fungal nail infections
Clinical Stage 3
• Unexplained severe weight (>10% of presumed or measured body weight) • Unexplained chronic diarrhoea for >1 month • Unexplained persistent fever for >1 month (37.6°C, intermittent or constant) • Persistent oral candidiasis (thrush) • Oral hairy leukoplakia • Pulmonary tuberculosis (current) • Severe presumed bacterial infections (e.g., pneumonia, empyema, pyomyositis, bone or joint infection, meningitis, bacteremia) • Acute necrotizing ulcerative stomatitis, gingivitis, or periodontitis • Unexplained anemia (haemoglobin <8g/dL) • Neutropenia (neutrophils <500 cells/µL) • Chronic thrombocytopenia (platelets<50,000 cells/µL)
Clinical Stage 4
• HIV wasting syndrome, as defined by the CDC • *Pneumocystis* pneumonia • Recurrent severe bacterial pneumonia • Chronic herpes simplex infection (orolabial, genital, or anorectal site for >1 month or visceral herpes at any site) • Esophageal candidiasis (or candidiasis of trachea, bronchi, or lungs) • Extrapulmonary tuberculosis • Kaposi sarcoma • Cytomegalovirus infection (retinitis or infection of other organs) • Central nervous system toxoplasmosis. • HIV encephalopathy • Cryptococcosis, extrapulmanary (including meningitis)

- Disseminated nontuberculosis mycobacteria infection
- Progressive multifocal leukoencephalopathy
- Candida of the trachea, bronchi, or lungs
- Chronic cryptosporidiosis (with diarrhea)
- Chronic isosporiasis
- Disseminated mycosis (e.g., histoplasmosis, coccidioidomycosis, penicilliosis)
- Recurrent nontyphoidal *Salmonella* bacteremia
- Lymphoma (cerebral or B-cell non-Hodgkin)
- Invasive cervical carcinoma
- Atypical disseminated leishmaniasis
- Symptomatic HIV-associated nephropathy
- Symptomatic HIV-associated cardiomyopathy
- Reactivation of Amerian trypanosomiasis (meningoencephalitis or myocarditis)

Annexure B - Research Questionaire:

This questionaire will take only few minutes to complete. The aim is to analyse lifestyle risk factors that affect long distance truck drivers everyday. Please answer the questionaire honestly. Your confidentiality is guaranteed and you will stay anonymous. We appreciate your co-operation and we hope that this study will add value to long distance truck drivers lives.

Section A – Biographic profile:

1. Gender? a) Male b)Female

a	b

2. Race Group? **a) White b)African c)Indian d) Coloured**

a	b	c	d

3. Country of birth?

South Africa	Zimbabwe	Namibia	Mozabique	Other (Specify)

4. Marritial Status?

Married	Unmarried	Single	Partner

5. Age?

Under 25	25 – 35	36 – 45	46 – 55	56 - 65

6. Years experience as truck driver?

1 - 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 - 34

7. Highest level of education?

Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12(Matric)	Other(specify)

8. How many Children do you have? **a) 1 b) 2 c) 3 d) 4**

a	b	c	d

9. What is your length?

Under 1.5m	1.5m – 1.6m	1.6m – 1.7m	1.7m – 1.8m	1.8m – 1.9m	1.9m – 2.0m

10. What is your weight?

Under 60kg	60kg – 70kg	70kg – 80kg	80kg – 90kg	90kg – 100kg	100kg – 110kg	110kg – 120kg	120kg – 130kg	130kg – 140kg	Other(specify)

11. Time you exercise per week? **a) once b) twice c) 3 times d) more than 3 times**

a	b	c	d

****Choose your response on the following scale: 1 – Strongly agree, 2 – Agree, 3 – Disagree, 4 – Strongly Disagree**

12. Have always wanted to be a truck driver?

1	2	3	4

Section B - Occupation

****Choose your response on the following scale: 1 – Strongly agree, 2 – Agree, 3 – Disagree, 4 – Strongly Disagree**

B1. Are you happy in your work?

1	2	3	4

B2. Does your employer treat you well?

1	2	3	4

B3. Are you happy with your salary?

1	2	3	4

B4. Have you ever been in a accident?

Yes	No

B5. What was the cause of the accident?

Fell a sleep	The road condition	The condition of the vehicle	Another party

B6. How many hours are you driving per day?

6 - 7 hours	8 – 10 hours	11 – 12 hours	13 – 14 hours	15 – 16 hours

B7. Time of driving without stopping?

2 – 3 hours	3 - 4 hours	4 – 5 hours	5 – 6 hours	6 – 7 hours	7 – 8 hours	8 – 9 hours	10 and more

B8. Days working per month?

21 days	22 days	23 days	24 days	25 days	26 days	More than26

B9. Hours sleep per day?

3 hours	4 hours	5 hours	6 hours	7 hours

B10. Amount of hours sleep during day time of total hours sleep?

½ hour	1 hour	1,5 hours	2 hours	2,5 hours	3 hours

B11. Days spend at home per month?

1 day	2 days	3 days	4 days	5 days	6 days	7 days	8 days

B12. How many km do you drive per month?

5000 – 7000	7001 – 9000	9001 – 11000	11001 – 13000	13001 – 15000	15001 – 17000	17001 – 19000	More than 19000

B13. Have you had an injury on duty?

Never	Fell of Trailer	Fell when getting out of truck	Other (specify)

B14. What of the following factors give you stress?

****Choose your response on the following scale: 1 – Strongly agree, 2 – Agree, 3 – Not sure,**

4 – Disagree, 5 – Strongly disagree

14.1 The inside and lay-out of the truck give me stress?

1	2	3	4	5

14.2 Other road users give me stress?

1	2	3	4	5

14.2 The hours that I drive give stress?

1	2	3	4	5

14.3 The way my manager/operator treat me gives me stress?

1	2	3	4	5

14.4 My family life give me stress?

1	2	3	4	5

14.6 The boring long road give me stress?

1	2	3	4	5

14.7 The loading and off-loading give me stress?

1	2	3	4	5

14.8 My salary give me stress?

1	2	3	4	5

B15. How often do you feel drowsy while driving?

Almost never	Seldom	Often	Almost always

B16. When feeling drowsy, which of the following actions do you do to stop drowsyness?

Take power nap	Open your window	Turn up the radio	Turn up the airconditioner	Stop and walk around the truck	Non mentioned

B17. Have you ever been robbed from your truck?

Yes	No

Section C – Health

C1. Do you smoke?

Yes	No

C2. Do you snore?

Yes	No

C3 .How regular do you consume alcohol?

Never	Everyday	Once a week	2- 3 times per week	Weekends only?

C4. Amount of alcohol cumsumed per occassion? **(1 = 1 beer or 1 glass of wine or 1 brandy/whiskey with mix)**

1	2 – 3	4 - 5	6 – 7	8 – 9	Everything	Other (specify)

C5. Which of these do you use – name all that are applicable?

Caffiene(Coffee)	Energy drinks	Dagga	Cocaine	Marijuana	Other (specify)

C6. Do you suffer from one or more of the following?

High Blood pressure	Diabetes	Lower backache	Depression	Low blood pressure	Other(Specify)

C7. Do you ever feel off-balance?

****Choose your response on the following scale: 1 – Strongly agree, 2 – Agree, 3 – Not sure, 4 – Disagree, 5 – Strongly disagree**

1	2	3	4	5

C8. How often do have a medical check?

Every 3 months	Every 6 months	Every year	Every second year	Other (Specify)

C9. Do you set an alarm clock to wake up?

Almost never	Seldom	Often	Almost always

C10. Do you still feel tired when you wake up?

Almost never	Seldom	Often	Almost always

C11. What time do you normally stop driving?

6pm – 8h59pm	9pm – 10h59pm	11 – 11h59pm	00am – 01am	Other (specify)

C12. What time do you normally start driving?

3am – 3h59am	4am – 4h59am	5am – 5h59am	6am – 8am	Other (specify)

Section D: Sexual Activities

D1. Do you know your HIV status?

Yes	No

D2. Choose one or more of the choices. Have you had intercoarse with a sexworker?

Never	While Married	While unmarried

D3. When having intercoarse with sexworker?

Never	With a condom	Without a condom

D4. Do you have HIV?

Yes	No

Section E: General

E1. What is the single most important factor contributing negatively to you as a driver?_____

E2. What is the single most important factor contributing positively to you as a driver?_____

E3. Do you have any sughestions to improve your lifestyle a long distance truck driver?_____

******Thank You******

Annexure C: Letter from language editor

November 24, 2014

TO WHOM IT MAY CONCERN

Re: Letter of confirmation of language editing

The dissertation **"An analysis of the lifestyle risk factors for long-distance truck drivers"** by **BK von Wielligh (23868287)** was language, technically and typographically edited. The sources and referencing technique applied was checked to comply with the specific Harvard technique as per North-West University prescriptions. Final corrections as suggested remain the responsibility of the student.

Antoinette Bisschoff
Officially approved language editor of the NWU since 1998
Member of SA Translators Institute (no. 100181)