



**AN INVESTIGATION OF SLEEP QUALITY, MENTAL HEALTH AND  
JOB SATISFACTION AMONG SHIFT WORKERS IN THE SOUTH  
AFRICAN LOGISTICS INDUSTRY**

By

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## Declaration

I, Thuraiyaa Patel, certify that this dissertation titled “**An investigation of sleep quality, mental health and job satisfaction among shift workers in the South African logistics industry**”, is my own work. I have acknowledged all sources, references, citations and borrowed ideas. Any help and assistance I have received in my research work and the preparation of this dissertation has been appropriately acknowledged.

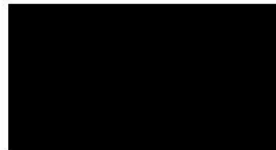


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## **Abstract**

South Africa hosts an immense human population - one that requires goods and service provision on a vast scale and a rapid timeline. Swift goods and service delivery necessitates an expansive logistics industry which operates on a 24/7 timeline. The employees who drive the logistics industry, known as shift workers, are responsible for ensuring that the local and global supply chains are well-oiled and constantly moving. However, the impact of the act of working in shifts denotes that these employees work odd hours, during the night, at different times every day and rest at abnormal hours of the day. Shift workers are known to experience unusual hours of work which can have implications on their physical health. For example, these could be irregular sleeping patterns and unhealthy lifestyles, and simultaneous disruption of their personal lives. The physical impact of shift work often has an unpleasant effect on the mental and emotional health of such employees, further impacting the feelings that a shift worker has toward the job. This study aimed to investigate sleep quality, mental health and job satisfaction of such shift workers in the South African logistics industry, such that a greater understanding can be obtained about the health of such employees in a relatively underexplored realm of South African research. This investigation additionally unearths the relationships between the constructs of sleep quality, mental health and job satisfaction and distinguishes if sleep quality is a mediator between the constructs of mental health and job satisfaction in shift workers.

This study followed a quantitative research design, utilising the theoretical frameworks of the Herzberg Two-Factor Analysis, Broaden and Build theory of Positive Emotions and Spielman's Three-Factor Model. The construct of sleep quality was measured through the Pittsburgh Sleep Quality Index, the construct of mental health was measured through the General Health Questionnaire -12 and the construct of job satisfaction was measured through

the Minnesota Satisfaction Questionnaire – with the biographical data obtained from a biographical questionnaire. A sample of 102 (N=102) was utilised for this study and was obtained from a national South African logistics company. Results of the study indicate that the levels of sleep quality and mental health of these shift workers were poor, whilst the level of job satisfaction experienced was on the positive and more inclined to good levels of job satisfaction. Additionally, the results of the study indicate that relationships between all three constructs are present and that sleep quality is a mediator of mental health and job satisfaction of such shift workers. A secondary test known as Sobel’s Test, was conducted to confirm that sleep quality is a mediator between mental health and job satisfaction. Limitations presented throughout the study related to the data collection process with physical pen-and-paper questionnaires, the time frame to collect data and the additional external challenge of navigating research during the COVID-19 pandemic.

*Keywords: sleep quality; mental health; job satisfaction; logistics industry; shift work; South African shift workers.*

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## **Chapter 1: Introduction and Background to the study**

This chapter covers an introduction and background to this investigation, as well as the research questions, objectives and an outline of each chapter of this study.

### **1.1. Background**

The 21st century is characterized by a smaller world in which a consumerist culture prevails, due to enhancements in technology and a rapidly growing human population. To cope with these changes, a logical shift toward economic globalisation has produced a network of supply chains that operate on a constant spectrum between manufacturer and consumer (Vidrova, 2020). The premise of these networks, globally and locally, relies on the logistics function of harmonising and coordinating the components in the supply chain ecosystem, to provide effective and efficient goods and service delivery (Prokhorova et al., 2016). Therefore, logistics providers serve as a systemic support function for the transportation, storage and movement of goods in ensuring the continuity of the supply chain (Havenga, 2018). South Africa, being a country rich in natural resources and host to a large population, is a contributor to the grand network of supply chains globally.

South Africa is the midpoint between countries in the Far East and West and comprises of eight natural ports, placing it at a strategic sea trade vantage (Meyiwa & Chasomeris, 2016). In 2020, however, South Africa closed two of its ports to passenger and crew traffic, whilst all ports remained open to imports and exports (Oyenuga, 2021). Port and sea trade play a vital role as a supply chain link between a country's local economy and the global economy (Meyiwa & Chasomeris, 2016). In addition, a substantial movement of goods and raw materials from the port to required destinations occurs via road transport. The South African industrial hub, where a large portion of the economy engages in trade, assembles away from the ports in the Gauteng province (De Villiers, 2017), thereby extending the supply chain inland. Furthermore,

important freight corridors exist between Gauteng and Durban, and between Gauteng and Cape Town which are instrumental in the local and global supply chain (Havenga, 2018). Essentially, the role of logistics is to purvey goods from the source to the consumer in a cost-effective manner, thereby functioning as the ‘middleman’ and pathway component of the supply chain.

The importance of the logistics industry in South Africa is emphasised by the 12% contribution to the country's gross domestic product and the wide availability of third-party logistics providers (Mvubu & Naude, 2020). Furthermore, as of the 2018 World Bank’s Logistics Performance Index, South Africa ranks 33rd out of 160 countries and within the top ten top-performing middle-income countries (Ittmann, 2018). However, there have been changes to production and supply chains since the COVID-19 pandemic and subsequent local and global lockdowns. Supply chains underpinned by maritime freight were affected before and during the pandemic. The economic and financial difficulties that existed in South Africa before the pandemic, along with the reduction in ship carrying capacity, port fees and funding, contributed to the reduction in trade volumes and decreased GDP (Grater & Chasomeris, 2022). Thus, the logistics industry is viewed as an enabler of development and progression, particularly in a country such as South Africa (Ittmann, 2018). Additionally, human resources make up a large component of the logistics industry responsible for the operation of heavy machinery, transportation of raw materials, warehousing and maintenance, all of which occurs on a continuous cycle of operation (Cirulis & Ginters, 2013).

In order to accommodate the continuous operation that enables the seamless working of the supply chain, the use of the human component in the logistics industry, is adjusted accordingly. Thus, in the logistics environment where transportation and warehousing are operational 24/7, shift work is inevitable (Banks et al., 2019). The psychological and physiological effect of shift

workers is a growing field of investigation, as sleep and fatigue is a vital component of shift work (Banks et al., 2019). Fatigue has become a common complaint amongst shift workers and its association between the requirements of a job and its impact on the health of workers has become a greater focus within the changing nature of work globally (Živčicová, 2018). Shift work has resulted in known mental illnesses such as insomnia and has been a contributor to physical illnesses such as cardiovascular disease and diabetes (Živčicová, 2018). Furthermore, the COVID-19 pandemic caused changes to various job types, where remote work became prevalent (Gigauri, 2020). This change was also experienced by frontline shift workers employed in security, logistics and healthcare who were under immense pressure and overworked during this period. The pandemic demanded that shift workers put in long hours for safety and health, whilst conversely affecting the levels of alertness and stress in these employees (Majumdar et al., 2020).

More concerted efforts are being made to promote a healthy workforce, by offering support to employees and protecting and enhancing the workspace for a more conducive working environment (Goetzel et al., 2018). In addition, the global trend of wellbeing and happiness in the work environment has prompted an investigation into the job satisfaction of employees in different sectors. The relationship between wellbeing and job satisfaction has been emphasised by the change in the context of work such as different hours of work, different environments and automation of tasks (Faragher et al., 2013). Recently, due to the stress and imbalanced work life many individuals endured, attention was drawn to the effects of work and the pandemic on mental health (Gigauri, 2020).

This investigation contributes to the limited existence of knowledge on South African shift workers' physical and mental health. The global shift toward the promotion of good mental

health in every facet of life, is expanding significantly to the work environment where the majority of human life is spent. Furthermore, the investigation of sleep quality, mental health and job satisfaction experienced by shift workers in such pressurised and time-constrained environments, is necessary to gain insight into the type of lives people lead outside of the traditional norms in society, and how they experience work and mental health. This quantitative study will empirically examine the role of sleep quality, mental health and job satisfaction in the lives of shift workers. A South African logistics company called FPT which operates in the land, sea freight, movement of goods and raw materials and warehousing, is the location of the study.

FPT is a logistics company operating along the coast of South Africa in Durban, Gqeberha and Cape Town. The company specialises in landside and port logistics services inclusive of coordination of cargo by handling, dispatch, coal chain and weighing of cargo. Due to the continuous service of break bulk, cold chain and dispatch, the organisation offers 24/7 operations.

## **1.2. Aim**

This study aims to investigate the sleep quality, mental health and job satisfaction of shift workers in the logistics industry in South Africa.

## **1.3. Objectives**

To measure the levels of sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry.

To investigate the relationship between sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry.

To determine if sleep quality mediates the relationship between mental health and job satisfaction amongst shift workers in the logistics industry.

#### **1.4. Research Questions**

What are the levels of sleep quality, mental health and job satisfaction amongst shift workers at a logistics company?

What is the relationship between sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry?

Does sleep quality mediate the relationship between mental health and job satisfaction amongst shift workers in the logistics industry?

#### **1.5. Problem Statement**

A 2015 National Sleep Foundation study recommended 7 to 9 hours of sleep for young and older adults, whilst emphasising the importance of sleep health for good physical and emotional health (Hirshkowitz et al., 2015). Short sleep of six hours or less has been associated with negative health outcomes such as obesity, diabetes mellitus and cardiovascular diseases (Itani et al., 2017). However, sleep health consists of multiple components in addition to sleep duration, such as sleep timing, sleep depth and sleep quality. More recently, due to the profound impact of the COVID-19 pandemic, attention has been drawn to sleep health and the complex problems associated with sleeping patterns and sleep disturbances (Alfonsi et al., 2022).

Furthermore, awareness of frontline work and work which contributed to keeping the economy and world operating during the pandemic, was created.

Occupations that require shift work operate 24/7 and consist of employees who experience short sleep and disturbed sleep, as the body functions against the natural sleep-wake pattern (Banks et al., 2019). Occupational requirements of shift work negatively affect the sleep health of employees and causes fatigue, safety risks and a decrease in performance (Banks et al., 2019). Furthermore, shift and night work, in particular, can adversely affect the cognitive efficiency of workers in reaction times, vigilance and concentration (Leso et al., 2021). In recent years, the study of sleep in shift workers has changed from establishing the impact of shift work on sleep, to the causative functions that impact poor sleep amongst shift workers (Shriane et al., 2020). However, this change has been in a global context, whilst in the local South African context few studies have addressed the concerns of the influence of shift work on the sleep health of shift workers. Furthermore, despite the existence of numerous sleep clinics, few studies have investigated and produced evidence of the sleep habits of South Africans and Africans (Gómez-Olivé et al., 2018) – much less sleep in South African shift workers.

The altered sleep patterns associated with shift work can affect the mental health of individuals (Zimberg et al., 2012). Work and workplaces that promote the good mental health of their employees are more likely to reduce absenteeism and increase the productivity of employees (de Oliveira et al., 2022). However, shift work, being an irregular form of work, has been associated with mental health disorders such as insomnia, depression, anxiety and burnout (Zhao et al., 2019). It has been indicated that the disruption of the body's circadian rhythm can lead to abnormal stress and the eventual erosion of mental health (James et al., 2017). However,

the reduction in mental health of shift workers is not homogeneous and consistent (Behrens et al., 2021).

Additionally, the psychological and psychosocial health of shift workers has been explored, but the level of statistical significance has not been attained to be able to formally draw conclusions (Behrens et al., 2021). In the general labour sphere, the growing number of work-related mental health problems is on the rise (Lecours et al., 2022). This has increased and presented greater difficulty during the COVID-19 pandemic, with an impact on the psychological resources and resilience of individuals (Giorgi et al., 2020). The empirical evidence for strengthening and measuring good mental health is sparse, whilst the pandemic shed light on mental health issues in South Africa, such as the current mental health gap and the constrained access to mental health services (Nguse & Wassenaar, 2021). Therein lies a segment of the importance of this study – the necessity of knowledge on how South African employees in a vital industry are experiencing sleep as a crucial component of physical health, and promoting a baseline familiarity and engagement with the mental health of such employees.

Sleep and mental health are both components of a holistic life, as is the way that people experience work. According to the Gallup statistics, 47% of the world's working population is disengaged at work, while 15% are happy and productive at work (Montuori et al., 2022). The construct of job satisfaction has become institutionalized in the world of work, but the concept remains subjective and a relative aspect to each individual or company, which presents a problem with regard to the differences between research and experience (Judge et al., 2020). The global pandemic challenged the stability of jobs and increased the stress experienced at work, drawing attention to the causes of poor job satisfaction (Cheng & Kao, 2022).

Additionally, the impact of shift workers' occupational requirements has been known to impact the job satisfaction of employees due to the quality of life experienced at work, in tandem with personal life and health (Moradi et al., 2014). Furthermore, specifically in the South African context job satisfaction is not only dependent on the occupational requirements of a job, but also the levels of job security, work stress and remuneration. The pandemic increased the level of threat to job stability and work pressure (Cheng & Kao, 2022), thereby shifting the control of job satisfaction to further external factors. Additionally, it has been emphasised that the objective measurement of job satisfaction is problematic due to its subjective nature and internal and external influences such as situational factors, the work environment and employee characteristics (Sypniewska, 2014).

## **1.6. Rationale**

Sleep is essential for good health and well-being – and this necessitates that sleep education and promotion be at the fore of public and organisational interventions (Ramar et al., 2021). Specifically, amongst shift workers and frontline workers, the study of sleep has increased since the COVID-19 pandemic. Rotational shifts and nighttime shifts have been associated with the most changes in sleep health (Moreno et al., 2019). Globally, sleep disturbances and poor sleep are associated with adverse physical health implications such as hormone imbalances, fatigue and immune functioning (Moreno et al., 2019). Whilst it was believed that mental health issues impacted negatively on sleep, the opposite has now also been investigated - thereby suggesting a bidirectional relationship between sleep and mental health (Scott et al., 2021).

The nature of shift work entails that sleep becomes an irregular component of an individual's life, thereby causing fatigue which impacts the levels of productivity and safety that shift

workers experience in their jobs (Banks et al., 2019). Specifically, the focus on sleep health has shifted to the bettering of sleep hygiene, which entails studying sleep quality in different contexts, to detect how sleep can be improved (Shriane et al., 2020). Essentially, this study is imperative in providing insight and statistical evidence of the levels of sleep and mental health in shift workers, as well as identifying how such operational requirements of shift work may affect the productivity and sleep health of workers to function effectively overall. This study also aims to specifically investigate a component of the characteristic of sleep in logistics shift workers, such that sleep quality of these employees can be better understood.

The study of shift work has been conducted by many authors globally and yielded information on sleep and shift workers (Ganesan et al., 2019; Nea et al., 2018; Ritonja et al., 2019). Additionally, South Africa is host to 29 sleep institutes with recent sleep studies focused on rural populations, older adults and young children (Peltzer & Pengpid, 2018; Pengpid & Peltzer, 2019), whilst the study of shift workers in South Africa has been conducted in industries such as the healthcare industry, mining industry and the trucking industry (Cook et al., 2021; Draaijer et al., 2022; Mhlongo et al., 2019). As such, there is a clear paucity of research on sleep health in South African shift workers, therefore, requiring a substantiation of sleep health of employees in the context of the South African logistics industry. This is ultimately the aim of the study. Furthermore, the South African legislative framework comprises one of the most progressive national mental health policies, but it lacks strong application and integration of mental health into many sectors. The focus on mental health in the South African context has gained traction in recent years, but amongst shift workers evidence still relates predominantly to healthcare shift workers (Engelbrecht et al., 2020; Khamisa et al., 2013; Vermaak et al., 2017). Thus, given the role of logistics and 24/7 operations in South Africa, this study aims to measure mental health of shift workers employed

in the logistics industry - in order to detect the level of mental health of these employees who are impacted by irregular sleep and engage in a form of high-pressured work.

Job satisfaction is inherently tied to the mental health of any employee, irrespective of their job context. Understanding job satisfaction is central to understanding employee motivation and engagement (Thokoa et al., 2021) - warranting the need to investigate the levels of job satisfaction in South African logistics shift workers. Furthermore, job satisfaction and mental health have been studied among South African shift workers (Khamisa et al., 2013), but the existence of the role of sleep quality as a mediator between mental health and job satisfaction, has not been investigated or established among shift workers in South Africa. Essentially, this study is crucial to gain empirical evidence of sleep quality, mental health and job satisfaction in the South African logistics industry – an industry which has remained relatively untouched. Additionally, this investigation is conducted with the intent to examine sleep quality and mental health in the labour sector in South Africa, and by extension the, 24/7 labour sector. Furthermore, this investigation is necessary to gain insight into the sleep quality, mental health and job satisfaction of employees as the world gradually adjusts to daily living with COVID-19 and post-COVID-19. This study is vital to establish that relationships between sleep quality, mental health and job satisfaction exist, and this is necessary to understand the role of the occupational nature of shift work on such employees.

## **1.7. Structure of this dissertation**

Chapter 1 presents the introduction, background of the study and the aims and objectives.

Chapter 2 includes a review of the literature on shift work, sleep, mental health and job satisfaction, as well as the theoretical framework that shapes this investigation.

Chapter 3 presents the methodology, which outlines how the study was conducted. It includes the research design, the instruments used, data collection methods, as well as the process of data analysis.

Chapter 4 includes the data analysis, results and discussion of this study.

Chapter 5 includes recommendations and conclusions of the study.

## **1.8. Conclusion**

This chapter introduced the investigation through the provision of a background to the constructs and context of the investigation. The aims and objectives of the investigation are provided, accompanying the research questions that this investigation aimed to answer. The problem statement and rationale of this investigation are provided to further highlight the need for such an investigation.

## **Chapter 2: Literature Review and Theoretical Framework**

This chapter consists of 2 sections: literature review and theoretical framework. The purpose of the section entitled ‘Literature Review’, is to provide an overview of the pertinent body of literature on sleep, mental health, job satisfaction and shift workers. This chapter specifically explores the global and local context of these categories. The section of the chapter entitled ‘Theoretical Framework’ includes the Broaden and Build theory, Herzberg’s Two-Factor Analysis and Spielman’s Three-Factor Model.

### **2.1. Literature Review**

#### **2.1.1. Shift Work**

Shift work comprises work outside of the conventional daytime hours and can be conducted for an organisation during the early morning, night time or on rotation (Costa, 2016; Kecklund & Axelsson, 2016). According to Costa (2016), the need for shift work arose to accommodate the changing global economy, competition amongst organisations, technological advancements and the increase in capacity and production. As such, shift work is associated with many industries such as emergency services, healthcare, manufacturing and transportation (Mohd Azmi et al., 2020; Živčicová, 2018). Thus, shift workers perform duties in an alternating pattern across a 24-hour cycle during weekdays and weekends, to ensure continuous operations – emphasising the irregular nature of this type of work. As a result, the line between working and social instances becomes far less rigid and unconventional for these workers (Costa, 2016). Nea et al. (2015) state that the role of shift work is advantageous economically and improves trade opportunities and the creation of employment. However, despite the clear necessity of shift work, the negative impact of the nature of this work is significantly well-known.

According to Potter and Wood (2020), the concept of shift work involves the disruption of the natural sleep/wake cycle of the body. Shift work directly affects the circadian rhythm and the body's natural clock, which generally functions during daylight hours and rests during the night time (Živčicová, 2018). According to Walker et al. (2020), the circadian rhythm synchronises the human biological process with the behavioural process in accordance with the temporal environment of light and dark. The endogenous circadian pacemaker in the body operates on a 24-hour timer which signals alertness during the day, whilst a high propensity for sleep and rest is assigned at night (Mohd Azmi et al., 2020; Rajaratnam et al., 2013). Therefore, night shift workers experience a misalignment between their natural circadian rhythm and the sleep/wake cycle. Bodily endocrine functions, metabolic processes and changes in exposure to light, affect the circadian rhythm of the body (Gumenyuk et al., 2012; Walker et al., 2020).

Walker et al. (2020) assert that light provides a type of 'cue' for the body in which alertness and body functioning occur – and when exposed to light during the day and night, can cause desynchronisation within the body. Night shift workers make use of artificial light to perform their tasks, thereby affecting the harmonisation of the body. Additionally, during the night or darkness, the hormone melatonin is secreted into the body in tandem with the natural circadian rhythm of the body (Herichova, 2013), thus when night shift workers are exposed to light during the night the secretion is delayed. This was evidenced in a cross-sectional study of day and night shift workers conducted by Papantoniou et al. (2014), wherein results revealed that exposure to permanent night shift work was associated with lower melatonin levels and a phase delay in melatonin in peak times. The disrupted levels of melatonin have become a focus and are associated with carcinogens (Garcia-Saenz et al., 2018; Leung et al., 2019; Ward et al., 2019), but this remains an inconclusive area of study currently. The factor of light, however, has a significant role to play in shift work. Marquié et al. (2015) found in a study of the

association of circadian rhythm with shipping accidents in navigational shift workers, that night shift work is associated with lower levels of alertness, resulting in a higher chance of accident occurrence as compared to day shift work.

The nature of shift work is associated with a shift in behaviour, requiring an inverted lifestyle from the norm (Pereira et al., 2021). As such, Pereira et al. (2021) found that shift work displays a relationship with poor occupational health and such workers have a higher association with hazard factors than with protective factors. In relation to the hazard factors, the factor of safety at work and its influence on the individual has also been considered. In a study conducted on night shift nurses by Vedaa et al. (2019), it was found that night shift workers were associated with work-related accidents such as dozing off at work or in commutes to and from work, nearly causing harm to equipment and to others. This cross-sectional study highlighted the inference of the act of dozing off and implied the potential for safety hazards principally when shift workers operate machinery or equipment for operational purposes. Ganesan et al. (2019) additionally found that the performance and alertness of healthcare shift workers was particularly impaired during night shifts due to circadian adaptation. Interestingly, Herichova (2013) recognised that the impact of shift work, though dire and problematic, is essential for operational purposes and a possible solution is to consider a functional relationship between shift work and human health.

Herichova (2013) advocated for the synchronisation between the capacity of the shift worker and the shift work schedule which is in agreement with Rajaratnam et al. (2013), who posited a forward rotation of shifts, whereby shifts extend from day to night. The shift working schedule has a significant impact on the individual worker. This was substantiated by a study on rotating shift and day shift workers by Ferri et al. (2016), where it was found that workers

with a rotating night schedule required health checks and greater attention, as the shift schedule had a greater impact on the quality of life experienced. This is in agreement with a study conducted by Juda et al. (2013) on the chronotype-dependent tolerance to the demands of working shifts, which indicated that the chronotype or the natural inclination for alertness and sleep related to shift work schedules, could be suited to certain chronotypes. In addition, Ganesan et al. (2019) found that in rotating shift workers, the early day shift has a similar effect on sleep, as the night shift. Short sleep prior to early day shifts was found to be more unfavourable as compared to short sleep associated with night shifts (Ganesan et al., 2019). This is consistent with the findings from a study conducted by McDowall et al. (2017), which indicated that shift-working nurses experienced poor sleep quality and that shift work was found to be an independent risk factor for poor sleep. Essentially, this indicates that the possibility for a higher propensity to cope with shift work lies in conjunction with the shift schedule as well.

However, despite the chronotype or suitability of the individual to shift work, the nature of shift work has lifestyle implications which further affect the overall health of the individual. The Working Time Society argue that an alteration in the physiological and behavioural processes, such as oxidative stress, inflammation and reduction in physical activity, is associated with shift work (Moreno et al., 2019). According to Nea et al. (2015), many of the risk factors for diseases such as cancer and metabolic syndrome stem from the factors that are associated with shift work such as poor diet, detrimental lifestyle behaviours and lack of sleep. Additionally, in a review conducted by Kecklund and Axelsson (2016), it was found that shift work was associated with other diseases such as type-2 diabetes, heart disease, obesity and stroke. Souza et al. (2019) support this further by maintaining that evidence suggests that shift work can lead to a change in eating habits, such as eating during the night and consuming food

and beverages high in fats. Furthermore, evidence indicates that a causal relationship exists between eating patterns and metabolic disturbances caused by disruption to the circadian rhythm (Souza et al., 2019). Additionally, Buchvold et al. (2018) revealed in a study of shift work schedules and night work, that body mass index significantly increased with night work.

Thus, the link between shift work and health becomes more pronounced through the behaviour associated with shift work. Moreover, emerging evidence suggests that in addition to causing weight gain, the stress hormone cortisol increases with the night shift and job function (Cannizzaro et al., 2020). This is similar to the findings by Marquié et al. (2015) and suggests that the context of shift work is as significant as the type of shift work. Further to this, the Working Time Society suggests that due to shift work schedules, the impact of shift work is felt on work-life balance, family time, and social and familial obligations (Arlinghaus et al., 2019). Arlinghaus et al. (2019) also found that greater predictability and regularity in working times, had the effect of reducing conflict between work and social life – further emphasising the effect that a shift schedule has on such employees.

#### **2.1.1.1. Shift work in South Africa**

There is limited literature available pertaining to South African shift workers, specifically South African logistics shift workers. The evidence that is present, relates predominantly to the impact that shift work has on the physical health of employees. The closest study relating to shift work in the logistics industry was in a recent cross-sectional study by Draaijer et al. (2022) conducted on 607 truck drivers in South Africa, which discovered an abundance of cardiovascular disease risk factors in long-haul truck drivers. However, these risk factors are not specifically related to the day or night shift, hinting at the infancy of evidence in this field.

In the healthcare industry, a cross-sectional study conducted by Monakali et al. (2018) on 203 nurses in the Eastern Cape of South Africa, found that a high 52% prevalence of hypertension existed amongst these workers. Furthermore, there was an unexpectedly low rate of awareness of hypertension amongst these workers despite the nature of their work (Monakali et al., 2018). In a qualitative study conducted by Phiri et al. (2014) on Western Cape nurses' lifestyle behaviours, it was found that night shift workers in this industry frequently reported weight gain and musculoskeletal pain. Moreover, the study also revealed that the work environment had a negative impact on the nurses' eating habits and workloads (Phiri et al., 2014). This relates to behaviours that are associated with shift workers and the social and lifestyle consequences that shift work has. This is supported by the findings in a study conducted on 71 nurses in Johannesburg by Cohen and Venter (2020), which revealed through semi-structured interviewing that shift scheduling impacted negatively on the individual and family lives of nurses, especially nurses who had children who depended on them.

A recent study conducted by Keyser et al. (2020) on shift workers within the mining industry in South Africa, produced evidence that work time pressure contributed to employees' rate of absenteeism, but that night shift work in particular was not a predictor of absenteeism. An article further exploring the context of South African employees found that on the optimisation of shift cycles in the South African mining industry by Pelders et al. (2021), a change in shift cycles can optimise the productivity of workers, reduce the impact of commuting times and lower worker fatigue. This further emphasises the contextual factors that have a possible impact on shift workers in South Africa, and the increase in the depth of investigation on this topic.

Minimal research on the well-being of shift workers in South Africa does exist. A study conducted on the impact of shift work on the health and well-being of campus security guards

conducted by Bazana et al. (2016) revealed that shift work did impact the health and well-being of workers. The study indicated that underlying factors such as limited control leading to stress, disturbed sleeping patterns and disrupted family lives, were also impacted. In a wholly South African context, the experiences of these shift workers in the study by Bazana et al. (2016) also revealed an existing link between work or shift work, and the cultural and religious activities of these workers that further relate to levels of self-esteem in fulfilling a cultural role, whilst balancing the irregular hours of work. Thus, the dearth of research that is conducted on shift workers in the logistics industry in South Africa, can be observed.

### **2.1.2. Sleep**

Sleep is the observed physiological reduction in body movement, closed eyes, reduced breathing and non-responsiveness to external stimuli (Zielinski et al., 2016). The concept of sleep is multidimensional and can be described from a physical, mental, durational, timing and alertness standpoint (Buysse, 2014). Assefa et al. (2015) argue that sleep is a dynamic behaviour which combines physical dormancy with the restoration of the brain, neurocognition and body. Besedovsky et al. (2012) state that sleep and the circadian rhythm of the body are tightly entwined, whereby both aid in adapting the body to the changing demands of the day and separate incompatible body functions at the correct time. The robust changes that occur according to the circadian timeframe are physical and mental in nature and additionally occur on an immune functioning level (Besedovsky et al., 2012). Jagannath et al. (2017) further explain that the cells in the body are maintained by the hypothalamic pacemaker of the body which controls the molecular function of the body. This implies that the act of sleep has a direct impact on the molecular functioning of the body and plays an instrumental role in maintaining health.

The circadian rhythm oscillates on a 24-hour period where the circadian drive for alertness is low and the homeostatic sleep pressure is high during the night (Satterfield & Killgore, 2019). Furthermore, Satterfield and Killgore (2019) proffer that the homeostatic and circadian processes become misaligned when people travel between time zones, mistime their sleep or work during the night and sleep during the day. Therefore, sleep is a restorative function which helps to repair whilst reviving the energy levels within the body that are usually consumed throughout the day (Assefa et al., 2015). Sleep occurs in stages that are classified by certain characteristics. According to Medic et al. (2017), sleep can be classified as rapid eye movement sleep (REM), non-rapid eye movement sleep (NREM) and slow wave sleep (SWS) - the depth of sleep increases from REM to NREM and then SWS, which is the deepest and most restorative sleep that can be experienced.

#### **2.1.2.1. Fatigue**

An element which relates to sleep and sleep quality is fatigue, especially in shift work. Tomic and Liu (2017) state that fatigue is a multidimensional and interdependent feeling and should be measured through physiological state, experience and functioning. Tomic and Liu (2017) also state that consideration has been provided to the relationship between shift work scheduling and fatigue, and the personal and behavioural characteristics of an individual impacting how fatigue is experienced. Essentially, fatigue can also be described as an overwhelming sense of tiredness. Di Muzio et al. (2019) state that poor sleep quality over a prolonged period, or compounded over time, can result in tiredness or fatigue and further impacts judgment, motivation and attention. Furthermore, in a study conducted by Di Muzio et al. (2019) on nurses working rapidly rotating shifts, it was found that fatigue and sleepiness increase at the end of night shifts in comparison to day shifts, with lower psychomotor performance during the night.

Richter et al. (2016), iterates that fatigue in shift workers is caused by the changes to the circadian rhythm and differentiation in light exposure during night shifts. Fatigue can be in relation to the breaks taken while on shift, as well as the levels of safety experienced at work. A study conducted by Chang et al. (2019) on air traffic controllers, characterised by a pressurised working environment due to the handling of aircraft, found that fatigue was dependent on the shift work schedule and the timing between tasks and breaks on shift. This again, suggests that the component of alertness is dependent on the shift schedule.

#### **2.1.2.2. Sleep Quality**

The common means of characterising sleep is through quantity and quality. Kohyama (2021) argues that sleep quantity can be measured objectively in many ways, but a subjective stance and measurement according to the deviation or adherence to each individual's optimal sleep quantity, is a superior measurement. As such, Fabbri et al. (2021) highlight that sleep quality is a multidimensional construct which consists of different elements that make it difficult to define and measure. In a report of the sleep quality recommendations by the National Sleep Foundation, it was found that sleep continuity measures, shorter sleep latencies and fewer awakenings, were indicative of good sleep quality, and sleep efficiency was an indicator of sleep quality in all ages (Ohayon et al., 2017).

According to Kohyama (2021), sleep quality is also measured subjectively, and can be deduced by the restfulness, sleep depth and level of restoration experienced from sleep. In a large population study of 3778 young adults conducted by Fatima et al. (2016), findings indicated poorer sleep quality experienced amongst females than males. St-Onge et al. (2016) argue that sleep quality is dependent on diet, with evidence suggesting that high caloric intake patterns

are associated with reduced SWS and increased REM, whilst some foods such as milk products and vegetables could be deemed as sleep modulators. Moreover, sleep quality over sleep quantity has been deemed more promising in reflecting upon the health and functioning of the body (Kohyama, 2021). However, in a recent study conducted on a group of healthy young adults by Zavecz et al. (2020), it was found that self-reported sleep quality was not associated with executive functions and working memory. The study by Zavecz et al. (2020) also suggests an additional finding that there exists a disassociation between subjective and objective sleep as both do measure the same domain. However, it does not capture the same aspects of sleep quality, rendering the results inconclusive.

Additionally, there is a scarcity of research on sleep in the South African population which is in contradiction to the many sleep laboratories present in the country (Komolafe et al., 2021). However, in a previous country-wide sample across Africa and Asia conducted by Stranges et al. (2012), it was found that South Africa has a high prevalence of self-reported sleep problems. This is consistent with the findings from a study of older South African adults conducted by Peltzer and Pengpid (2018), which indicated that in addition to the prevalence of sleeping problems, sociodemographic and lifestyle factors were at risk for emphasising sleeping problems in individuals. In a study conducted by Pretorius et al. (2015) on South African participants from Soweto, it was found that female sleep duration and male napping during the day were both associated with a lower body mass index and lower blood pressure. This relates to a study conducted by Karthik et al. (2020), which suggested that short sleep duration has a positive and negative association with the hormones leptin and ghrelin respectively, which both contribute to the increase in appetite resulting in a higher body mass index. This is in accordance with St-Onge et al. (2016), who argue that sleep duration and sleep quality have been linked with obesity and weight gain.

In relation to sleep duration, the significant impact of the COVID-19 pandemic was also felt on the sleep duration and sleep quality in general, across multiple populations. In an international study on sleep quality during the COVID-19 pandemic conducted by Kocevská et al. (2020), it was found that individuals with pre-pandemic sleep disorder experienced better sleep during the pandemic, as opposed to pre-pandemic good sleepers, who experienced poorer sleep. This surprising finding suggested that there was no consistent effect of the lockdown or the pandemic on sleep quality – however, it does allude to the mental health implication that the pandemic had on sleep quality, as a result of people experiencing negativity and worry during such a dire time.

The construct of sleep quality as explored by Song et al. (2020), was found to be a mediator between perceived job stress and job burnout. As burnout is linked to levels of job satisfaction as submitted by Jiang et al. (2017), it is possible to see a vague and interrelated relationship between the constructs explored in this investigation, namely sleep quality, mental health and job satisfaction. Sleep quality as a mediator has been explored in more recent studies (Lai, 2018; Mao et al., 2022; Wang et al., 2021) and in different contexts relating to lifestyle and mental health. In the study by Wang et al. (2021), it was found that sleep quality mediated the relationship between coping strategies and mental health. It was also found that the relation between negative coping abilities and poor mental health is through the sleep quality experienced.

### **2.1.2.3. Work and Sleep**

From an occupational stance, employees who are lacking in sleep or are sleep deprived, appear to have a higher chance of causing harm at work, resulting in unethical, unprofessional and

ineffective work (Barnes & Watson, 2019). Causes of sleep deprivation and sleepiness are either related to the sleep choices that an individual makes or the operational requirements of a job such as shift work (Pilcher & Morris, 2020). In a review of the impact of sleep loss on employees and organisations conducted by Budnick and Barber (2015), it was found that sleep loss can result in employees taking unnecessary risks, making poor decisions at work and responding negatively or impulsively to threat-ambiguous situations. Additionally, in a meta-analysis of 27 studies conducted by Uehli et al. (2014), it was found that workers with sleep problems had a higher chance of work injuries, due to perhaps the ingesting of medications to cope with the sleep problems. Furthermore, it was also found that sleep quality appeared to be more important than sleep quantity (Uehli et al., 2014). Pilcher and Morris (2020), further iterate that the changes experienced in sleep patterns or sleep deprivation relating to occupational demands vary according to the characteristics of the job such as being a shift worker.

#### **2.1.2.4. Sleep Disorders**

Sleep disturbances and stressors in daily life can risk the formation of sleep disorders such as sleep apnoea and insomnia. According to Pavlova and Latreille (2019), sleep apnoea is characterised by pauses in breathing during sleep and can be caused by an obstructive airway or through the disruption of brain signalling to the muscles that control airflow in the body. Pinto et al. (2016) argue that sleep apnoea causes poor sleep and further affects the working and social life of individuals who experience it. A study on the comorbidities associated with obstructive sleep apnoea conducted by Pinto et al. (2016), indicates that the prevalence of comorbidities such as hypertension, depression and obesity accompany those who suffer from sleep apnoea. Furthermore, a study conducted on adults in rural South Africa by Roche et al.

(2021), revealed that older age and a higher body mass index were significantly associated with obstructive sleep apnoea.

Pavlova and Latreille (2019) also state that insomnia, another type of sleeping disorder, is diagnosed when an individual reports dissatisfaction with sleep, as well as experiencing symptoms of sleepiness and impaired attention. According to Peltzer and Pengpid (2019), factors associated with insomnia are sociodemographic, physical and mental. In a study conducted on a national population sample in South Africa conducted by Peltzer and Pengpid (2019), it was revealed that the presence of significant insomnia symptoms, as well as posttraumatic stress and psychological distress, had a positive relationship with adults experiencing insomnia. However, the results also indicated that from a global standpoint, South Africa's statistical evidence of insomnia is lower than other larger countries such as China and Canada (Peltzer & Pengpid, 2019). Additionally, in a study conducted by Chatterjee and Ambekar (2017), it was found that in rotating shift workers, there was a 45% prevalence of insomnia, along with increased subjective behavioural and psychological sleepiness – thereby highlighting shift work's association with sleep.

### **2.1.3. Mental Health**

According to Bhugra et al. (2013), mental health describes the ability of an individual to perform social and cultural roles, engage in affectionate relationships, communication and navigate emotions within one's life. A good state of mental health consists of having a strong sense of self, in addition to healthy social relationships (Bhugra et al., 2013). Galderisi et al. (2015) argue that mental health is not simply the absence of mental illness and differences in the definition of mental health are inconsistent, as it differs from country to country. Galderisi

et al. (2015) further substantiate that the concept of mental health strives for more inclusivity of different cultures and beliefs to accommodate the globalised world.

Additionally, in the current context, the impact of the COVID-19 pandemic on the mental health of individuals and communities presents a boundless field to explore. Robinson et al. (2022) compared a plethora of longitudinal mental studies before and during the pandemic, which indicated that negative mental health symptoms increased within the first two months of the pandemic, followed by a substantial decrease as the pandemic went on. Studies found that mental health symptoms in those individuals with diagnosed depressive and mood disorders worsened and persisted for a large portion of the pandemic, while those with pre-existing mental ill-health symptoms, surprisingly did not experience a significant change during the pandemic (Robinson et al., 2022). The symptoms of mental distress and mental health symptoms were a lived experience for every individual and shifted the stance on mental health. Emotional distress, fear and anxiety are common during a crisis such as the COVID-19 pandemic, due to the information-overload surrounding the virus, which further contributed to the stigma surrounding COVID-19 (Wasim et al., 2022).

It was a global health effort to enforce the links between mental health and physical health, sleep and even finances. Villadsen et al. (2021) found that during the COVID-19 pandemic, poor mental health was associated with adverse health behaviours such as poor sleep, reduced exercise and alcohol consumption. Furthermore, this is consistent with a study conducted by Stanton et al. (2020), which found that the negative changes that occurred in physical activity, sleep and alcohol intake were associated with increases in depression, anxiety and stress. It can be deduced that the behaviours associated with physical health appear to have a relationship with mental health. Additionally, there exists a bi-directional relationship between mental

health and economic factors, such as poor mental health associated with productivity loss and economic disadvantage (such as a spouse losing their job in a dual-income household), which is associated with an increased likelihood of mental illness (Knapp & Wong, 2020).

### **2.1.3.1. Mental Health and Sleep**

Sleep and mental health are intrinsically linked and this relationship has a fundamental role to play (Neculicioiu et al., 2022). In a study conducted by Teker and Luleci (2018), it was found that poorer sleep quality and anxiety levels were related. Furthermore, sleep quality and anxiety levels were found to be affected by gender, income level, quality of relationship with family and social environments (Teker & Luleci, 2018). A cohort study of occupational stress and sleep duration in relation to anxiety symptoms conducted by Kim et al. (2020) found that beneficial levels of total sleep time were capable of reducing anxiety in employees, but that sleep longer than 9 hours and sleep shorter than 7 hours had no impact on the anxiety experienced by employees. Additionally, the COVID-19 pandemic highlighted the bi-directional relationship that exists between sleep, mental health and the pandemic (Neculicioiu et al., 2022). An increase in sleep duration during the pandemic, but a decrease in sleep quality and altered sleep timing was experienced, along with decreases in mental health (Neculicioiu et al., 2022). This is consistent with a study conducted by Afonso et al. (2017) on 429 study participants. The results from the study by Afonso et al. (2017) indicated that employees who worked longer hours experienced poorer sleep and mental health with stronger anxiety and depressive symptoms. This solidifies that notion that sleep and mental health can be viewed as separate constructs and as interlinked aspects of overall health.

### **2.1.3.2. Mental Health and Work**

In an article by Elraz (2018) it was argued that identifying with a mental health condition can place an individual in a vulnerable situation in the workplace. A study conducted on the long-term effectiveness of stress management at work by Herr et al. (2018), found that reduction in reactivity to social conflicts at work resulted in lower levels of depression and sleep problems. Additionally, Herr et al. (2018) found that stress management interventions and reduction in prolonged reactivity to stress in the workplace over seven years, allowed for the improvement of mental health. Furthermore, a study across seven distinct cultures conducted by Haar et al. (2014) found that high levels of work-life balance were positively associated with job and life satisfaction and mental health. This study also established that work-life balance and care for mental health were more prominent in individualist than collectivist societies (Haar et al., 2014), which South African society is considered to be.

In consideration of the different contexts of work, the association between shift work and mental health has also been studied. Torquati et al. (2019) found that the mental health of shift workers was adversely affected and depressive symptoms of shift workers were 33% higher than that of non-shift-workers. Additionally, it was found that there appeared to be a relationship between mental health and circadian rhythm disruption (Walker et al., 2020), which is most certainly linked to shift work. Walker et al. (2020) also found that circadian rhythm may not be the sole cause of mood disorder, but can be considered a contributor to the symptoms in individuals who are predisposed to mental health disorders. However, Nadinloyi et al. (2013) found that there exists a negative association between mental health and the job satisfaction of an employee. Furthermore, a study conducted by Wisetborisut et al. (2014) found that a strong link between shift work and burnout existed, with an increase in the frequency of burnout relative to the number of years involved in shift work. However, a study

conducted by Reynolds et al. (2022) found that sleep disorders, as opposed to just shift work, was associated with poor mental health. This highlights the indirect relationship that occupational factors can have on the mental health of employees.

### **2.1.3.3. Shift Work Disorder**

According to Wickwire et al. (2017), a condition which is triggered by circadian misalignment and is the subsequent cause of constant sleepiness and insomnia, is known as Shift Work Disorder (SWD). The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders details that this circadian rhythm sleep disorder is a result of work times that are scheduled during the natural hour of sleep (d'Ettorre & Pellicani, 2020). In an article by Wickwire et al. (2017), it is suggested that shift work varies substantially in tolerance and adaptability from individual to individual with approximately one in five shift workers developing SWD. In an international meta-analysis on shift work conducted by Pallesen et al. (2021), it was found across 29 studies that SWD had a prevalence of 26,5% - making the disorder common amongst one in four shift workers. Di Milia et al. (2013) found that night-shift workers experience SWD at a higher rate than day-shift workers. Furthermore, a significant link between hypertension and shift workers is indicated by the study by Di Milia et al. (2013). A study by Booker et al. (2020) indicated that those at high risk for SWD were also at risk for impaired mental health, anxiety and depressive symptoms.

A study on the role of sleep reactivity conducted by Kalmbach et al. (2015) yielded results that, rotating shift workers who experienced high sleep reactivity were at an elevated risk for developing SWD and symptoms of depression and anxiety. Sleep reactivity is the ability of an individual to cope with stress, which can subsequently affect sleep (Booker et al., 2020). In a study of 202 nurses conducted by Booker et al. (2020), it was argued that shift workers who

had poor sleep hygiene were at a greater risk for developing SWD. Booker et al. (2020) describe sleep hygiene as the behavioural and environmental components that can promote or demote sleep, such as the bedroom environment, stress, bed timing and feelings of worry. Furthermore, the results from the study by Booker et al. (2020) indicated that the prevalence of SWD amongst nurses is consistent with other industries employing shift workers, where reducing stress or worry could be beneficial for those with SWD.

In a field study conducted by Vanttola et al. (2019), it was found that those with SWD had less relaxation at bedtime, and that lower objective sleep efficiency and poorer subjective sleep quality indicated that the quality of sleep is significantly associated with SWD. Kalmbach et al. (2015) further argue that work-related sleep patterns extend beyond the classification of sleep disturbances and resultantly morph into SWD. In a study on SWD in the manufacturing industry conducted by Taniyama et al. (2015), it was established that environmental and somatic factors relating to sleep could have an effect on the susceptibility to developing SWD but there is no evidence for the direct relationship. The findings of a random population sample study conducted by Di Milia et al. (2013) indicated that the prevalence of SWD is higher in night shift workers, with night work and hypertension significantly associated with a severe form of SWD.

#### **2.1.3.4. Mental Health in South Africa**

In South Africa, the Mental Health Care Act No. 17 was adopted in 2002 with a proactive stance to addressing mental health as a component of health care. The Act makes provisions for the best mental health care, treatment and rehabilitation, whilst coordinating the provisions and integrating mental health services into the general health space. Furthermore, in 2013, the Mental Health Policy and Framework in alignment with the World Health Organisation Mental

Health Action Plan was designed for the integration of mental health into general or primary healthcare services by 2020 (Marais & Petersen, 2015). However, Szabo and Kaliski (2017) argue that the allocation of resources for mental health has always been problematic in South Africa. Furthermore, Wyatt et al. (2017) observed that in South Africa there is a lack of understanding of how culture affects mental health and treatment, whilst evidence suggests that socioeconomic status and relationship dynamics increase the risk for post-traumatic stress disorder and depression.

The South African Human Rights Commission on the state of mental health released in 2019, highlighted the mismanagement and underfunding of mental health services (Pillay, 2019). Furthermore, Nguse and Wassenaar (2021) argue that the COVID-19 pandemic had a negative impact on the already constrained mental health system that exists in South Africa, as was the case globally. Consistent with this, is a study conducted on the impact of the COVID-19 pandemic in South Africa by (Kim et al., 2020), which found that 10-20% of the 221 participants reported potent feelings of anxiety and worrisome thoughts as a result of the pandemic.

According to Memish et al. (2017), mental health problems such as anxiety and depressive symptoms are becoming more prevalent in the workplace, usually necessitating the use of employee wellness programs. On the drivers of employee wellness in South African workplaces, Nzozzo (2017) found that work stress could impact engagement at work through the effect of burnout or emotional exhaustion. Furthermore, Paunio et al. (2015) reiterate that a larger working population is now subjected to sleep disturbances which increase the risk for somatic and psychiatric disorders. Additionally, the layout of the work environment, lifestyle measures and stable working conditions are factors to be considered when dealing with mental

health (Paunio et al., 2015). Here, it has become clearer that there exists an association between mental health and work-related outcomes.

#### **2.1.4. Job Satisfaction**

The concept of job satisfaction is a fairly recent discovery and has been considered as the positive emotions or feelings that individuals experience in relation to their job (Judge et al., 2020). Additionally, Judge et al. (2020) state that job satisfaction is a multidimensional concept which has cognitive and affective components. Furthermore, this concept is a component of motivation and better performance of employees in the workplace (Raziq & Maulabakhsh, 2015). Subsequently, issues with work such as decreased salaries or increased working hours have resulted in the formation of negative attitudes at work, high levels of disappointment and low levels of commitment to their jobs (Belias & Koustelios, 2014b).

Judge et al. (2020) established that the facets of job satisfaction can be described through the extrinsic elements such as pay and promotion, and the intrinsic elements such as supervision, dealing with co-workers and the nature of the job itself. Essentially, job satisfaction is also the physiological, psychological and environmental conditions that allow for each employee to be happy at work (Raziq & Maulabakhsh, 2015). Thus, the measurement of job satisfaction is at a subjective level. Belias and Koustelios (2014a) extend this, by describing job satisfaction as an organisation-related phenomenon and includes leadership style and organisational culture as the factors affecting job satisfaction. In relation to shift workers, a cohort study of shift workers from different industries conducted by Achari (2021), found that the job satisfaction of shift workers differed according to shift schedules.

Qasim and Syed (2012) emphasised that some of the determinants of job satisfaction can be the work environment, the remuneration that workers receive or fairness of treatment in the workplace. In a study conducted by Taheri and Arabameri (2012) on the impact of the work environment on job satisfaction, it was found that job satisfaction is significantly related to the physical working environment, social working environment as well as a secure working environment. This is further supported by the findings of a similar study conducted by Agbozo et al. (2017) on job satisfaction in an international banking sector, in which a significant relationship between the physical work environment and job satisfaction was found to exist. Furthermore, in the study by Agbozo et al. (2017), results indicated that communication and good relations had an impact on morale and satisfaction experienced at work.

Additionally, in a study conducted by Permadi et al. (2018), it was revealed that job satisfaction was directly linked to the level of compensation that was offered to employees, as well as a significant relationship existing between job satisfaction and job performance. This is consistent with a later study conducted by Sidabutar et al. (2020) wherein it was found that better compensation has a positive impact on job satisfaction, which in turn has a positive impact on employee performance. The study by Sidabutar et al. (2020) viewed job satisfaction as an intervening variable in compensation and employee performance.

In addition to compensation and work environment, the culture of the organisation has a role to play in job satisfaction (Sharma, 2017). A study conducted by Sharma (2017) found that employees were more likely to be satisfied in their jobs when the possibility for growth professionally and personally, was perceived (Sharma, 2017). However, a study conducted on the facets of job performance by Shaikh et al. (2012) found that despite the positive relationship between promotion and job satisfaction, the task and contextual performance of employees had

no significant link with job satisfaction. This is in contradiction to the 5 core intrinsic characteristics of the job satisfaction model as stated by Judge et al. (2020), which is namely; task identity, task significance, feedback, skill variety and autonomy.

In relation to this, Demircioglu (2021) argued that innovations emanating from the employees up to management - in other words, employee autonomy or self-determination - is positively related to the job satisfaction that employees experience. Furthermore, the study conducted by Demircioglu (2021) highlighted the mediating effect of autonomy in relation to job satisfaction. However, Saleem (2015) found that transformational leadership, which involves motivation and positive changes in psychological state, has an affirmative association with job satisfaction. This implies that the role of leadership is also instrumental in the job satisfaction experienced by subordinate employees. A limitation highlighted by Demircioglu (2021) was that substantial attention is paid to the internal factors that affect job satisfaction, despite the external factors also having a role to play. A study conducted by Nelson et al. (2018) found in the global culture of privatisations, employees experience poor levels of job satisfaction, as compared to post-privatisation when the organisational structure and divisions are much better defined.

#### **2.1.4.1. Job Satisfaction and Stress**

Work-related stress is an important factor in the construct of job satisfaction, and can act as a motivator for creativity and satisfaction if applied positively, but can result in low satisfaction if applied negatively (Hoboubi et al., 2017). Nelson et al. (2018) further attested that stressful organisational structure contributes to the stress experienced by employees, thereby affecting the levels of satisfaction experienced by employees. In agreement with this, a study conducted by Singh et al. (2019) highlighted that as levels of stress increase, the level of job satisfaction decreases, whilst the relationship between job stress and psychological factors in employees is

evident. The impact of job satisfaction on mental health is further argued for by a meta-analysis of 500 studies conducted by Faragher et al. (2013) which found that the relationship of aspects of mental health such as burnout, anxiety and self-esteem can impact the levels of dissatisfaction experienced by individuals at work. Specifically relating to shift workers, a study conducted by Jaradat et al. (2017) on shift-working nurses, identified that mental distress was firmly associated with a decrease in job satisfaction.

Additionally, there is a cause-effect relationship that exists between job satisfaction and employee productivity (Hoboubi et al., 2017). In a study conducted by Hoboubi et al. (2017) it was found that in relation to work productivity, shift workers' job satisfaction was average, possibly due to the misalignment in circadian rhythm as well as the average to higher levels of stress experienced. This also draws attention to the nebulous relationship between job satisfaction and mental health and sleep. Sleep and job satisfaction have been indicated to have a relationship and according to Barnes et al. (2013), sleep loss is more inclined to leave an employee feeling frustrated and less capable of executing tasks, and sleep quantity influences job satisfaction. This is consistent with the study conducted by Shatté et al. (2017) that an aspect such as a difficult work environment is associated with greater stress, lower job satisfaction and burnout and can further impact sleep quality and depressive symptoms. This further emphasises the role that the nature of the job and environment has on the experience of satisfaction at work.

#### **2.1.4.2. Job Satisfaction in South Africa**

The concept of job satisfaction has been studied expansively across different specific professions in South Africa. A recent study conducted by Mathevula (2017) focused on a particular genre of industry, in an attempt to gain insight into job satisfaction in a broader sense.

Mathevula (2017) found that in the healthcare sector in South Africa, a lot of dissatisfaction is based on the poor benefits, work accomplishments and salary received by employees. Additionally, the study found that job security was the aspect with the least dissatisfaction, due to the labour laws and policies of the country that help to protect the employees in this sector. This is consistent with a study conducted by Iwu et al. (2013) on the job satisfaction of South African teachers, which yielded results that working conditions, job growth opportunities and job security were important for employee motivation, and by extension, job satisfaction.

Iwu et al. (2013) argued that the South African perspective of job satisfaction is also dependent on the sense of belonging that employees experience in the workplace, as well as the support and engagement provided by superiors, and the role of the industry in the national context of policy formation. Thokoa et al. (2021) agreed with this through the results of a study conducted on the employees of the South African National Treasury, which indicated that there is a firm relationship between job satisfaction and worker engagement in the workplace. Furthermore, it was found that the impact of salary or pay was not a predictor of employee engagement, as money is not the only driving force for job satisfaction (Thokoa et al., 2021).

South Africa is also a fairly political country which extends to organisational politics. Organisational politics can be described as the activity where employees accomplish goals without going through the correct channels (Olorunleke, 2015). A study conducted by Munyeka and Setati (2022) on South African police officers, found that a negative relationship exists between office politics and job satisfaction, wherein behaviour to discredit others, unjust decision making and unfair conduct, are associated with lower levels of job satisfaction. Khamisa et al. (2017) argued that work stress relating to staff shortages is a better predictor of low job satisfaction than personal stress in South African nurses with irregular work schedules.

Contextually, the demands or requirements of the job appear to have a vital role. In South Africa, the aspect of staffing shortages is synonymous with the nature of a developing country (Khamisa et al., 2017).

Another important aspect of the South African dynamic is the emphasis placed on equity in the workplace, as a result of the unjust history of apartheid. A study conducted by Stoermer et al. (2019) on 154 South African employees found that a significant amount of black employees experienced racial harassment in the workplace as compared to white employees, thus being indicative of lower job satisfaction amongst such employees. Furthermore, Stoermer et al. (2019) also found that lower managerial rank or organisational role is associated with lower job satisfaction in relation to workplace racial harassment, which is in contrast to the racial harassment and job satisfaction that employees in pronounced career orientations experienced. Essentially, the concept of equity in South Africa is emphasised by the Employment Equity Act No. 55 of 1998 and is a vital component of the labour industry.

van Wyk et al. (2016) found that in South Africa, higher job satisfaction was associated with employees engaging in different aspects of the organisation through job rotation initiatives. This study also found that boredom, monotonous work and thus job dissatisfaction, can be curbed by job rotation (van Wyk et al., 2016). Adriano and Callaghan (2020) argue that job satisfaction would be a mediating factor between work-life balance conflicts and turnover intentions in the context of studying professions in South Africa, but were opposed by the findings of their study which yielded results to indicate that job satisfaction is not a mediating factor. However, Jackson and Fransman (2018) found that well-being in terms of finance and work-life balance were significant predictors of job satisfaction, whilst subjective experiences

of productivity was a mediator between financial wellbeing and work-life balance, and job satisfaction.

Additionally, Brouwers and Paltu (2020) argue that toxic leadership is significantly related to employee turnover and in a study of employees in the South African manufacturing industry, it was found that toxic leadership, in the form of abusive supervision and authoritarian leadership, was related to intrinsic and extrinsic job satisfaction. Van der Walt et al. (2016) found that job satisfaction in South Africa was also linked to the relationship with trade union representation in matters of remuneration and working conditions. According to Van der Walt et al. (2016), it allows employees to experience higher levels of job satisfaction which in turn ensures that skills retention occurs.

### **2.1.5. Summary of Literature Review**

This section, entitled ‘Literature Review’, detailed the body of literature that is most pertinent to this study in the constructs of shift work, sleep, mental health and job satisfaction. No study has looked at these three constructs in South Africa and no study has investigated these three constructs in the logistics industry. Therefore, this confirms the necessity of the current study in the world of work, particularly industries such as the logistics industry, the healthcare sector and policing/security, which rely on shift workers.

## **2.2. Theoretical Framework**

Due to the nature of this study, the theoretical frameworks are related to constructs that are measured in this investigation namely; sleep, mental health and job satisfaction. Therefore, the following theories that frame this investigation are Herzberg’s Two-factor Analysis, the

Broaden and Build theory of positive psychology and Spielman's Three-factor Insomnia Model.

### **2.2.1. Herzberg Two-factor theory**

Herzberg's two-factor theory, also known as the "motivation-hygiene theory", is influenced by Maslow's hierarchy of needs. According to Alshmemri et al. (2017), the two factors in the theory relate to self-actualisation known as the motivation factor, as well as the factor of avoiding unpleasantness known as the hygiene factor. Furthermore, the intrinsic and extrinsic factors which affect the individual at work are what the motivation and hygiene factors pertain to. Alfayad and Arif (2017) state that this theory focuses on identifying the needs of the individuals at work to determine how those needs can be satisfied. Additionally, the satisfiers or motivators are related to the nature of the job, whereas the hygiene factors are related to the environment that the job occurs in.

The motivation-hygiene theory underpins the job satisfaction construct of this investigation. The hygiene factor of sleep relates directly to the nature of the job of shift workers, whilst the extent to which the hygiene factors influence the employee's perception of job satisfaction explains the relationship between constructs. This theory has been used in an African context in an investigation conducted by Victor and Hoole (2021) where results from the study were framed by the extrinsic motivator of rewards at work. Their study also found that amongst South African employees, the aspects of recognition and learning and development opportunities serve to motivate employees, thereby affecting the levels of satisfaction at work (Victor & Hoole, 2021).

This is consistent with a study conducted by Akintola and Chikoko (2016) on South African healthcare workers, where the motivation-hygiene theory was also used as a framework. Akintola and Chikoko (2016) found that opportunity for development and promotion at work serves to empower and motivate, despite the low remuneration that might occur. Furthermore, the absence of hygiene factors was observed to dissatisfy, whilst the presence of motivating factors relating to career advancement served to satisfy employees. For this context, the theory provides a dual-pronged approach for two of the constructs in this investigation; namely sleep quality and job satisfaction. The Herzberg Two-Factor theory can be criticised for the disregard towards individual differences as well as the inconsistency in the categorisation of the factors (Gumbri et al., 2015). Employees differ in their characteristics and interests and thus, the indication that a general rule can be applied to the experience of job satisfaction is not always adequate (Velmurugan & Sankar, 2017).

### **2.2.2. Broaden and Build theory**

According to Conway et al. (2013), the Broaden and Build theory is used to explain the unique ability or impact of positive emotions as opposed to negative emotions. The specific action tendencies accompanied by the discrete positive emotions serve an adaptive function. Furthermore, the occurrence of positive emotions are used to ignite broader thinking and expansive thought-action tendencies, which over time aids in the development of creative solution thinking and builds future sustaining social and psychological resources within people (Chen et al., 2016). This theory, being a relatively modern theory, has framed studies in organisational behaviour and occupational health due to the emphasis on positive emotions and action-building.

Essentially, the premise of the theory is that positive emotions hold the power of a broader scope of ideas and behaviours, which helps to broaden the cognitive and actioned aspects of individuals (Chen et al., 2021). Fredrickson (2013) posited that the development and maintenance of positive emotions is for the primitive instinct of survival whereby, the positive emotions aid in building resources for better health through fulfilment. This theory underpins the mental health construct of this investigation and frames the aspect of holistic wellness that shift workers may or may not be receiving in their daily lives.

Furthermore, Fredrickson (2013) states that the growth of positive emotional experiences in peoples' lives has a small but impactful ability in reshaping the trajectory of individuals, such that good resources are built to ensure survival. Simons and Buitendach (2013) used the Broaden and Build theory in a South African study of call centre employees and found that the experience of positive emotions in the workplace can steer workers to individual and organisational growth and functioning. This theory frames the aspect of this investigation that seeks to understand the impact of positive emotions on the levels of happiness, wellbeing and satisfaction that employees experience due to how their job is perceived in relation to the nature of the job. The Broaden and Build theory has not been sufficiently critiqued and the focus remains on the positive emotions of an individual.

### **2.2.3. Spielman's Three-Factor Insomnia Model**

According to Talbot and Harvey (2016), this model is also known as the 3P model. It includes predisposing factors that are biological, psychological or social; precipitating factors such as a trigger event or stress and perpetuating factors such as maladaptive coping skills. These factors all relate to the development of insomnia in individuals and frame the sleep construct of this

investigation, as the precipitating factor of shift workers is the nature of the work through the disruption of the circadian rhythm and sleep - core tenets of the shift workers daily life.

Anderson (2018) utilises the 3P model in relation to the maladaptive behaviour that occurs when there is a misalignment in the circadian rhythm predominant amongst shift workers. Consistent with this Gałuszko-Węgielnik et al. (2012), who stated that the precipitating factors interacting with the factors which predispose one to developing insomnia, are readily accessible through shift work or irregular hours of work which requires sleep to occur outside of the natural expected hours in the day. This model also relates to the concept of sleep hygiene and the influence that the behaviour related to sleep and sleep quality can have on an individual. The predisposing factors within each individual make the individual more susceptible to insomnia and, when compounded with stressors that diminish over time, create the gateway for a sleep disorder such as insomnia to endure (Ellis et al., 2021).

### **2.3. Conclusion**

This chapter included the literature review, where the body of literature pertaining to sleep, mental health and job satisfaction were explored. Additionally, the theoretical frameworks, Herzberg's Two-Factor theory, Broaden and Build theory and the Spielman Three-Factor Insomnia Model, were explored in so far as they contribute to the underpinning of this study.

## **Chapter 3: Research Methodology**

This chapter delineates the methods, design of sampling strategy, data collection procedure, information on the data collection instruments and data analysis of the study. The ethical considerations are also discussed.

### **3.1. Research Design**

Swedberg (2020) states that when research aims to work through a new topic, to discover new ideas of already existing topics or provide a new form of research, it is known as exploratory research. As this research, in essence, is an investigation of three constructs to yield new ideas about already established topics, it can be classified as an exploratory study. Moreover, this study employs a quantitative design. Quantitative research obtains data that can be measured and represented numerically, such that statistical information can also be derived and used to describe the information obtained (Goertzen, 2017). This structured investigation made use of pre-determined instruments which acted as a means to measure sleep quality, mental health and job satisfaction amongst logistics employees. Therefore, the empirical nature of this investigation ensured that the information obtained from the instruments was transformed into descriptive data and correlational data. Additionally, the non-experimental design of this investigation allows for the data obtained, to be described. Descriptive data ensures that the variables are not manipulated, which allows for multiple variables to be considered and to observe the relationships that may exist between the constructs within the investigation (Siedlecki, 2020).

### **3.2. Sampling Strategy**

To achieve the objectives of this investigation, primary data was collected from shift workers. The participants for this study emanated from a national logistics company in South Africa, called FPT. Time and location constraints quelled the ability to obtain information from every shift worker within the logistics organisation, resulting in a sample of the population engaging in this study. The total population of shift workers employed at FPT was 122, making up a large portion of the general staff complement. Furthermore, a sample is a subset of the population which provides information, is described, and will eventually allow for inferences to be made about the target population (Thacker, 2020). A larger sample size is, therefore, necessary to generalise about a population as it will be more representative of the population (Andrade, 2020) – thereby yielding substantiative empirical data.

The sample of the population employed in this study, also known as the total participants of this study, was 108 shift workers. Participants for this investigation were selected using a systematic random sampling technique. Systematic random sampling is classified as probability sampling and is generally very cost-effective with high reliability and validity (Acharya et al., 2013). This form of sampling was carried out by means of dividing the number of items in the sampling frame by the desired sample size to achieve the ‘*n*’ term – one in every *n*th item is then selected to be a part of the sample population (Acharya et al., 2013). In this case, the sample size calculated for this study was 93, and when the target population of 122 is divided by the sample size of 93 it yielded the *n*th term to be 1.3. Therefore, as the *n*th term was every 1.3, as far as possible all 122 shift workers were allowed to participate in the study. Furthermore, all the shift workers who participated in the study worked on a rotational shift work schedule. However, due to occupational and resource constraints, only 108 participants responded to the questionnaire. The exclusion criteria for this investigation were all employees

within the logistics organisation who were not shift workers. Due to the national status of the organisation, the participants emanated from Durban, Cape Town and Gqeberha.

### **3.3. Data Collection**

Remaining committed to the quantitative design of this investigation, a set of 4 predetermined instruments (Appendix D) were utilised for data collection. The instruments were in a survey questionnaire format, which Ponto (2015) stated has been used for larger population-based studies. This survey questionnaire allowed for data to be collected from a large sample within a short period (Ponto, 2015). Additionally, because the instruments were predetermined, the reliability and validity of the instruments were already established.

The survey consisted of a 4-part questionnaire to measure sleep quality, mental health and job satisfaction, whilst also recording the biographical information of the participants. The first section consisted of the biographical information questionnaire, followed by the second section of the Pittsburgh Sleep Quality Index (PSQI). The PSQI is a self-administered data collection tool for sleep quality and was most suitable for this study as it measured comprehensively 7 aspects of sleep, whilst also being cost-effective and easy to administer (Manzar et al., 2018). The third section consisted of the General Health Questionnaire -12 (GHQ12), followed by the Minnesota Satisfaction Questionnaire Short Version (MSQ). The GHQ12 was chosen for its property to measure mental health problems and has been used in different contexts and countries (Anjara et al., 2020), whilst the MSQ short version was suitable for this study due to its concise but effective measure of intrinsic, extrinsic and general satisfaction of individuals in a work setting (Bello et al., 2020).

### 3.3.1. Data Collection instruments

The biographical information sheet consisted of 5 questions exploring the age, race, gender, relationship status and shift working period. The demographic information of the participants adds depth to the investigation.

**Table 1**

*Table depicting data collection instruments, measurements and properties.*

<b>Data Collection Instrument</b>	<b>Instrument measures?</b>	<b>Properties of the Instrument</b>
<b>Pittsburgh Sleep Quality Index (PSQI)</b>	The PSQI is a self-rated questionnaire: It consisted of 19 items that evaluated sleep over the course of a month. The questionnaire measures 7 constructs of sleep quality namely: daytime dysfunction, sleep disturbance, sleep medication, subjective sleep quality, sleep efficiency, sleep latency and sleep duration. This instrument measured the sleep quality of the shift workers and provided information on the factors that contributed to the sleep quality experienced.	The PQSI had a content validity of 0.9 and a good construct validity, with a Cronbach alpha of 0,746 for reliability, in a study of healthcare shift workers by Wang et al. (2022). This entails that there is reliability and validity of the instrument in relation to shift workers and the job type of this study. The PSQI has yielded a unifactorial model (Buysse et al., 1989; Zhu et al., 2018) and a dual-factor model (Otero et al., 2022) in

	<p>different studies. The PSQI has been utilised in studies by Lipinska and Thomas (2017); van Wyk et al. (2016) which comprised of South African samples or populations. Furthermore, the PSQI has been adapted for many cultures globally.</p>
<p><b>General Health Questionnaire 12 (GHQ12)</b></p>	<p>The GHQ-12 is a self-reported questionnaire: It includes 12 items which evaluate the current mental health of an individual. The GHQ-12 is an abridged version of the original and is one of the best-validated instruments for measuring mental health (Kim et al., 2013). The instrument contains questions on a 4-point Likert scale and has been used in many countries (Liang et al., 2016).</p> <p>The instrument is validated by the World Health Organisation and had a Cronbach’s alpha of 0,847 in a study conducted on medical doctors in South Africa and therefore suggests its reliability (Govender et al., 2012). This instrument has been found to have a multiple factorial model (Griffith &amp; Jones, 2019; Hystad &amp; Johnsen, 2020), as well as a unifactorial model (Gnambs &amp; Staufenbiel, 2018).</p>

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**Minnesota Satisfaction  
Questionnaire**

The MSQ is a questionnaire that measures the construct of satisfaction in an individual. The MSQ short version was used in this investigation and consists of 20 questions on a 5-point Likert scale. The instrument is designed to measure the extrinsic factors, such as the influence of environmental factors, as well as the intrinsic factors such as those factors which are directly related to the job itself (Polat & Terzi, 2018)

In a study on hospital workers, it was found that Cronbach's alpha was 0.82, implying that the instrument is reliable for employees who possibly work shifts (Khosrojerdi et al., 2018). The instrument has good validity, even in the translated versions that exist (Gholami Fesharaki et al., 2012). This instrument has been found to have a 1-factor model due to the shortened version, with just 20 questions. Additionally, the MSQ has been used on South African participants, in a study conducted by Khunou and Davhana-Maselesele (2016) on the level of job satisfaction amongst nurses.

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### **3.4. Data Collection Procedure**

Access to the shift workers employed at the logistics company, FPT, commenced through communication with the Managing Director (MD) and Head of Human Resources (HR) at FPT. The managing director of FPT was presented with a proposal for this study. The gatekeeper's permission form (Appendix A) provided additional detail and was signed by the managing director, providing consent for the study sample to be derived from this company. Two weeks had been allocated for the data collection process. Due to the COVID-19 pandemic and restrictions of access at the Durban harbour and ports, the researcher liaised with the Head of HR to coordinate the study. The shift workers were informed of the study by the head of HR and the MD of FPT and were subsequently invited to participate in the study voluntarily. The nature of the study was explained to each participant through the information sheet provided in the questionnaire booklet and the researcher gained permission from the 108 shift working employees who wished to be a part of the investigation.

Following a comprehensive understanding of the study, written consent (Appendix C) was obtained from every participant in the study. The questionnaire booklet emphasised the voluntary participation and anonymity of the participants. Additionally, the questionnaire booklet included the contact details of the researcher to ensure accessibility to the participants should they have any questions.

The questionnaires were administered in a hardcopy, pen-and-paper format, as access to electronic copies was not possible due to the nature of the participants' work. As the company employed shift workers nationally, coordination and liaison of the dissemination of the surveys to participants was conducted with the head of HR. Questionnaires were given to the head of HR and were delivered to the 3 operating regions of FPT in Cape Town and Gqeberha, in

addition to the Durban branch. One HR officer in each region was allocated to distribute and collect surveys for this study. The questionnaire took approximately 20-30 minutes to be completed. The data collection process occurred for two weeks in September 2022. A further one week was afforded to accommodate the shift workers' schedules. The questionnaires were disseminated in this manner as the participants worked on a rotational shift cycle and in a high-pressure work environment.

When the participants completed the survey, at their convenience, they were informed to leave the questionnaires in an envelope with the designated HR officer. After the period for the data collection had lapsed, all surveys in the envelopes were sealed and sent back to the head of HR in the Durban branch. The sealed envelopes containing the primary data were collected by the researcher. A total of 108 shift workers participated in the study with 8 participants from Gqeberha, 39 from Cape Town and 61 from Durban.

### **3.5. Data Analysis**

The data collection process yielded a large amount of raw data which was required to be organised into a meaningful form. This remained consistent with the quantitative design of this study, whereby raw data is reduced to a more manageable format through the data analysis process (Scherbaum & Shockley, 2015). The data for this investigation was analysed through the IBM Statistical Package of Social Sciences (SPSS). The SPSS is a computer programme that is very widely used in quantitative studies and is an aid to statistical analysis (Brace et al., 2016). The data was first entered into Microsoft Excel, from where it was transferred to SPSS. The PSQI was scored according to the scoring method to obtain scores for the 7 constructs of sleep – with a final global score of sleep quality yielded (Manzar et al., 2018). The GHQ12 was scored using the 0-1-2-3 method of scoring, which is predominantly used in research, and

yielded a score between 0-36 (Anjara et al., 2020). Additionally, the MSQ was scored on a 5-point Likert scale with “1” being “very dissatisfied” and “5” being “very satisfied”, and produced a range of scores between 20 and 100, with 100 being very satisfied in the job (Chang & Chang, 2019).

**Table 2**

*The analysis tools used for each research question data analysis.*

<b>Research question</b>	<b>The instrument used to collect data</b>	<b>Tool to analyse data</b>
<p>1. What are the levels of sleep quality, mental health and job satisfaction amongst shift workers at a logistics company?</p>	<ul style="list-style-type: none"> <li>• Data on sleep quality was collected with the PSQI.</li> <li>• Data on mental health was collected with the GHQ12.</li> <li>• Data on job satisfaction was collected with MSQ.</li> </ul>	<p>Descriptive statistics through frequency tables and graphs are used to show the levels of sleep quality, mental health and job satisfaction of these employees, respectively.</p>
<p>2. What is the relationship between sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry?</p>	<p>The correlation is done to determine if a relationship exists between two variables and is a univariate measure (Bujang &amp; Baharum, 2016).</p>	<p>Factor analysis and correlations analysis were conducted to yield information on relationships that may exist between the constructs. Additionally, Cronbach’s alpha was used</p>

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		to measure the reliability and validity of the instruments used for sleep quality, mental health and job satisfaction. Pearson's correlational analysis was conducted to obtain the relationships between the constructs.
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3. Does sleep quality mediate the relationship between mental health and job satisfaction amongst shift workers in the logistics industry?	<p>The hierarchical multiple regression is utilised for the mediation process in this study. The mediation involves an intermediate variable between an independent and dependent variable, where the intermediate variable that is hypothesised is aimed to transmit a causal effect from the independent variable to the dependent variable (Agler &amp; De Boeck, 2017)</p>	<p>A hierarchical multiple regression analysis was conducted. Sobel's Test was done to obtain the mediation. Sobel's test examines if the inclusion of the mediator in the regression analysis diminishes the effect that the independent variable has on the dependent variable (Preacher &amp; Leonardelli, 2020).</p>
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### **3.6. Reliability and Validity**

Rigour, which is the extent of research quality, is essential for quantitative research (Heal & Twycross, 2015). The rigour of a study is achieved through the reliability and validity of the instruments used and the study itself. According to Heal and Twycross (2015), reliability is the level to which a study or instrument is consistent in what it proposes to measure. Sürücü and Maslakçi (2020), substantiate that reliability is an indicator of the stability of the instruments and the results yielded. The internal consistency, and by extension the reliability, of the instruments, is measured by calculation of Cronbach's alpha. A high Cronbach's alpha is indicative of a strong correlation between the constructs in the investigation (Heal & Twycross, 2015).

According to Heal and Twycross (2015), validity is the level to which the study or instrument accurately measures what it proposes. Essentially, validity testing is conducted to assess whether the instrument measures what it proposes to. The construct and criterion validity of the instruments in this investigation is vital. This is to assess if the instruments cover the domain of the study and if the concepts and aspects of the instruments are accurate in their measure (Heal & Twycross, 2015). The construct validity of the instruments, and by extension the study, is crucial as it ensures that the specific behaviour is measured precisely (Sürücü & Maslakçi, 2020). The correlation scores of the instruments are calculated to establish the criterion validity of the study.

Additionally, the systematic random sampling technique employed for this study has internal and external validity (Acharya et al., 2013). Therefore, the rigour of the study lies in the exploration of the reliability and validity of the instruments in previous studies so that the suitability for the current investigation could be established. The reliability and validity of the

instruments and methods used in this investigation were established to protect the participants and the results yielded from the investigation, by preventing harm, through accurate measures and measuring what is indicated.

### **3.7. Ethical Considerations**

Before this study, a proposal was submitted to the University of KwaZulu-Natal Humanities and Social Sciences Research Ethics Committee (HSSREC), to gain ethical clearance to conduct this investigation (Appendix E). Ethical clearance for this research was granted on 19 August 2022 with Protocol reference number: HSSREC/00004440/2022. This research adhered to the ethical guidelines set out by the HSSREC. Furthermore, other ethical considerations such as anonymity, consent and confidentiality were thoroughly outlined such that the participants in this study were unharmed and respected.

#### **3.7.1. Anonymity**

Anonymity refers to the collection of data without obtaining any identifiable information about the participants (Coffelt, 2017). Essentially, this implies that the participants of the investigation would remain unnamed. Rather each participant was assigned a number for the purpose of data analysis. The demographic information of the participants were recorded but no names were attached to the information – thus maintaining the anonymity of the participants.

#### **3.7.2. Consent**

Informed consent refers to informing the participant of their rights, providing the potential risks and benefits, detailing the purpose of the investigation and delineating the extent of the confidentiality in the study (Nijhawan et al., 2013). Essentially, the participant is informed of all vital information to voluntarily participate in the investigation and consent. All information

to obtain informed consent was provided to each shift working employee before participation, in the form of an information sheet and a consent form which was signed. The signed consent form only required the signature of the participant, adhering to the anonymity of the investigation.

### **3.7.3. Confidentiality**

The concept of confidentiality refers to the separation or modification of identifiable information from the participants of a study (Coffelt, 2017). Confidentiality is based on the principle of respect for the participant and entails non-disclosure of names or identities of participants. Any names that were provided to the researcher were not recorded and were not mentioned in this investigation.

Signed forms of the participants adhere to the principle of informed consent, anonymity and confidentiality by remaining unattached to any names or forms of identity. Furthermore, the data for this investigation would be stored with the research supervisor in a locked drawer or vault for 5 years after which, the data will be destroyed, according to the UKZN Policy of Research Ethics (CO/06/2906/07).

### **3.8. Limitations**

This study and data collection took place during the COVID-19 pandemic when certain restrictions applied for occupational reasons for organisations, and protocols and restrictions needed to be observed. Furthermore, as the data for this study was collected at a national company, coordination between when data would be available for the collection was a challenge. However, this was mitigated through liaising with the head of HR ensuring that data was handled with care and confidentiality. Additionally, the biographical data portion of the questionnaire did not specify the region or branch that each shift worker came from (as this

may have posed a threat to anonymity). However, the number of participants from each region was tallied upon collection of the surveys and thus the number of participants ascertained from each region was obtained by the researcher (for data analysis purposes).

Due to the sensitivity of the data relating to job satisfaction and participants' doubts about anonymity and confidentiality, other shift workers in the organisation refused to participate – hence the sample of 108 from 122 shift workers. The questionnaire detailed the information on confidentiality and anonymity; however, this study was voluntary and as such shift workers in the organisation were free to agree or disagree to participate. Furthermore, two weeks were allocated to data collection but due to the occupational constraints of the participants and the high-pressured and demanding work environment, more time was needed for participants to consciously dedicate themselves to completing the questionnaires. This time constraint issue was mitigated by allocating a further week to the data collection process.

### **3.9. Conclusion**

Chapter 3 details the step-by-step methodological processes that were undertaken to conduct this investigation. The measuring tools and instruments are detailed and the reliability and validity of the PSQI, GHQ-12 and MSQ are provided. Furthermore, information on the research participants and the sampling strategy is provided to extend the level of transparency that this chapter offers.

## Chapter 4: Results

This chapter provides the results found in the research study. This chapter aims to provide the results obtained from the collected data in relation to the aims and objectives set out for this study. The reliabilities of the three constructs; namely sleep quality, mental health and job satisfaction are provided, as well as the factor analyses for each – followed by the descriptive statistics of the sample. Pearson’s correlational analysis is then provided to illustrate the relationships that exist between the constructs, followed by multiple hierarchical regression to address the mediated relationship within the study.

This study utilised demographic questions, PSQI, MSQ and GHQ12 to obtain primary data from shift workers at FPT and yielded a total of 108 responses. However, a total of 6 questionnaires were incomplete and thus, a total of 102 completed questionnaires were used for the data analysis presented in this section.

### 4.1. Description of sample

**Table 3**

*Gender*

		Frequency	Percent
Valid	Male	75	73.5
	Female	27	26.5
	Total	102	100.0

Table 3 highlights that the majority of the participants were male which made up 73.5% (75) of the sample, while 26.5% (27) were female.

**Table 4***Age*

		Frequency	Percent
Valid	18-24	9	8.8
	25-34	30	29.4
	35-44	35	34.3
	45-54	24	23.5
	55+	4	3.9
	Total	102	100.0

Table 4 highlights that the majority of the participants were over 35 years of age, which made up 61.7% (63) of the sample. It was found that 8.8% (9) were aged between 18-24 years, 29.4% (30) were 25-34 years, 34.3% (35) were aged 35-44%, 23.5% (24) were aged 45-54, and finally 3.9% (4) were aged 55 years and above.

**Table 5***Marital Status*

		Frequency	Percent
Valid	Single	53	52.0
	Married	45	44.1
	Divorced	1	1.0
	Widow	3	2.9
	Total	102	100.0

Table 5 highlights that the majority of the participants were single, thereby making up 52% (53) of the sample. It was found that 44% (45) were married, 2.9% (3) were widowed and 1% (1) were divorced.

**Table 6**

*Race*

		Frequency	Percent
Valid	Black	51	50.0
	White	2	2.0
	Coloured	20	19.6
	Indian	29	28.4
	Total	102	100.0

Table 6 highlights that the majority of the participants were Black and made up 50% (51) of the sample. It was found that 28.4% (29) were Indian, 19.6% (20) were Coloured and 2% (2) were White.

**Table 7**

*Years employed in the organisation*

		Frequency	Percent
Valid	Less than a year	7	6.9
	1-2 years	29	28.4
	3-5 years	25	24.5
	6-10 years	13	12.7
	10 years +	28	27.5

Total	102	100.0
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Table 7 highlights that the majority of the participants had been employed at the organisation for 5 years or less and made up 59.8% (61) of the sample. It was found that 6.9% (7) worked for less than a year in the organisation, 28.4% (29) worked for the organisation for 1-2 years, 24.5% (25) worked for the organisation for 3-5 years, 12.7% (13) worked for the organisation for 6-10 years, and finally, 27.5% (28) worked for 10 years or more at the organisation.

**Table 8**

*Period of working shifts*

	Frequency	Percent	
Valid	Less than a year	6	5.9
	1-2 years	26	25.5
	3-5 years	27	26.5
	6-10 years	16	15.7
	10 years+	27	26.5
	Total	102	100.0

Table 8 highlights that the majority of the participants have been working shifts for 5 years or less and made up 57.9% (59) of the sample. It was found that 5.9% (6) worked shifts for less than a year, 25.5% (26) worked shifts for 1-2 years, 26.5% (27) worked shifts for 3-5 years, 15.7% (16) worked shifts for 6-10 years, and finally, 26.5% (27) worked shifts for 10 years or more.

## 4.2. Factor Analysis

Exploratory factor analyses were conducted on each of the three constructs. The results are presented in the sections that follow.

### 4.2.1. Pittsburgh Sleep Quality Index (PSQI)

The results from the KMO and Bartlett's Test of Sphericity showed a score of .726 as well as the scores being significant ( $p=.000$ ) so from this result the factor analysis is appropriate to run (See Table 9). From the correlation matrix, items did not exceed 0.9 so they are not too high or show a multicollinearity issue.

**Table 9**

*KMO and Bartlett's Tests for Pittsburgh Sleep Quality Index*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.726
Approx. Chi-Square		116.381
Bartlett's Test of Sphericity	Df	21
	Sig.	.000

The results from the exploratory factor analysis showed a concentration of seven-factor loadings. A reliability analysis was conducted on this combination of factor loadings and the Cronbach Alpha statistic was 0.668 which demonstrated an acceptable level of reliability.

**Table 10***Reliability Statistics for Pittsburgh Sleep Quality Index*

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.668	.707	7

In addition, each of the factor loadings were between 0.4 and 0.7 which reinforces that each of the items fits within this construct.

**Table 11***Component Matrix<sup>a</sup> for Pittsburgh Sleep Quality Index*

	Component
	1
Subjective sleep quality	.735
Sleep latency	.578
Sleep duration	.453
Habitual sleep efficiency	.481
Sleep disturbances	.673
Use of sleeping medication	.617
Daytime dysfunction	.661

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Furthermore, more than 35% of the variance in the scale has been drawn from only one factor and, therefore, for this research and the reflection of current research, only one factor has been drawn for this research and labelled Global Sleep Score.

**Table 12**

*Total variance explained for Pittsburgh Sleep Quality Index*

Component	Initial Eigenvalues			Extraction Sums of Squared		
	Total	% of Variance	Cumulative %	Loadings		
				Total	% of Variance	Cumulative %
1	2.581	36.865	36.865	2.581	36.865	36.865
2	1.077	15.384	52.249			
3	.983	14.037	66.286			
4	.719	10.267	76.553			
5	.658	9.404	85.957			
6	.569	8.126	94.083			
7	.414	5.917	100.000			

Extraction Method: Principal Component Analysis.

#### **4.2.2. General Health Questionnaire 12 (GHQ 12)**

The results from the KMO and Bartlett's Test of Sphericity showed a score of .876 as well as the scores being significant ( $p=.000$ ) so from this result the factor analysis is appropriate to run (See Table 13). From the correlation matrix, items did not exceed .9 so they are not too high or show a multicollinearity issue.

**Table 13***KMO and Bartlett's test for General Health Questionnaire 12*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.876
	Approx. Chi-Square	657.174
Bartlett's Test of Sphericity	Df	66
	Sig.	.000

The results from the exploratory factor analysis showed a concentration of twelve-factor loadings. A reliability analysis was conducted on this combination of factor loadings and the Cronbach Alpha statistic was 0.905 which demonstrated excellent levels of reliability.

**Table 14***Reliability Statistics for General Health Questionnaire 12*

Cronbach's Alpha	Cronbach's Alpha Based on	
	Standardised Items	N of Items
.905	.903	12

In addition, each of the factor loadings were between 0.4 and 0.8 which reinforces that each of the items fits within this construct.

**Table 15***Component matrix<sup>a</sup> for General Health Questionnaire 12*

	Component
	1
Been able to concentrate on what you're doing?	.722
Lost much sleep over worry?	.790
Felt you were playing a useful part in things?	.435
Felt capable of making decisions of things?	.582
Felt constantly under strain?	.717
Felt you couldn't overcome your difficulties?	.766
Been able to enjoy your normal day-to-day activities?	.542
Been able to face up to your problems?	.734
Been feeling unhappy and depressed?	.785
Been losing confidence in yourself?	.872
Been thinking of yourself as a worthless person?	.736
Been feeling reasonably happy, all things considered?	.658

---

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Furthermore, more than 50% of the variance in the scale has been drawn from only one factor and therefore for this research, only one factor has been drawn and labelled General Health Score.

**Table 16***Total variance explained for General Health Questionnaire 12*

Component	Initial Eigenvalues			Extraction Sums of Squared		
	Total	% of Variance	Cumulative %	Loadings		
				Total	% of Variance	Cumulative %
1	5.959	49.656	49.656	5.959	49.656	49.656
2	1.219	10.160	59.816			
3	.942	7.851	67.667			
4	.792	6.599	74.266			
5	.659	5.488	79.754			
6	.624	5.197	84.951			
7	.463	3.859	88.811			
8	.368	3.065	91.876			
9	.340	2.832	94.707			
10	.298	2.483	97.191			
11	.188	1.564	98.755			
12	.149	1.245	100.000			

Extraction Method: Principal Component Analysis.

**4.2.3. Minnesota Satisfaction Questionnaire (MSQ)**

The results from the KMO and Bartlett's Test of Sphericity showed a score of .883 as well as the scores being significant ( $p=.000$ ) so from this result the factor analysis is appropriate to run (See Table 17). From the correlation matrix, items did not exceed .9 so they are not too high or show a multicollinearity issue.

**Table 17***KMO and Bartlett's test for Minnesota Satisfaction Questionnaire*

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.883
	Approx. Chi-Square	1135.561
Bartlett's Test of Sphericity	Df	190
	Sig.	.000

The results from the exploratory factor analysis showed a concentration of twenty-factor loadings. A reliability analysis was conducted on this combination of factor loadings and the Cronbach Alpha statistic was 0.928 which demonstrated excellent levels of reliability.

**Table 18***Reliability Statistics for Minnesota Satisfaction Questionnaire*

Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
.928	.927	20

In addition, each of the factor loadings were between 0.4 and 0.8 which reinforces that each of the items fits within this construct.

**Table 19***Component matrix<sup>a</sup> for Minnesota Satisfaction Questionnaire*

	Component
	1
Being able to keep busy all the time	.514
The chance to work alone on the job	.473
The chance to do different things from time to time	.713
The chance to be somebody in the community	.709
The way my boss handles his or her workers	.810
The competence of my supervisor in making decisions	.815
Being able to do things that don't go against my conscience	.700
The way my job provides for steady employment	.490
The chance to do things for other people	.726
The chance to tell people what to do	.653
The chance to do something that makes use of my abilities	.744
The way company policies are put into place	.547
My pay and the amount of work I do	.597
The chances for advancement on this job	.650
The freedom to use my own judgement	.747
The chance to try my own methods of doing the job	.754
The working conditions	.668
The way my co-workers get along with each other	.399
The praise I get for doing a good job	.652
The feeling of accomplishment I get from the job	.566

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Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Furthermore, more than 40% of the variance in the scale has been drawn from only one factor and, therefore, for the purposes of this research only one factor has been drawn for this research and labelled Job Satisfaction Score.

### 4.3. Descriptive Statistics

Descriptive statistics aim to provide information on the distribution of scores and their interrelationships. Sleep quality is measured in a 5-point Likert Scale ranging from (1 = strongly disagree through to 5 = strongly agree) and Table 18 presents descriptive statistics for the Pittsburgh Sleep Quality Index.

**Table 20**

*Descriptive statistics for the Pittsburgh Sleep Quality Index*

Items	Mean	Std. Deviation	Minimum	Maximum	Range	Skewness	Kurtosis
Subjective sleep quality	1.04	0.820	0	3	3	0.367	-0.478
Sleep latency	1.12	0.749	0	2	2	-0.196	-1.180
Sleep duration	1.60	0.870	0	3	3	-0.675	-0.359
Habitual sleep efficiency	1.78	1.473	0	3	3	-0.395	-1.872
Sleep disturbances	1.23	0.595	0	3	3	0.172	0.131

Use of sleeping medication	0.63	0.911	0	3	3	1.215	0.291
Daytime dysfunction	0.83	0.955	0	3	3	0.759	-0.627
Sleep score global	8.24	3.810	0	18	18	0.375	-0.239

The average range of the global sleep score was from 0-18 ( $M=8.24$ ,  $SD= 3.810$ ). Sleep quality was approximately normally distributed with a skewness of 0.375 ( $SE=0.239$ ) and a Kurtosis of -0.239 ( $SE=0.474$ ).

**Table 21**

*Descriptive Statistics for the General Health Questionnaire 12*

Item	Mean	Std. Deviation	Minimum	Maximum	Range	Skewness	Kurtosis
Been able to concentrate on what you're doing?	2.03	0.789	1	4	3	0.934	1.061
Lost much sleep over worry?	1.83	0.913	1	4	3	0.97	-0.036
Felt you were playing a	1.99	0.751	1	4	3	1.017	1.616

useful part in things?							
Felt capable of making decisions of things?	1.92	0.670	1	4	3	0.695	1.429
Felt constantly under strain?	2.06	1.032	1	4	3	0.541	-0.909
Felt you couldn't overcome your difficulties?	1.75	0.861	1	4	3	0.974	0.235
Been able to enjoy your normal day- to-day activities?	2.18	0.723	1	4	3	0.680	0.752
Been able to face up to your problems?	2.10	0.738	1	4	3	0.747	0.916

Been feeling unhappy and depressed?	1.77	1.004	1	4	3	1.068	-0.070
Been losing confidence in yourself?	1.57	0.907	1	4	3	1.621	1.701
Been thinking of yourself as a worthless person?	1.38	0.797	1	4	3	2.194	4.025
Been feeling reasonably happy, all things considered?	1.91	0.691	1	4	3	0.669	1.081
<hr/> GHQ Score	22.500	6.968	12.000	44.000	32.00 0	1.234	0.868

The average range of the general health score was from 0-36 ( $M=22.5$ ,  $SD= 6.968$ ). Mental health was approximately normally distributed with a skewedness of 1.234 ( $SE=0.239$ ), and a Kurtosis of 0.868 ( $SE=0.474$ ).

**Table 22***Descriptive Statistics for the Minnesota Satisfaction Questionnaire*

Item	Mean	Std. Deviation	Minimum	Maximum	Range	Skewness	Kurtosis
Being able to keep busy all the time	3.70	0.983	1	5	4	-0.502	-0.179
The chance to work alone on the job	3.75	0.849	2	5	3	-0.295	-0.451
The chance to do different things from time to time	3.56	1.086	1	5	4	-0.414	-0.651
The chance to be somebody in the community	3.40	0.947	1	5	4	-0.247	-0.083
The way my boss handles his or her workers	3.45	1.325	1	5	4	-0.387	-1.105
The competence of my supervisor in making decisions	3.46	1.340	1	5	4	-0.444	-1.077

Being able to do things that don't go against my conscience	3.67	0.937	1	5	4	-0.387	0.311
The way my job provides for steady employment	4.04	0.964	1	5	4	-0.824	0.080
The chance to do things for other people	3.74	0.954	1	5	4	-0.491	-0.001
The chance to tell people what to do	3.41	1.028	1	5	4	-0.009	-0.474
The chance to do something that makes use of my abilities	3.68	0.946	1	5	4	-0.667	0.467
The way company policies are put into place	3.45	1.059	1	5	4	-0.379	-0.484
My pay and the amount of work I do	2.58	1.308	1	5	4	0.150	-1.285

The chances for advancement in this job	2.89	1.218	1	5	4	-0.025	-0.882
The freedom to use my judgement	3.19	1.303	1	5	4	-0.189	-0.984
The chance to try my methods of doing the job	3.38	1.194	1	5	4	-0.355	-0.602
The working conditions	3.45	1.140	1	5	4	-0.470	-0.454
The way my co-workers get along with each other	3.81	1.051	1	5	4	-0.715	-0.033
The praise I get for doing a good job	3.35	1.183	1	5	4	-0.245	-0.797
The feeling of accomplishment I get from the job	3.99	0.917	1	5	4	-0.844	0.803
MSQ_Score	69.9510	14.22895	30.00	100.00	70.00	-0.153	-0.487

The average range of the job satisfaction score was from 0-100 ( $M=69.95$ ,  $SD= 14.228$ ). Job satisfaction was approximately normally distributed with a skewedness of  $-0.153$  ( $SE=0.239$ ) and a Kurtosis of  $-0.487$  ( $SE=0.474$ ).

#### 4.4. Pearson’s Correlation

**Table 23**

*Pearson correlation for PSQI, GHQ and MSQ*

		Sleep score global	GHQ_Score	MSQ_Score
Sleep score global	Pearson	1	.586**	-.349**
	Correlation			
GHQ_Score	Pearson		1	-.396**
	Correlation			
MSQ_Score	Pearson			1
	Correlation			

\*\* . Correlation is significant at the 0.01 level (2-tailed).

There are linear relationships between all constructs. When the correlation coefficient is positive, it indicates that as one index score increases; the other index score will also increase. And vice versa. When the correlation coefficient is negative, it denotes that as one index score increases, the other index score will decrease.

The relationship between sleep quality and general health quality – Correlation coefficient denoted by  $r$  is 0.586. This means that as the mental health score decreases, the sleep quality score also decreases with an individual experiencing better sleep ( $r = 0.586$ ,  $p$ -value  $< 0.05$ ).

The relationship between sleep quality and job satisfaction – The correlation coefficient denoted by  $r$  is -0.349. This indicates that as the job satisfaction score increases the sleep quality score decreases. This means that people with better job satisfaction also experience better sleep quality ( $r = -0.349, p\text{-value} < 0.05$ )

The relationship between mental health and job satisfaction – The correlation coefficient denoted by  $r$  is -0.396 which indicates that as the mental health score decreases job satisfaction score increases. This means that individuals experiencing better mental health are more satisfied at work ( $r = -0.396, p\text{-value} < 0.05$ ).

#### 4.5. Hierarchical Multiple Regression Analysis

**Table 24**

*Hierarchical Multiple Regression Analysis*

	MSQ > GHQ			MSQ + SQ > GHQ			MSQ > SQ		
	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$	<i>B</i>	<i>SE</i>	$\beta$
Intercept	36.075	3.20		22.323	3.57		14.768	1.79	
		9			1			1	
Minnesota									
Satisfaction	-0.194***	0.04	-	-	0.04	-	-	0.02	-
Questionnaire		5	0.39	0.107**	1	0.21	0.093*	5	0.34
(MSQ)			6			9	**		9
Pittsburgh									
Sleep Quality				0.931**	0.15	0.50			
Index (SQ)				*	4	9			
<i>F</i>	18.633**			30.965*			13.849		
	*			**			***		

$R^2$	0.157	0.385	0.122
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Notes: GHQ = General Health Questionnaire,  $B$  = unstandardised parameters,  $\beta$  =

standardised parameters, \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ ,  $p < 0.10$

Table 24 indicates that 15.7% of GHQ can be predicted by MSQ ( $R^2 = 0.157$ ;  $F = 18.633$ ,  $p < 0.00$ ). Furthermore, the relationship between GHQ and MSQ was determined by the regression coefficient which was negative and statistically significant ( $\beta = -0.396$ ;  $t = -4.317$ ;  $p < 0.00$ ).

Table 24 indicates that 38.5% of GHQ can be predicted by MSQ ( $R^2 = 0.385$ ;  $F = 30.965$ ,  $p < 0.00$ ). Overall, SQ showed the highest contributing model ( $\beta = 0.509$ ;  $t = 6.054$ ;  $p < 0.00$ ) and was positive and statistically significant. However, MSQ ( $\beta = -0.219$ ;  $t = -2.600$ ;  $p < 0.00$ ) showed a diminished contribution even though it was still negative and statistically significant.

Table 24 indicates that 12.2% of SQ can be predicted by MSQ ( $R^2 = 0.122$ ;  $F = 13.849$ ,  $p < 0.00$ ). Furthermore, the relationship between MSQ and SQ was determined by the regression coefficient which was negative and statistically significant ( $\beta = -0.349$ ;  $t = -3.721$ ;  $p < 0.00$ ).

**Table 25***Sobel's Test results*

Input		Test Statistic	Std Error	p-value
A	-0.093	-3.168	0.027	0.002
B	0.931			
S <sub>a</sub>	0.025			
S <sub>b</sub>	0.154			

The Sobel test confirmed that Sleep Quality is the mediating variable between MSQ and GHQ as the Z score was confirmed as  $Z = -3.168$  and  $p = 0.002$ . According to this mediation analysis, sleep quality mediates the relationship between mental health and job satisfaction amongst shift workers in the logistics industry.

Therefore, it can be concluded that sleep quality does mediate the relationship between job satisfaction and mental health.

#### **4.6. Conclusion**

This chapter contained the results that were yielded according to the research aim, objectives and questions set out at the beginning of this study. The details of the findings after data analysis using the SPSS system and different analysis methods are also depicted in this chapter.

## **Chapter 5: Discussion of Results**

This chapter provides a discussion of the results obtained in this study. This discussion includes the results of the analyses conducted and the various studies that resonate with this study. This section will also answer the 3 research questions posed:

1. What are the levels of sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry?
2. What is the relationship between sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry?
3. Does sleep quality mediate the relationship between mental health and job satisfaction amongst shift workers in the logistics industry?

### **5.1. Demographic information about the sample**

The number of shift workers sampled across FPT totalled 108 participants. The sample consisted of 75 Males (73%) and 27 Females (26.5%). The biographical data found that the majority of the participants were aged between 35 – 44 years, which made up 34.3% (35) of the sample. It was found that 29.4% (30) of the participants were aged between 25 – 34 years old, 23.5% (24) were aged between 45 – 54 years old, 8.8% (9) were aged between 18 – 24 years old and 3.9% (4) were aged 55 years and older. The demographics of the marital status of the participants indicated that the majority of the participants were Single, which made up 52% (53) of the sample. It was found that 44% (45) of the participants were Married, 2.9% (3) were Widowed and 1% (1) were Divorced. Furthermore, the racial demographics depicted that the majority of participants were Black and made up 50% (51) of the sample. It was found that 28.4% (29) of the participants were Indian, 19.6% (20) were Coloured and 2% (2) of the participants were White.

The demographics for the number of years that participants were employed in the organisation, indicated that the majority of the participants were employed in the organisation for 1 – 2 years, which made up 28.4% (29) of the sample. It was found that 27.5% (28) of the participants were employed for 10 years or more by the organisation, 24.5% (25) were employed for 3 – 5 years, 12.7% (13) were employed for 6 – 10 years and 6.9% (7) were employed for less than a year in the organisation. Results from the sample indicated that 26.5% (27) of the participants had been working shifts for 3 – 5 years, and 26.5% (27) of the participants had been working shifts for 10 years or more. It was found that 25.5% (26) of the participants were working shifts for a period of 1 – 2 years, 15.7% (16) were working shifts for 6 – 10 years and 5.9% (6) of the participants were working shifts for less than a year.

### **5.1.1. Factor Analysis results**

One of the aims and objectives of this investigation was to examine the relationship between sleep quality, mental health and job satisfaction. Additionally, it was essential to determine the nature of each of the instruments used, and the factor loadings of each of the constructs aided in this. An exploratory factor analysis was conducted on the items of the 3 instruments measuring the 3 constructs; namely sleep quality, mental health and job satisfaction. The factor analysis of the PSQI revealed that a one-factor model was the best fit for this investigation, which is a departure from studies which have found the two-factor model to be superior (Otero et al., 2022). However, despite support for the dual-factor model, the empirical evidence from this investigation supports the one-factor model and is consistent with Zhu et al. (2018) and the original unidimensional factor model as suggested by Buysse et al. (1989).

The exploratory factor analysis of the GHQ12 yielded a one-factor model as well, which is best fit for the investigative nature of this research. Although recent studies (Griffith & Jones, 2019;

Hystad & Johnsen, 2020), have identified the multidimensional factor structure as appropriate, some studies have identified that the debate on the factor structure of the GHQ-12 is ongoing, and the best-fit factor structure, in some cases, appears to be the unidimensional factor structure (Gnambs & Staufienbiel, 2018). The unidimensional factor structure yielded by this investigation is, therefore, consistent with the findings by Gnambs and Staufienbiel (2018). Additionally, the exploratory factor analysis of the MSQ for this investigation yielded a unidimensional factor structure, which is consistent with Maloba and Pillay-Naidoo (2022). The nature of the study also considers a mediation between the constructs of this study, thus making the unidimensional factor structure appropriate.

### **5.1.2. Descriptive data of this investigation**

The internal reliability of the PSQI scale in the study is  $\alpha = .668$ . This is consistent with Wang et al. (2022), in relation to shift workers and the instrument can be considered reliable and valid for this context. The internal reliability of the GHQ12 scale for this investigation is  $\alpha = .905$ , which is consistent with and surpasses Govender et al. (2012) and indicated the instrument's reliability in the South African context. The internal reliability for the MSQ scale for this study is  $\alpha = .928$ . This is consistent with and surpasses Khosrojerdi et al. (2018) and is indicative of the reliability and validity of this measure in the context of shift workers.

According to the results of this research, which was conducted to examine in part, the levels of sleep quality, mental health and job satisfaction - the average level of sleep in the sample was 8.24. In light of this, and according to the original design and interpretation of the PSQI, this score ( $M=8.24$ ) is indicative of low to poor sleep quality within this logistics industry sample. This is consistent with McDowall et al. (2017) and due to the rotating shift work nature, can be further related to Ganesan et al. (2019). As proven by previous studies and consistent with this

investigation, sleep quality is indicated as poor amongst shift workers despite the context or industry. This implies that the level of sleep quality in logistic shift workers is compromised and could face further detriment if efforts to correct this are not implemented.

The aspect of the rotating shift pattern can be a possible contributor to the quality of sleep experienced among these shift workers. Furthermore, the poor sleep quality can conceivably be attributed to fatigue and sleepiness experienced due to rotating shifts, as suggested by Di Muzio et al. (2019). Moreover, the differentiation in light exposure and changes to the circadian rhythm can also be viewed as a cause of poor sleep quality as Richter et al. (2016) and Tomic and Liu (2017) established. The aspect of rotating shifts can also be considered a key factor in the secretion of the hormone melatonin, which is synchronised with the circadian rhythm of the body. Thus, the factor of rotating shifts and poor sleep is indicative of the desynchronisation of the circadian rhythm and melatonin secretion amongst these shift workers and relates to the findings by Papantoniou et al. (2014). In conjunction with poor sleep levels, it is possible that these employees who work with heavy machinery and transportation, as required by the logistics industry, are more vulnerable to incident-causing behaviour and sleeping on the job, consistent with Vedaa et al. (2019). The results of this study further relate to the alertness and fatigue that these employees may be experiencing due to poor sleep quality, and the timing of breaks in tasks and shift schedules as found by Chang et al. (2019), can be considered a component amongst these employees.

The lack of sleep quality can also affect the physical health of such individuals and, as suggested by Nea et al. (2015), render these employees more susceptible to diseases such as cancer and metabolic syndrome, due to the possible detrimental lifestyle behaviours and poor diet which accompanies this type of work and lack of sleep. The physiological and behavioural

changes associated with shift work, such as a lack of sleep and poor diet, can predispose these employees to heart disease and type-2 diabetes as argued by Moreno et al. (2019). Additionally, as this investigation was conducted during the COVID-19 pandemic, it is also vital to consider the influence of this external factor on the sleep quality experienced by these shift workers. Spielman's Three-Factor insomnia model, as a theoretical model for this investigation, can be applied to the additional contextual factors which affect shift workers during the pandemic. In accordance with Talbot and Harvey (2016), it can be inferred that predisposing factors such as the circadian rhythm misalignment amongst these employees, together with the precipitating factors, such as stress associated with the health crisis presented by the pandemic, interacted with the perpetuating factors such as how individuals coped with the pandemic. Furthermore, this is suggestive of the possible sleep disorder such as sleep apnoea as mentioned by Pinto et al. (2016), which is caused by obstructive sleep, or insomnia which according to Chatterjee and Ambekar (2017) is associated with shift work.

The average level of mental health in the sample was 22.5, indicating that shift workers in this logistics industry sample have a severe level of psychological distress. This finding is consistent with that of Memish et al. (2017), who ascertained that mental health problems are becoming more prevalent at work. Furthermore, this is in conjunction with the findings of Torquati et al. (2019), that the mental health of shift-working employees is poor. This low level of mental health amongst these employees can be attributed to circadian disruption which, according to Walker et al. (2020), can be considered a contributor to the symptoms that could create a predisposition to mental health disorders. The role of the pandemic can also be identified as a contributor to the mental health state of these individuals, as this external factor affected individuals globally, not just in a specific industry or category. Such results, as yielded in this study can be observed in tandem with a study by Kim et al. (2020), where South African

individuals' mental health was affected by the pandemic. The poor levels of mental health in this study are consistent with Teker and Luleci (2018), who found that factors such as income level, quality of relationships and social environments can affect the mental health of employees. This is also consistent with Arlinghaus et al. (2019), suggesting that the relationship between work and social lives due to shift scheduling, may produce added strain on the mental health of these individuals.

The stress that accompanies any work or job is also a factor that can be actively considered to underpin the mental health experienced by shift workers in this industry. In accordance with (Nzozzo, 2017), work stress relating to shift work job characteristics could be suggested as causing possible burnout in the employees, and the work environment as suggested by Paunio et al. (2015) could be affecting the mental health state of these shift workers. Furthermore, utilising the Broaden and Build theory, it becomes suggestive that the personal and psychological resources within these employees may be diminished, or have not even been stimulated to aid in mental health restoration. The poor mental health of these employees can also be attributed to the gaps in mental health promotion and possibly the allocation of mental health resources which Szabo and Kaliski (2017) highlighted as always being problematic in South Africa. It is also very possible that the results of poorer mental health in these individuals are a manifestation of the high chance that these employees are experiencing symptoms associated with SWD (Kalmbach et al., 2015).

The average level of job satisfaction in this sample is 69.95 which indicates that the levels of satisfaction that shift workers in this logistics industry sample experienced is fairly good. This is in contradiction to Jaradat et al. (2017), who found that poor job satisfaction was experienced in shift workers. However, the average levels of job satisfaction in this study are consistent

with the findings of Hoboubi et al. (2017). There are numerous factors which can be contributing to the average levels of job satisfaction such as lack of job rotation, monotonous work and employee engagement as suggested by van Wyk et al. (2016). Additionally, the concept of job satisfaction is subjective in nature and personal circumstances would also need to be considered.

In the wake of COVID-19, the way in which people work and experience meaningful work has also changed and become more pronounced. Work environment and organisational culture may be more inclined to affect how these shift workers perceive their satisfaction at work, according to Sharma (2017). The average level of job satisfaction amongst the participants of this study also indicates that there is perhaps a balance between the autonomy and self-determination experienced as suggested by Demircioglu (2021), and the work-related stress as suggested by Hoboubi et al. (2017). Additionally, when factors for satisfaction at work such as pay, benefits and recognition are neglected, there is a greater chance of job dissatisfaction as Mathevula (2017) found. Therefore, in accordance with the Herzberg Two-Factor theory which underpins this study, the possible hygiene factors and motivators amongst these shift workers are indicative of being average and not substantial enough to yield good job satisfaction amongst these employees. A possibility also exists that the shift working employees are content with their job, given that 42.2% have been employed as shift workers for over 6 years but lack the adequate motivators and hygiene factors to move past an average level of satisfaction at work. It is also possible that, given the nature of the job and years working shifts, these employees are experiencing a sense of burnout as suggested by Wisetborisut et al. (2014), which could be enhanced by the pandemic stressors.

### 5.1.3. Pearson's Correlation Analysis

One of the objectives of this investigation was to measure the relationship between Sleep Quality, Mental Health and Job Satisfaction. This objective was achieved through Pearson's correlation analysis which yielded Pearson's coefficient for each construct. This coefficient was used to establish the relationship between the constructs.

The results of the analysis indicate that the relationship between Sleep Quality and Mental Health is significant ( $p < 0.05$ ) and that they are positively related. This indicates that as mental health improves, so does sleep quality. Similarly, this supports the idea that a shift-working individual displaying poorer mental health is more likely to experience decreased levels of sleep quality. These findings can be contextualised in previous studies (Stanton et al., 2020; Villadsen et al., 2021) which have found a direct and positive relationship between mental health and sleep quality. Furthermore, the relationship between mental health and sleep quality appears to be bi-directional in nature, whereby one influences the other – thus, as indicated by Neculicioiu et al. (2022), the two are inextricably linked. The results of this study are also consistent with Kim et al. (2020), who found that beneficial sleep, also known as quality sleep, had the effect of reducing symptoms of anxiety in employees. Extrapolated for shift workers, this indicates that poor shift schedules that do not allow for quality sleep can contribute to the development of mental ill-health in these employees.

The findings of Pearson's correlation analysis further indicate that Sleep Quality and Job Satisfaction are related ( $r = -0.349$ ,  $p$ -value  $< 0.05$ ), in that as job satisfaction amongst these employees increases, so too do they experience better sleep quality. This is consistent with Barnes et al. (2013) and does imply that poorer sleep or sleep loss is inclined to leave employees in a compromised state of mind and thus, leave employees feeling less capable of executing

tasks or feeling frustrated and inadequate at work. However, results from this study which indicate that sleep quality is poor and job satisfaction is average may suggest that an average satisfaction with the job and the nature of the job may be contributing to the type of quality of sleep experienced. The other aspect of the work environment and the context of the shift worker may be impacting the sleep experienced, as conveyed by Shatté et al. (2017).

The findings of Pearson's correlation analysis indicate that Mental Health and Job Satisfaction are related ( $r = -0.396$ ,  $p\text{-value} < 0.05$ ), in that, as mental health amongst these employees increases, a greater level of job satisfaction is experienced. This is consistent with the findings of Hoboubi et al. (2017) and suggests that the misalignment in the circadian rhythm of shift workers as well as the possible stress of the job and the current climate, relate to the level of job satisfaction that these employees experience. Additionally, the findings of this study are inconsistent with the negative association between mental health and job satisfaction as indicated by Nadinloyi et al. (2013). Furthermore, the findings in this investigation can be considered consistent with Faragher et al. (2013) who suggested that mental health problems such as burnout and anxiety can dissatisfy employees at work. This further indicates, that as employees are not mutually exclusive from their emotions, mental state and job, those shift workers who are already predisposed to or experiencing some negative mental health symptoms, are more likely to enjoy their job.

#### **5.1.4. Hierarchical Multiple Regression Analysis**

The path to the mediation conducted in this study is set out by the brief guidelines provided by Agler and De Boeck (2017). The mediation involves three variables. The intermediate variable acts as a mediator between the independent and dependent variable and can be deemed as subjective in the interpretation (Agler & De Boeck, 2017) and, to fulfil this, regressions were

done. The result of this study indicates that sleep quality is the mediating factor between mental health and job satisfaction amongst shift workers. Essentially, this implies that sleep quality transmits a causal effect from the mental health to the job satisfaction of an employee. This implies that the nature of the job, which ultimately affects the personal resource of sleep quality, is further utilised to act as a vehicle between mental health and job satisfaction.

Sobel's test was then done to confirm the mediation of sleep quality between mental health and job satisfaction (Preacher & Leonardelli, 2020). Although the results from the mediation in this investigation are for the most part unique, it can be tied to the underpinnings of the Herzberg Two-Factor theory and the Broaden and Build theory, which theoretically frame this study. It can be inferred that the relationship between mental health and job satisfaction among shift workers is layered and further interrelated through the construct of sleep quality. This study can be considered as being consistent with the findings of Song et al. (2020) on sleep quality mediation.

## **5.2. Conclusion**

This chapter contained the discussion of the results in relation to the literature, as well as extrapolated information inferred from the results, to ensure that a more holistic and accountable stance is provided as a conclusion.

## **Chapter 6: Conclusion**

This chapter concludes the investigation based on the findings, and presents the study's limitations and recommendations for future research within this population.

### **6.1. Conclusions**

#### **6.1.1. Reliability of measuring instruments**

The internal consistency of the measuring instruments used, namely the PSQI, MSQ and GHQ was suitable to high, as observed from the Cronbach alphas of the instruments, as well as the descriptive statistics of each instrument and construct. Therefore, the measuring instruments can be concluded to have had good reliability and consistency.

#### **6.1.2. Conclusion in accordance with the empirical results of the study.**

- a. What are the levels of sleep quality, mental health and job satisfaction amongst shift workers at a logistics company?*

The levels of sleep quality within this sample were found to be average to poor while the mental health state was found to be average to poor as well. The levels of job satisfaction were noted to be average to high. The results reveal that from the sample, the shift workers in the logistics industry have low sleep quality and mental health in comparison to the level of job satisfaction which is high average.

- b. What is the relationship between sleep quality, mental health and job satisfaction amongst shift workers in the logistics industry?*

The relationship between the constructs measured in this study is indicated as linear. It was found that as sleep quality increases, so does the mental health of the shift workers in the logistics industry. Additionally, as job satisfaction increases so does the quality

of sleep experienced by shift workers. The relationship between mental health and job satisfaction is such that the better the mental health of the shift worker is, the more job satisfaction is experienced. Sleep, being the vital construct on which shift work is based, is found to have an important role to play in the mental health of such employees. In turn, it can be concluded that the better satisfied a shift worker is with the job, the more likely a better quality of sleep will result.

- c. *Does sleep quality mediate the relationship between mental health and job satisfaction amongst shift workers in the logistics industry?*

In consideration of the results of this investigation, sleep quality does have a mediating impact on job satisfaction and the mental health of shift workers in the logistics industry. Essentially, the relationship can be considered, in addition to being a linear relationship, a mediating relationship. A three-tiered approach toward these constructs in this industry would be beneficial, in that each element can be considered as a by-product of the other.

## **6.2. Limitations**

The limitations of this study include the sampling technique, required time, nature of the sample and the contextual factors presented by the COVID-19 pandemic. A non-traditional approach to accessing participants within the organisation was problematic, considering the staff compliment within this organisation and the nature of the job. Additionally, due to the rotational shift work, it proved difficult to gather the data within the original allocated period of two weeks. As such, the data collection process was extended to a month.

Further limitations were presented in the data collection process, whereby a physical pen-and-paper questionnaire was utilised. For the majority, this method of data collection was more than adequate to accommodate the employees who did not have access to an online questionnaire. However, employees who did have access to online platforms did indicate that an online questionnaire would have been better suited. Additional limitations, considering the large sample size, was ensuring that questions and material within the instruments were well understood. This being a common concern in psychological testing, it would have been beneficial to conduct a qualitative follow-up to ensure that the questionnaire was fully conceptualised.

A limitation is presented in the contextual climate of the time, i.e., during the COVID-19 pandemic. Access to the South African ports was limited during this time and observing the pandemic protocols did slow down the process. Additionally, conducting a national study, although enriching, involved a great deal of logistical preparation to protect the data and to ensure that the process was carried out in uniformity.

### **6.3. Recommendations**

This research aimed to investigate the relationship and impact of sleep quality, mental health and job satisfaction. Upon commencement of this investigation, the available research on shift workers in this industry, in a country such as South Africa where trade is an instrumental part of our economy, was scarce. Therefore, there is certainly a need for further research on these constructs in such populations, especially within a South African context. Particularly, considering the role that sleep plays in the lives of shift workers, a more in-depth and qualitative approach to understand the nuances behind the quality and quantity of sleep in shift workers, would be beneficial. Additionally, the impact of shift work on the work-life balance in relation

to sleep quality would be a beneficial step to understanding how sleep and shift work interact with other aspects of these employees outside of the strict confines of their job. A greater focus on the mental health of shift workers is also required in the post-COVID-19 years to examine the psychological and social impact of an added external factor on shift workers.

The COVID-19 pandemic indicated that the role of sleep in physical and mental health is vital and requires greater exploration in employees who are employed outside the regular hours of work. Therefore, a possible investigation between the work-life balance, sleep quality and job satisfaction, with sleep quality as a mediator may be a vital study in the South African context. Additionally, numerous studies in this field of investigation relate to shift work in the healthcare industry, and future researchers might benefit from greater consideration of the impact of shift work in other industries such as the safety and security industry and the transportation industry.

#### **6.4. Summary**

This chapter provided the conclusion on the main results that were obtained from this investigation. Additionally, the responses to the research questions posed in the initial stages of the investigation were concisely answered in this chapter. The possible limitations of this investigation were indicated in this chapter, along with the promising recommendations for future research.

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## Appendix A

### Gatekeeper Permission



School of Applied Human Sciences  
University of KwaZulu-Natal  
Howard College  
Durban  
4041

FPT Group (Pty) Ltd  
Duncan Dock, South Arm Road  
Port of Cape Town

To whom it may concern

#### REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a Masters student at the School of Applied Human Sciences at the University of KwaZulu-Natal, wishing to undertake research on employees who work shift at a national logistics company in South Africa. The title of my study is: An investigation of sleep quality, mental health and job satisfaction in shift workers in the South African logistics industry.

The research involves the administration of a survey that will be provided in a form of a booklet (see appendix c) The survey takes 20 – 30 minutes to complete and may be completed by the employee at any time.

I would like to request to conduct data collection between any time between the months of June – August 2022 (at your earliest convenience). Data collection will be collected over the course of 2 weeks. The study will provide information about shift workers and will be used by the researcher to explore possible recommendations for employers of shift workers. Besides being for informative purposes, the study will not benefit or harm the company in any way.

I hope that my request is received in good faith and I will be granted permission to conduct my research at your company.

*P&F*

Yours faithfully

Student: Thuraiyaa Patel – 215034439

215034439@stu.ukzn.ac.za

[REDACTED]

Supervisor: Dr Zandile Madlabana-Luthuli

[REDACTED]

[REDACTED]

24/06/2022

Signed

Date

Paulo Franco Managing Director

Permission Granted

## **Appendix B**

### **Instruction Sheet**



**SCHOOL OF APPLIED HUMAN SCIENCES  
DEPARTMENT OF PSYCHOLOGY**

### **INSTRUCTIONS**

Dear Research Participant, you are requested to read and answer all the questionnaires in this booklet. Following this you are requested to sign an indemnity form to indicate your consent to this study. Please answer all the questions.

Thank you

## Appendix C

### Information Sheet

Dear research participant,

My name is Thuraiyaa Patel and I am a Master's student at the University of KwaZulu-Natal, Howard College in Durban, Kwa-Zulu-Natal. My contact details are as follows:

Email: 215034439@stu.ukzn.ac.za

Tel: [REDACTED]

You are invited to participate in this study which investigates sleep quality, mental health and job satisfaction in the logistics industry. The purpose of this research is to examine the relationship between these three constructs in a shift work environment. The study aims to have an estimated 150 shift working participants from a logistics company in Durban, South Africa. The study involves a 4-part survey, where participants are requested to fill in the answer that suits them best. The 4-part survey begins with questions on biographical data followed by questions on sleep quality, mental health and ends with questions pertaining to job satisfaction. The duration of this survey is 30 minutes.

#### **It is important to note:**

1. This study aims to provide information on sleep quality, mental health and job satisfaction of South African shift workers. Studies have investigated shift work previously in South Africa but information on logistics shift workers is where the focus of this study lies. This investigation will provide evidence of problems within the logistics shift working industry and can subsequently result in finding solutions. Despite the benefits this study will provide to a body of literature, there will be no direct benefit to you. Your participation is thus solely out of interest. The findings of the study will be shared through the company communication channels.
2. If you are unsure about anything or have questions please contact the researcher Thuraiyaa Patel [REDACTED] or the research supervisor Dr Zandile Madlabana-Luthuli [REDACTED]

3. Your participation is voluntary in this study and you may withdraw at any time with no disadvantage.
4. Your identity will be protected throughout the research study and you will remain anonymous. However, the research team may use the data (information) obtained in this study, for future research, publications in journals and other research outputs. Any such use of identifiable data would be reviewed and approved by a research ethics committee. In such cases, as with this project, your identity would not be identifiable in any report.
5. It is the ethical duty of the researcher to make you aware of the study and your role in this study.
6. There are no costs to you in this study.
7. To safeguard the raw data collected in this study, which includes a survey, the information will be stored for 5 years and thereafter will be destroyed by shredding the surveys.

Thank you once again for your time.

## **Consent Form**

I ..... (Full name of participant) have been informed about the study entitled: An investigation of sleep quality, mental health and job satisfaction among shift workers in the South African logistics industry by Thuraiyaa Patel. I am aware of the purpose of this study and acknowledge that I have been given the opportunity to ask questions at any time during this research. I understand that if I decide at any time during the study, I no longer want to take part, I can withdraw without a reason or consequence to me. I understand that I will remain anonymous and will not be identifiable throughout this study. I have read and understood all information provided thus far. I agree that the research team for this study may use my data for future research, publications in journals and other research outputs. I understand that any identifiable data would be reviewed and approved by the ethics committee. In such a project, I understand that my identity would not be identifiable in any report. I hereby consent to participate in the research project.

---

**Signature of Participant**

---

**Date**

## Appendix D

### 1: BIOGRAPHICAL DATA SHEET

Please answer the following biographical data sheet.

INSTRUCTIONS: Please place an **X** over the response you choose.

#### Gender?

MALE	FEMALE
------	--------

#### Age?

18-24	25-34	35-44	45-54	55+
-------	-------	-------	-------	-----

#### Marital Status?

Single	Married	Divorced	Widow	Remarried
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#### Race?

Black	White	Coloured	Indian	Other
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#### Years employed in the organisation

Less than a year	1 - 2 years	3-5 years	6-10 years	10 years +
------------------	-------------	-----------	------------	------------

**Period of working shifts?**

Less than a year	1 - 2 years	3-5 years	6-10 years	10 years +
------------------	-------------	-----------	------------	------------

## 2: PITTSBURGH SLEEP QUALITY INDEX (PSQI)

**INSTRUCTIONS:** The following questions are related to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply to the majority of days and nights in the past month. Please answer all questions.

1. During the past month when have you usually gone to bed at night?

USUAL BEDTIME \_\_\_\_\_

2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

NUMBER OF MINUTES \_\_\_\_\_

3. During the past month, when have you usually gotten up in the morning?

USUAL GETTING UP TIME \_\_\_\_\_

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spend in bed.)

HOURS OF SLEEP PER NIGHT \_\_\_\_\_

**INSTRUCTIONS:** For each of the remaining questions, choose the best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because of you ...

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. ... cannot get to sleep within 30 minutes				

b. ... wake up in the middle of the night or early morning				
c. ... have to get up to use the bathroom				
d. ... cannot breathe comfortably				
e. ... cough or snore loudly				
f. ... feel too cold				
g. ... feel too hot				
h. ... had bad dreams				
i. ... have pain				

j. Other reason(s), please describe

---



---

How often in the past month have you had trouble sleeping because of this?				
--	--	--	--	--

	Very good	Fairly good	Fairly bad	Very bad
6. During the past month, how would you rate your sleep quality overall?				

	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
7. During the past month, how often have you taken medicine (prescribed or 'over the counter') to help get sleep?				
8. During the past month, how often have you had trouble staying awake while driving, eating meals or engaging in social activity?				

	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
9. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				

### 3. GENERAL HEALTH QUESTIONNAIRE

**INSTRUCTIONS:** Please place an **X** in the block for the appropriate response

1. Been able to concentrate on what you're doing	Better than usual	Same as usual	Less than usual	Much less than usual
2. Lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
3. Felt you were playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
4. Felt capable of making decisions of things?	More so than usual	Same as usual	Less so than usual	Much less capable
5. Felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
6. Felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual
7. Been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
8. Been able to face up to your problems?	More so than usual	Same as usual	Less so than usual	Much less able
9. Been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
10. Been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual

11. Been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
12. Been feeling reasonably happy, all things considered?	More so than usual	About the same as usual	Less so than usual	Much less than usual

#### 4. MINNESOTA SATISFACTION QUESTIONNAIRE (MSQ) SHORT FORM

**INSTRUCTIONS:** Please place an **X** in the block with the appropriate response for you.

At my present Job, this is how I feel ...

	Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfie d
1. Being able to keep busy all the time					
2. The chance to work alone on the job					
3. The chance to do different things from time to time					
4. The chance to be 'somebody' in the community					
5. The way my boss handles his/her workers					
6. The competence of my supervisor in making decisions					
7. Being able to do things that don't go against my conscience					
8. The way my job provides for steady employment					

9. The chance to do things for other people					
10. The chance to tell people what to do					
11. The chance to do something that makes use of my abilities					
12. The way company policies are put into place					
13. My pay and the amount of work I do					
14. The chances for advancement on this job					
15. The freedom to use my own judgement					
16. The chance to try my own methods of doing the job					
17. The working conditions					
18. The way my co-worker get along with each other					
19. The praise I get for doing a good job					
20. The feeling of accomplishment I get from the job					

## Appendix E



19 August 2022

**Thuraiyaa Patel (215034439)**  
School of Applied Human Sc  
Howard College

Dear T Patel,

**Protocol reference number:** HSSREC/00004440/2022

**Project title:** An investigation of sleep quality, mental health and job satisfaction among shift workers in the South African logistics industry.

**Degree:** Masters

### **Approval Notification – Expedited Application**

This letter serves to notify you that your application received on 01 July 2022 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**.

**Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.**

This approval is valid until 19 August 2023.

To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

HSSREC is registered with the South African National Research Ethics Council (REC-040414-040).

Yours sincerely,



-----  
**Professor Dipane Hlalele (Chair)**

/dd

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### **Humanities and Social Sciences Research Ethics Committee**

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**Telephone:** +27 (0)31 260 8350/4557/3587 **Email:** hssrec@ukzn.ac.za **Website:** <http://research.ukzn.ac.za/Research-Ethics>

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