

**ASSESSING THE RELATIONSHIP BETWEEN VARIOUS WORK SHIFTS AND
HEALTH STATUS OF NURSES WORKING AT THE MACHAKOS LEVEL FIVE
COUNTY REFERRAL HOSPITAL, MACHAKOS COUNTY, KENYA**

ROSEMARY MUTINDI MUTUA



**A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT
FOR THE AWARD OF MASTER OF SCIENCE DEGREE IN HEALTH SYSTEMS
MANAGEMENT
OF
MOUNT KENYA UNIVERSITY**

MAY, 2025

DECLARATION AND APPROVAL

Declaration by the candidate


I declare that this thesis is my original work and has not been presented for a degree in any other university or for any other academic award.

Date: 8/5/2025 Signature: 


Rosemary Mutindi Mutua
Registration No: MHSM/2018/36712

Approval by the Supervisors

This is to confirm that the above candidate carried out this thesis under our supervision

Date: 13/5/2025 Signature: 

Dr Atei Kerochi,
MD, MPH,
Lecturer, School of Public health,
Mount Kenya University.

Date: 09/05/2025 Signature: 

Dr. Nilufa Hassanali Jivraj
PhD., MScN., BScN., Dip ICN., Dip RN
Lecturer, School of Nursing,
Mount Kenya University

DEDICATION

To my family members for their overwhelming support during the study period.



ACKNOWLEDGEMENT

Thanks be to the Almighty God for the far I have reached in this research process. I am highly indebted to my supervisors (Dr. Atei and Dr. Nilufar) for their mentorship and guidance during the study period. I am highly grateful to the entire staff at the Mount Kenya School of public Health for their support when need arose.

To every person who played a role (directly/indirectly) during my study period, please feel appreciated.



ABSTRACT

Hospitals have designed shift work which comprise of irregular working hours beyond the traditional diurnal working schedules in order to meet the patients'/ clients' demands for health care, 24 hours a day. Some of these shifts may pose challenges to the nurses, imparting negatively on patient care and also the wellbeing on the health care providers, hence the need to assess the relationship between various work shifts and health status among nurses in Machakos Level five county referral hospital. A descriptive cross-sectional study design was used to collect data from 167 respondents using a structured questionnaire. Qualitative data was also collected through focused group discussion and key informant interviews. Qualitative data was transcribed and reported verbatim. Quantitative data was entered in to the Statistical Package for the Social Sciences (SPSS) software version 27 to generate both descriptive and inferential statistics. Mean score for various responses were computed to assess the relationship between various working shifts and the respondent' health status. Authority to collect data was sought from the Mount Kenya University Ethical Review Committee (ERC), National Commission for Science, Technology and Innovation (NACOSTI) and the Machakos level five county referral hospital management. The study results showed that the 12 hours shift had an effect on the respondents' physical health with most respondents saying that the shift caused various illnesses like muscle strain, backache varicose veins and fatigue. Likewise, night duty and 12 hours shift affected the respondents' mental health by causing sleep disturbances, disorientation, mental fatigue, feeling of being isolated, poor concentration to patient care and also mood disorders. Regarding the respondent's social health, night duty and 12 hours shift had a negative effect, with most of them stating that the shifts led to marriage instabilities, being viewed by the community as promiscuous, family strains, and also being isolated by neighbours and friends. Others included being absent in some major social activities in the family / community and lack of time to interact with family members. The researcher therefore recommends that the hospital management should prioritize implementing shorter shifts (6 or 8 hours) to improve nurses' overall wellness and performance. There is also need to ensure a fair and structured shift rotation system should be established to prevent prolonged night and 12-hour shifts, reducing burnout. There is also need Strive to recruit more nursing staff to avoid overburdening existing employees and reduce the need for extended shifts. Counseling services and stress management programs should be introduced to help nurses cope with the psychological impact of night and long-hour shifts. Also, nurses should be encouraged to communicate their preferred shifts where feasible to maintain a balance between work, family, and personal time.

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LIST OF ABBREVIATIONS AND ACRONYMS

BScN: Bachelor of Science in Nursing

CI: Confidence Interval

ENT: Ear, Nose and Throat

ERC: Ethical Review Committee

FGD: Focusses Group Discussion

KI: Key Informants

MHSM: Masters in Health Systems Management

MKU: Mount Kenya University

MSc: Master of Science

NACOSTI: National Commission for Science, Technology and Innovation

SPSS: Statistical Package for the Social Sciences

U.S.A: United States of America

WHO: World Health Organization

CHAPTER ONE: INTRODUCTION

Globally, nurses form the largest workforce in healthcare facilities, providing continuous patient care through various work shifts (Heyam et al., 2018). The nature of nursing requires 24-hour service delivery, with some departments, such as outpatient clinics, operating primarily during the day, while inpatient wards and emergency departments require round-the-clock coverage. To ensure continuity of care, nurses work in rotating shifts, including night shifts. However, despite the necessity of shift work, existing evidence suggests that irregular working hours can have significant adverse effects on nurses' health, well-being, and job performance. Research has linked shift work to sleep disturbances, increased stress, burnout, and reduced efficiency, all of which may compromise patient safety through medication errors and impaired decision-making (Ferri et al., 2016; Pelissier et al., 2015).

Furthermore, studies conducted in different regions indicate that nurses frequently experience mental and physical health challenges due to shift work, contributing to high turnover rates. For instance, a systematic review by Khamisa et al. (2013) identified burnout and work-related stress as common among nurses, while a European study involving 34,587 nurses found that 86.8% left their jobs due to shift-related difficulties, health concerns, and career progression aspirations (Estryn-Behar et al., 2010).

In Kenya, healthcare services have been devolved to county governments, with the national Ministry of Health providing policy guidance. Despite this, many healthcare facilities continue to experience workforce shortages, particularly among nurses. To address this deficit, hospitals have implemented shift work to ensure continuous service delivery.

However, limited research has been conducted within the Kenyan healthcare context—especially at county referral hospitals—to examine the specific impact of various work shifts on nurses' health and job performance. The extent to which shift work affects nurses' well-being and the quality of care they provide remains unclear in this setting.

This study, therefore, sought to bridge this knowledge gap by assessing the relationship between different work shifts and the health status of nurses working at Machakos Level Five County Referral Hospital. Understanding these effects will inform strategies to create more favorable work schedules that balance nurses' well-being with optimal healthcare service delivery.

1.2: Statement of the problem

Nurses form the backbone of healthcare service delivery, ensuring continuous patient care in both outpatient and inpatient settings. To meet the growing demand for 24-hour healthcare services, hospitals have adopted shift work schedules that extend beyond traditional daytime working hours. At Machakos Level Five County Referral Hospital, nurses in various departments, particularly inpatient wards and emergency units, work in different shifts, including night duty and extended 12-hour shifts, to ensure uninterrupted care. However, these demanding schedules may have significant consequences on nurses' health and job performance.

Studies have shown that shift work can negatively impact healthcare workers' physiological, psychological, and social well-being. Research by Vidotti et al. (2018) found high levels of mental fatigue and job dissatisfaction among nurses working in rotating shifts, while Postma et al. (2017) highlighted that shift work contributes to disrupted sleep patterns, poor dietary habits, and increased stress. Furthermore, safety

concerns related to commuting after night shifts have been reported among nurses working long hours. These challenges, if unaddressed, can lead to burnout, reduced work efficiency, and compromised patient care.

Despite the well-documented effects of shift work on nurses' health globally, there is limited research within the Kenyan context, particularly in county referral hospitals such as Machakos Level Five. As a high-volume healthcare facility serving a large population, nurses at this hospital are frequently subjected to demanding work schedules that could negatively impact their well-being. The extent to which different shifts affect their health and the quality of care they provide remains unclear. Given the critical role of this facility in healthcare delivery within Machakos County, it is essential to investigate the relationship between work shifts and nurses' health status. This study aimed to bridge this knowledge gap by providing evidence-based insights that can inform policies to improve nurses' well-being and enhance the overall quality of healthcare services at Machakos Level Five County Referral Hospital.

1.3 Purpose of the study

The purpose of this study was to investigate the relationship between shift work and the health status of nurses at Machakos Level Five County Referral Hospital. Specifically, the study aimed to assess how different work shifts impact nurses' physical, mental, and social well-being, so as to provide an insight that can inform strategies to improve the overall health and job performance among the nurses.

1.4 Study objectives

1.4.1 Broad objective

To assess the relationship between various work shifts and the health status of nurses working at the Machakos level five county referral hospital in Kenya

1.4.2 Specific objectives

1. To determine the relationship between various work shifts and the physical wellness of the nurses working at the Machakos level five county referral hospital in Kenya
2. To establish the relationship between various work shifts and the mental wellness of the nurses working at the Machakos Level five county referral hospital in Kenya
3. To determine the relationship between various work shifts and the social wellness of the nurses working at the Machakos Level five county referral hospital in Kenya

1.5 Research questions

1. What is the relationship between various work shifts and the physical wellness of the nurses working at the Machakos level five county referral hospital
2. What is the relationship between various work shifts and the mental wellness of the nurses working at the Machakos Level five county referral hospital
3. What the relationship between various work shifts and social wellness of the nurses working at the Machakos Level five county referral hospital

1.6 Justification of the Study

A poorly designed work schedule can negatively impact the well-being of healthcare workers, including nurses. Irregular and demanding shifts often contribute to stress, fatigue, and decreased job satisfaction, ultimately affecting nurses' overall health and job performance. Research by Jahromi et al. (2013) suggests that allowing nurses to voluntarily choose their preferred shifts can enhance job satisfaction and reduce complaints related to shift work. Furthermore, studies have shown that job satisfaction positively

influences nurses' performance, leading to improved healthcare service delivery (Putra et al., 2017).

Despite these findings, limited research has been conducted within the Kenyan healthcare system, particularly in county referral hospitals, to assess the impact of different work shifts on nurses' health. Machakos Level Five County Referral Hospital is a major healthcare facility with a high patient load, requiring nurses to work in rotating shifts, including night and extended-hour shifts. Understanding the relationship between these shifts and nurses' health is essential in developing policies that promote a healthier and more productive workforce.

This study aims to bridge this gap by assessing the relationship between various work shifts and the health status of nurses at Machakos Level Five County Referral Hospital. The findings and recommendations will be shared with the hospital's management to inform policies and strategies that mitigate the negative effects of shift work, ultimately improving nurses' well-being and the quality of healthcare services provided.

1.7 Scope of the study

The study was only carried out on nurses allocated to work in various departments in one county hospital (Machakos County level five referral hospital).

1.8 Study Limitations

The study had various limitations. Since it was only being carried out in one health care facility, generalization may not be possible. On the other hand, data collection on the assessment of the relationship between various working shifts and the nurses' health status was based on self-reporting by the respondents, which could have been affected by selective memory. Heavy workload among the respondents was also another limitation, in

which case the researcher administered the data collection tools when the respondents were less busy.

1.9 Assumptions of the study

It was assumed that the study participants were sincere while responding to the data collection tools. The sincerity of the respondents was important since the data was based on their self-reporting, depending on the health effects that they had experienced in relation to the various working shifts. It was also the researcher's assumption that the data collected was the real reflection of the general situation among nurses in relations to work schedules and shifts.

1.10 Operational definition of terms

Acceptance: Nurses' willingness to take up the scheduled work shift without coercion

Day duty: Six, eight, or 12 working hours, between 7 a.m. to 7 p.m.

Effect of shift work: These are the health related effects regarding a given work schedule that may occur to the nurse. These effects may be mental, social or even physical

Health: A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity

Mental health: A state of wellbeing in which the individual realizes his or her own abilities, can cope with normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community. Mental health also includes absence of depression, being oriented in time and space, ability to maintain good hygiene and also ability to maintain good friendship.

Night duty: Working hours which occur between 6pm to 8am of any working day of the week

Perception: Nurses' individual views and feelings on a given work shift.

Physical wellbeing: This is the ability of an individual to carry out various tasks effectively, with enough energy to enjoy the tasks and handle any unplanned eventualities. It includes the absence of physical health related conditions like backache, joint pains, abdominal discomforts and varicose veins among others.

Shift work: Scheduled period within 24 hours when the nurse is supposed to be providing nursing services to patients.

Social wellbeing: Ability of the nurse to adjust with others along various aspects of social life. It includes the nurse's ability to maintain good relationships among family members and friends.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Different health institutions allocate nurses different working shifts, according to the demands in the facility. The shifts include working on day and also at night. However, these have had various effects on the nurses' health status which may affect provision of quality patient care.

According to the World Health Organization (Birgitte and Mednick, 2002), health is defined as a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity. Health is specific to person's life, it is dynamic, holistic and multidimensional. Health is related to the person's ability to cope with the challenges faced in one's daily life.

Any working shift outside of 7 am to 6 pm or more hours of duty causes an increased risk for sleep disturbances. Similarly, working on shifts on top of prolonged working hours may also lead to poor work out put and other effects on an individual's health, like increased body weight, musculo-skeletal injuries on top of other chronic conditions like hypertension, fatigue and diabetes (Caruso, 2014). In the context of this study, the research aims at examining three dimensions of health (physical, mental and social effect of various shifts to the health status of the nurses). The three dimensions forms the basis for the objectives of this study as described in the subsequent subsections in this chapter.

2.2 Common working shifts among nurses

Understanding the relationship between the various work shifts nurses' health status will enable systemic modifications health care facilities to optimize patient care. This will be achieved by conducting studies on the same. For example, Stimpfel and Aiken (2013)

conducted a study among 22275 nurses from 577 hospitals to analyze their shift length, scheduling characteristics, and reported safety and quality. The study showed that 65% of the nurses were allocated the 12 to 13 hours shift while 26% of them were allocated the eight to nine hours shift. The results also showed that four percent of them were allocated the 10 to 11 hours shift while 5% of the nurses were working for more than 13 hours. In the same aspect, another study involving 2990 nurses in 48 hospitals in England showed that 33.0% of the nurses worked for eight hours or less, 13.8% worked for eight to 10 hours, 19.2% worked for 10.1 to 11.9 hours while 34.1% worked for more than 12 hours (Emmanuel et al, 2020).

A study carried out in 12 European countries to assess the relationship between the 12 hours work allocation and the respondents' job satisfaction showed that 50% of the nurses worked for less than eight hours, 31% of them had worked for eight to 10 hours while 4% had worked from 10.1 to less than 12 hours. The results also showed that 14% of the nurses reported that they had worked for 12 to 13 hours, while less than one percent had worked for more than 13 hours (Dall'Ora et al, 2015). Another study by Alsharari (2019) on psychosocial effects related to working at night among nurses in Saudi Arabia which involved 1521 nurses showed that 75.1% of the participants were involved in rotating night shift work. In this case, they worked on night duty for a period between two to three days continuously and then changed to day duty. About 10.8% of the participants were allocated to work on continuous night shift for one week, whereas 14.1% worked on night shift when requested. Among the study participants, 15.5% of them said that they liked night shift work, 49.1% said they disliked the night shift, while 35.4% said that they preferred to work on night occasionally.

A cross-sectional study to determine the association between shift working and musculoskeletal symptoms among nurses in a general hospital in Tehran, established that 35.7%, 8% worked on night duty while 56.3% worked on rotating shifts (Attarchi et al, 2014). Another cross-sectional study among 31,627 registered nurses in general medical/surgical units in 488 hospitals in 12 European countries established that most (50%) of the nurses were working for eight hours or less, 32% worked between eight and ten hours, 14% worked between 12 to 13 hours while only 1% of them worked for more than 13 hours (Griffiths et al, 2014). A system review on nurses' experiences and preferences around shift patterns showed that some of the nurses were working on four hour shift, others worked between eight to 10 hours with some working on shifts longer than 12 hours (Ejebu et al, 2021).

2.3 Shift work on the physical wellness among nurses

Physical health (physical wellness) is defined as the proper functioning of an individual's organs and systems hence permitting one to undertake daily duties and other assigned chores with minimal or no hindrances. It relates to the physical fitness. Physical health includes adequate body weight, acceptable levels of vision, hearing and locomotion or movements. Physical health also includes having the cardiovascular and respiratory parameters within normal and acceptable ranges (Khan and Qureshi, 2018). Studies have demonstrated that various working shifts affect the physical health of nurses as described in this section. For example, a study conducted by Valerie (2010) to determine the experience of night shift among nurses at an emergency care facility in U.S.A, showed that physical exhaustion during their shifts was one of the major complaints of the participants. Similarly, Buja et al, (2013) carried out a study in a university hospital in North-East Italy,

among 806 nurses in selected units to determine the relationship between various duties worked by the nurses and job-related health issues. They established that working on night duty caused more Job Strain. The shifts also caused such ill effects like fatigue and abdominal pains. In concurrence with this, participants in a study which was conducted by Postma et al, (2017) to identify pre-licensure, baccalaureate nursing students' perceptions of problems and potential solutions related to adapting to shift work in clinical settings stated that shift work affected their physical health. The study participants stated that shift work especially working for long hours affected their personal safety negatively, especially when they were driving home from work. Another study carried out among 120 nurses working at the Clinical centre of Vojvodina (Serbia) to assess the effect of shift work on fatigue level showed that the fatigue level among the nurses working on night shift was significantly higher compared to the ones who were working in the other types of shifts (Batak et al, 2013). Likewise, a one-year trial study was conducted to examine the experiences of 24 nurses on 12-hours duty allocation in a non-intensive care unit and an intensive care unit in a public hospital. The study results showed that most of the respondents in the study reported physical and mental fatigue during the 12-hour shift compared with 8-hour shift, due to long periods walking and standing (Ose et al, 2019). On the same aspect, Çalik et al (2015) carried out a study to assess the effect of shift working and rotating shifts among 477 nurses in Trabzon. Most of the participants indicated that the working hours had various negative effect on their life. Among these negative effects, 95.2% of them cited physical health while 77.6% of them cited their own safety.

A review on health effects of shift work and extended hours of work showed that Shift work, particularly night shifts, has been linked to increased risks of cardiovascular diseases

(CVDs) among nurses. The review cited that irregular work hours affects sleep patterns, which may predispose one to high blood pressure (Harrington, 2021). Similarly, a cross-sectional study on the impact of night shifts on sleeping patterns, psychosocial and physical well-being among healthcare professionals showed that nurses working long shifts, particularly those exceeding 12 hours, reported higher rates of workplace injuries, including needlestick injuries and patient-handling accidents, due to fatigue and decreased alertness (Qanash, 2021). Another study conducted among 454 health care workers including nurses and nurses' aides in a general hospital in Iran to determine the association between shift working and musculoskeletal symptoms among nursing personnel showed that the common musculoskeletal symptoms among the nurses included lower backache, knees joint pains, and upper back pains (Attarchi et al, 2014).

2.4 Shift work and mental wellness among nurses

Mental health is a state of wellbeing in which the individual realizes his or her own abilities, can cope with normal stresses of life, can work productively and fruitfully and is able to make a contribution to his or her community. Good mental health means a person should be able to understand the potential, can manage the general and normal life stresses, can be able to participate in the society, and can be able to work (Boruchovitch and Mednick, 2002). It is the individual's ability to carry out institutionalized social roles, while the evaluation of somatic health was based on the individual's effectiveness in accomplishing valued tasks. A mentally normal person has the ability to mix up with others, make friendship and behave in a balanced manner. The person should be able to keep self -tidy, observe adequate personal hygiene and should be well oriented (WHO, 2020). In respect to their mental health, nurses have reported different effects of various

working shifts allocated to them in their respective health care facilities. A research by Vidotti et al (2018) on burn out syndrome and shift work among nurses at a philanthropic hospital in Brazil demonstrated that mental fatigue and poor job satisfaction were more (53.98%) in nurses working on day duty compared to (46.02%) on those working night duty. On the same aspect, another survey involving 200 nurses was carried out by Vasquez-Trespacios et al (2016) to determine the association between current shift work and work-related stress symptoms among health care workers in a tertiary hospital in Medellin, Colombia. The study showed that nurses working on night shift caused more severe mental symptoms compared to those on day duty ($p=0.030$ and $p=0.047$ respectively). Also, Alsharari (2019) carried out a survey among 1521 nurses who were allocated on night duty in public hospitals in Saudi Arabia, whereby 88.2% of the participants indicated that night shift work affected them psychologically.

A study was carried out to determine the factors connected to fatigue at work place and recovery among nurses allocated on the 12-hours duty. The results showed that nurses suffered from psychological effects and work related fatigue (Han et al, 2014). Another survey was conducted among nurses employed in hospital settings in the United States to assess the effects of night shift on their health. When the participants were asked about their perceptions towards night shift, most of them strongly agreed that the shift was a risk factor to family stress and mood changes (Books et al, 2017). Likewise, another research was conducted among 31627 nurses in 2170 general units within 488 hospitals in 12 European countries to assess the relationship between working for long hours. The study showed that working for 12 hours increased emotional stress by 26%, in comparison with those working for eight hours or less (Dall'Ora et al, 2015). On the same aspect, Çalik et al

(2015) carried out a study to assess the effects of shift working and rotating shifts among 477 nurses in Trabzon, whereby 87.2% of the participants reported that the shift duty affected their psychological health.

2.5 Shift work and the social wellness among nurses

Social health is the ability of individuals to form healthy and rewarding interpersonal relationships with others. Social health also includes one's ability to develop and maintain friendships, creating boundaries in friendships and relationships and having a supportive network of family and friends (Tammy, 2020). Studies have demonstrated that working in shifts affects social life in addition to physiological and mental conditions. It poses negative effect to social life especially marital and child-related responsibilities of women working on night duty as a result of inadequate time. Other issues associated with night duty include disruption of family order, divisions and poor relationships with friends (Okuyan and Deveci, 2017). In this respect, a was study carried out among 120 nurses working at the Clinical Centre of Vojvodina (Serbia) to assess the effects of shift work on fatigue. In this study, nurses who were working on the other shifts apart from night duty indicated that their social life was highly affected (Batak et al, 2013).

A qualitative case study was carried out in Australian hospitals among 14 nurses who were allocated to work on night shifts in medical and surgical wards. The study showed that working on night allowed time for the nurses to participate in various social and family undertakings (Powell, 2013). Similarly, Rathore et al (2012) carried out a research to assess problems associated with shift work and its effects on female nurses in Udaipur, Rajasthan in India. The results demonstrated that female nurses, especially those working on night shift experienced many challenges related to ill health. The participants said that

they could not give much time to their family members especially their children who sleep early. The participants also said that sometimes they had to work on night shifts and also attend to their social functions. Some of the nurses said that their family members (children and husband) in some cases were uncooperative causing a lot of frustration to them.

2.6 Theoretical framework

The current study utilized Betty Neuman's systems model, which perceives a person/ client as an open system that is capable of reacting towards stressors in its surroundings. The client has various variables that include physiological (structure and functions of the body), psychological (mental processes and relationships), sociocultural (system functions that relate to social and cultural expectations and activities), developmental (those processes related to development over the lifespan), and spiritual (the influence of spiritual beliefs). The client system consists of a basic or core structure that is surrounded by concentric rings or lines of resistance to maintain system stability from stressor invasion. The usual level of health is identified as the normal line of defense that is protected by a flexible line of defense. Stressors are intra-, inter-, and extrapersonal in nature and arise from the internal, external, and created environments. When stressors break through the flexible line of defense, the system is invaded and the lines of resistance are activated and the system is described as moving into illness on a wellness-illness continuum. If adequate energy is available, the system will be reconstituted with the normal line of defense restored at, below, or above its previous level. The flexible line of defense is a protective mechanism that surrounds and protects the normal line of defense from invasion by stressors. On the other hand, the normal line of defense is an adaptational level of health developed over time and considered normal for a particular individual client or system, which becomes a

standard for wellness-deviance determination. The line of resistance includes protection factors activated when stressors have penetrated the normal line of defense, causing a reaction symptomatology.

Betty Neuman defines a stressor as any phenomenon that might penetrate both the flexible and normal lines of defense, resulting in either a positive or negative outcome. For the person to manage the stressors, a stability must be achieved. As the stressors continue to invade the normal line of defense, a degree of response may occur, leading to instability (entropy). However, if stressors are managed, negentropy occurs (George, 2002). In the current study, the stressors invading the open system are the various work shifts allocated to the nurses by their nurse managers. These shifts may affect the nurses' health status (either physical, mental or social health status). The effect will manifest as the stressors (working shifts) break the lines of defense among the nurses' body systems. This may in turn affect the ability of the nurse to provide quality care to the patients among other negative effects.

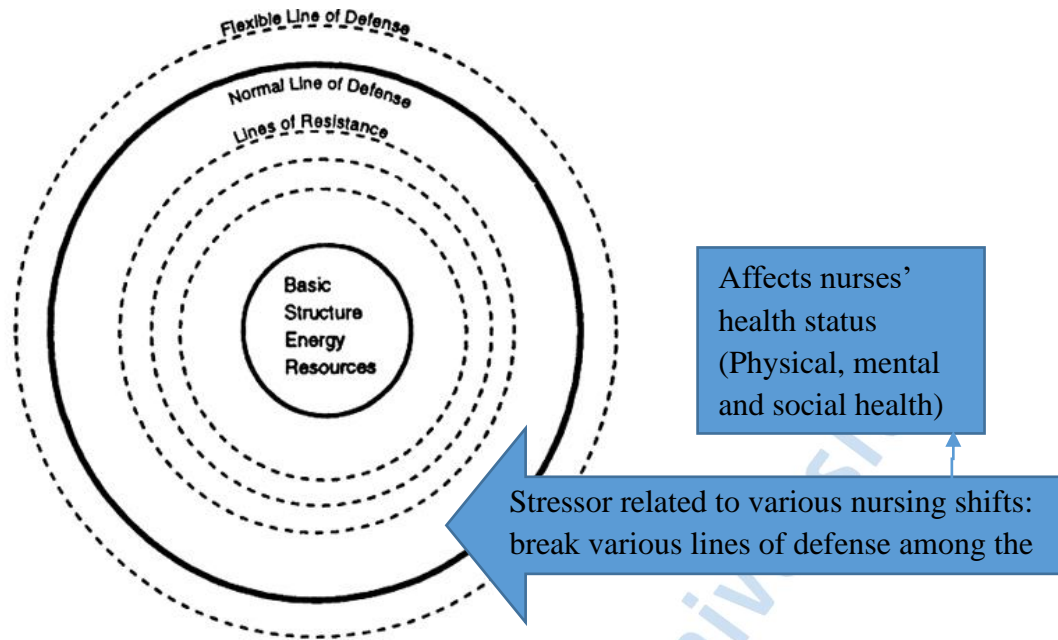


Figure 1: An illustration of Betty Neuman's theory in relation to effects of shift work on nurses' health

2.7 Conceptual frame work

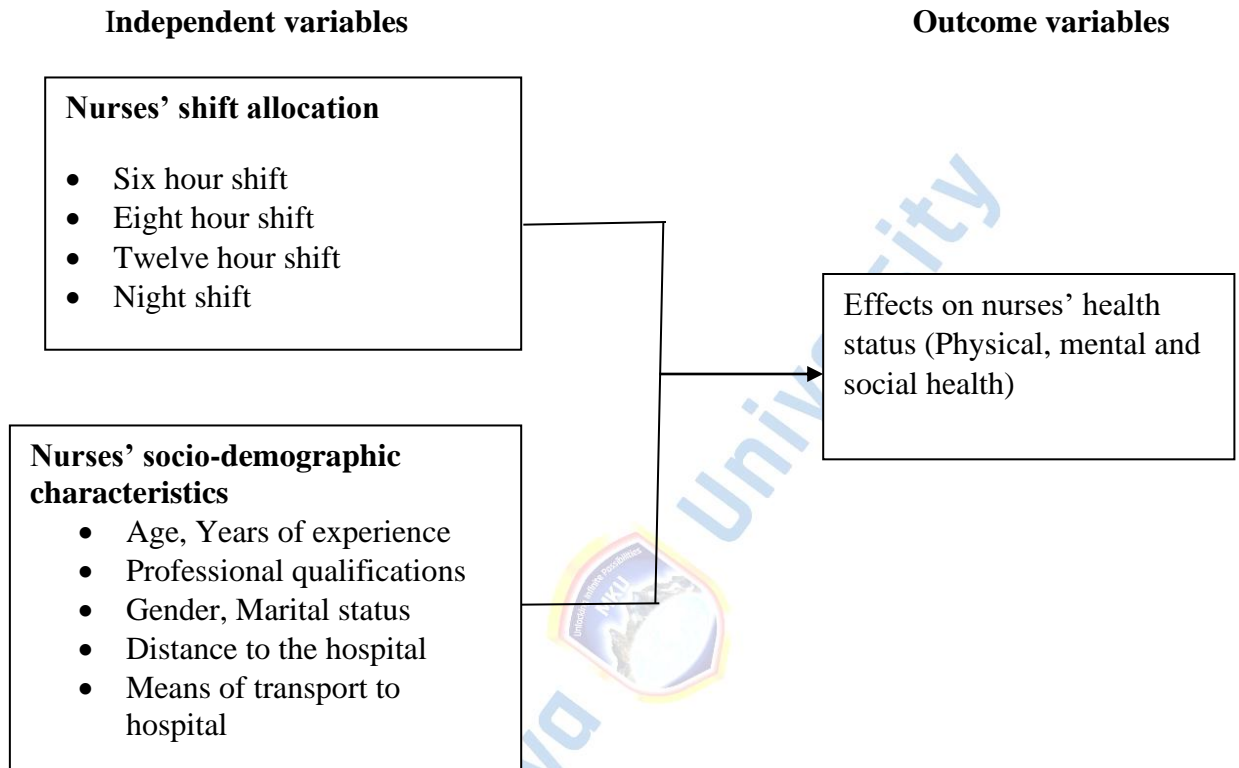


Figure 2: Conceptual frame work

2.8 Gaps identified in the literature review

The literature review described in this chapter has identified the relationship between various work shifts and the health status of the nurses in different health care facilities. However, all these studies were conducted in the western countries that have different settings compared to the African ones, and more so in Kenya. Therefore, this study aimed at bridging this gap, by generating knowledge on the subject, based on Kenyan health care facilities.



CHAPTER THREE: STUDY METHODOLOGY

3.1 Introduction

Approaches to data collection and management which were utilized are described in this chapter as per the research objectives. It includes the study design, study site, study population and data collection tools. Sample size determination, sampling techniques, data management and ethical considerations are also covered in this chapter.

3.2 Research design

In this research, descriptive cross-sectional study design was utilized to determine the relationship between various work shifts and the health status of nurses working at the Machakos level five county referral hospital. In this design, data was collected from study participants at a single point in time. It provides a snap shot of a given situation at the specific time of data collection. The design is relatively cheap and easy to conduct, since there is no follow up. It is also saves time since data is collected at once. By use of this design, some limitations like loss to follow up are eliminated (Sedgwick, 2014).

In the current study, triangulation approach was applied by use of both qualitative and quantitative approaches. Use of triangulation ensures validity of research through the use of a variety of methods to collect data on the same topic. It enriches research by offering a variety of datasets to explain differing aspects of the subject under study (Noble and Heale, 2019).

3.3 Study area

The data was collected from the Machakos level 5 county referral hospital, which is located in Machakos town (Kenya). The hospital was established in 1925 and currently it has a bed capacity of 560 beds. The health care facility is about 63 Kilometers southeast of

Nairobi. It is about 200 meters from the Machakos bus park, off the Machakos-Makueni road. Machakos County borders eight counties namely, Nairobi and Kiambu counties to the Western side, Embu county to the Northern part, Kitui county to the Eastern side, Makueni county to the South with Kajiado county to the South Western side. Other counties bordering Machakos include Muranga and Kirinyaga counties to the North Western part. Machakos county lies between latitudes 0°45' South and 1°31' South and longitudes 36°45' East and 37°45' East. The County has an estimated area of 6208.2 square kilometers and a catchment population of 1,421,932 people, according to the 2019 national census report.

Machakos county level five referral hospital receives patients referred from its eight sub-counties namely; Machakos town, Mwala, Kangundo, Mavoko, Kathiani, Matungulu, Yatta and Masinga (Appendix XI). It also receives patient referred from private health care facilities within the county, and some parts of the neighbouring counties. The hospital has an average inpatient bed occupancy capacity of about 360 patients per day, while a total of 155 patients are attended to daily as out-patients. The service delivery areas in the hospital include male and female wards (medical and general surgical conditions for each gender). It also has a male and a female orthopaedic ward. Other service delivery units include two paediatric wards (one for children below five years and another one for children above five years), obstetrics and gynaecology ward, psychiatry ward, labour ward, postnatal ward, a ward for post caesarian section mothers, new born unit, and a ward for mothers with children in the new born unit. The hospital also has a Maternal and Child Health (MCH) unit, Ear, Nose and Throat (ENT) /Ophthalmology clinic and a general out- patient unit. The health care facility also offers specialized health care services like renal dialysis,

intensive care unit, operating theatres, palliative care and cancer treatment center. The hospital has a busy emergency department which operates for 24 hours daily. The study respondents were sampled from all these service delivery points.

3.4 Study population

This refers to all the participants that meet the set specifications (Kapur, 2018). The current study involved all the nurses working at the Machakos level 5 county referral hospital during the period of study. Nurse managers in the health care facility also participated in the study. Machakos county Level five referral hospital has a total of 376 nurses, who formed the study population.

3.5 Inclusion and exclusion criteria

3.5.1 Inclusion criteria

This specifies the desired characteristics of the subjects to be recruited for study purposes (Kapur, 2018). In this study, the inclusion criteria was as follows;

- i. All the nurses responsible for the provision of direct care to patients in the various departments of the health care facility were included.
- ii. Nurse managers for each department were included as key informants

3.5.2 Exclusion criteria

The following were excluded from the study;

- i. All nurses who have worked for less than one month in the health care facility during the study period
- ii. All nurse managers who were in acting capacity in the departments
- iii. Student nurses and nurses on nursing council attachment

3.6 Sample size determination

Study sample involves the subjects identified from the larger population to be included in a study. The size of the sample should meet the requirements of the study in terms of reliability and generalization (Kothari, 2004). In the current study, the sample size was calculated using the Fisher's formula according to Kasiulevicius et al (2006). The population in the current study was 376, which is less than 10,000. Therefore, the sample size (n) was calculated as follows;

$$n = \frac{z^2 pq}{d^2}$$

n = sample size

z = standard normal deviate which corresponds to 95% confidence level

Confidence interval (CI) = 1.96

p = Proportion of the target population with the desired characteristics. In the current study, the desired characteristics were the effects of various work shifts on the nurses' health status. In this case, since the proportion was not known, 50% (0.5) was used.

$$q = 1 - p$$

d = set precision = 0.05

$$n = \frac{(1.96)^2 (0.5)^2}{(0.05)^2}$$

= 384.16, which is =384 study participants.

In the current study, the population (N) was 376, hence the formula for infinite population was utilized as described below.

Therefore, $n_f = \frac{n}{1+n} \cdot N$

$$n_f = \frac{384}{1+384} \cdot 376$$

$$n_f = \frac{384}{2.02}$$

$$n_f = 190.1$$

Hence, the sample size, (n_f) was 191. This formed the study participants who were expected to fill the questionnaires.

Eight nurses were randomly sampled from the various service delivery points in the hospital to participate in the focused group discussion rounds, two weeks after filling the study questionnaires. Likewise, eight nurse managers were selected to participate in the Key informant interviews.

The number of respondents to be interviewed in each of the service delivery points in the hospital was calculated proportionately as shown in table 1.

Table 1: Nurses distribution in various units in Machakos Level five county referral Hospital

	Unit	Number of nurses	Proportionate sample size
1.	Pediatrics ward 1A (Children above 5 years)	16	8
2.	Pediatrics ward 1B (Children below 5 years)	11	5
3.	Female surgical ward	12	6
4.	Male surgical ward	12	6
5.	Male medical ward	16	8
6.	Female medical ward	15	8
7.	Male orthopaedic ward	14	7
8.	Female orthopaedic ward	10	5
9.	Eye ward	8	4
10.	Psychiatry ward	10	5
11.	Obstetrics and gynaecology ward	13	7
12.	New born unit (NBU)	18	9
13.	Post natal ward	14	7
14.	Ward for mothers with children in NBU	10	5
15.	Post caeserian section ward	14	7
16.	Labour ward	29	14
17.	Comprehensive care clinic	7	4
18.	Out- patient department	11	5
19.	Clinics (eye, dental, ENT)	7	4
20.	Maternal and child health clinic (MCH)	9	5
21.	Casualty	23	11
22.	Intensive care unit (ICU)	24	12
23.	Covid 19 isolation ICU	13	7
24.	Renal unit	12	6
25.	Cancer treatment center	7	4
26.	Palliative care unit	1	1
27.	Maternity theatre	13	7
28.	Main operating theatres	20	10
29.	Sterilization unit	7	4
	Total	376	191

3.7 Sampling technique

Sampling is the process that involves selection of a study participants. It clearly elaborates the steps that were used by the researcher to recruit the subjects from whom the data was collected (Sekaran, 2003). In the current study, multistage sampling was used whereby the institution was stratified according to the service delivery areas (specialties) like medical, surgical, maternity, paediatrics, gynaecology and accidents/ emergency department among others. Units in each specialty were then identified after which the nurses to participate in the study were randomly selected. In this case, papers written “YES” or “NO” were used. In each of the unit, the papers written “yes” were equal to the proportionate sample size for that specific unit. Nurses who picked the papers indicated “YES” were recruited to participate in the study. The nurse managers in each unit were conveniently selected as key informants. For the focused group discussion, the researcher conducted the interview after two weeks following the administration of the questionnaires. For the focused group discussion, one nurse was randomly sampled from each of the specialties, to make a total of eight participants. In total, the researcher conducted two focused group discussions.

3.8 Data collection tools

Data was collected by use of self-administered structured questionnaires, interview guide for focused group discussion and key informant (KI) interview guide for the hospital nurse managers. The questionnaires were composed of various sections to capture information as per the study objectives. Part I was designed to capture the respondents’ socio-demographic characteristics to include age, gender, designation, area of deployment, years of experience and professional qualifications among others. Part II aimed at capturing the common shifts which are allocated to the nurses in the hospital and also the nurses’ preferred shifts. In part III, information on the relationship between various work shifts and

the physical wellness of the nurses was captured. Part IV of the questionnaire was designed to collect data on the relationship between the various work shifts and the nurses' mental health. The other section of the questionnaire was part V, which had questions aimed at gathering data regarding the relationship between various work shifts and the social wellness of the nurses.

The other data collection tool was an interview guide for focused group discussion among the respondents. In this case, the researcher sought to collect in-depth information on the contents contained in the questionnaire.

The key informant interview guide was designed to collect data from the nurse managers of the various units in the hospital. The researcher sought to collect information regarding the role of the hospital management on mitigating the negative effect of the various working shifts on the nurses' health status.

3.9 Validity and reliability of the data collection tools

Reliability is the ability of a data collection tool to yield similar results if it is administered a second time in a similar group of participants. On the other hand, validity is the extent to which a tool measures up to the concepts it is made to measure (Polit and Beck, 2013).

3.9.1 Validity of the data collection tools

Validity allows the researcher to draw appropriate conclusions from the sample being studied. The common types of validity include content, construct, criterion and face. Content validity is the extent to which items in a data collection tool are able to adequately measure intended characteristics. Content validity deals with the degree to which the test indicators attempt to measure various aspects of the concepts in question. In the current study, the researcher worked with the supervisors to ensure that the data collection tools

were suitable for the study. Once the data entry tools were filled by the study participants, the researcher counter checked them to ensure that all the required information was captured correctly. Any unclear entries were sorted out on the spot, before leaving the data collection point. On the other hand, construct validity is the extent to which a data collection instrument is able to accurately measure a construct. In the current study, pre-testing was carried out at Thika Level five County referral Hospital in Kiambu County using 10% of the study participants (20 participants). This health care facility is at the same level with Machakos level five county referral hospital and also has similar characteristics of nurses. The researcher also held discussions with the nursing services manager of Thika level five hospital on the various items of the data collection tools. This assisted in enriching the requisite items that were to be collected during the research process. The researcher revised the data collection tools according to the inputs from the respondents and also after discussions with the supervisors. Likewise, criterion-related validity indicates the extent to which the instrument's scores correlate with another measurement. It helps to detect the presence or absence of one or more criteria considered to represent some constructs of interest for the given study. In the current study, any suggestions from the respondents during the pretesting phase were incorporated appropriately in the data collection tools. Face validity is the other type of validity. It is used to ascertain whether the data collection tool appears to be assessing the intended concepts being studied. In this case, the researcher worked with the supervisors and peers, to review and revise the data collection tools appropriately (Polit and Beck, 2013).

3.9.2 Reliability of the data collection tools

In the current study, Cronbach's alpha (α) was computed using the information which was gathered during pretesting of the data collection tools in Thika level five county referral hospital. Most of the items had a Cronbach's alpha (α) which was greater than 0.7 which was acceptable and reliable (George and Mallery, 2003). Two items from the tool on mental health were deleted since they had a Cronbach's alpha (α) which was less than 0.7. Regarding the interview guide and focused group discussion guide, both were also subjected to pretesting. Sections that were not clear were rephrased accordingly.

3.10 Data collection procedure

A research assistant who had a Bachelor of Science degree in Nursing (BScN) was recruited to assist in the data collection process. He was also trained by the researcher for one day in relation to the data collection process.

Qualitative and quantitative approaches were employed during the data collection process. To collect qualitative data, two focused group discussions (FGD) were conducted among eight nurses. The researcher scheduled the FGD during the time when the participants were not busy to avoid interfering with the patient care activities. During the interview, the researcher and assistant made side notes and compared them later to ensure that the data that was generated during the interview process was well documented. Recording of the interviews was also be carried out.

Nurse managers (eight) from the various service delivery points were also recruited as key informants (KI). The researcher made arrangements with them to meet at the time when they were not busy. During the interview, recording was done and notes taken to ensure that all the relevant information was gathered.

Structured questionnaires were used to collect quantitative data from the nurses who provided direct care to patients. Before administration of the questionnaires, the research assistant explained the data collection process to the sampled respondents and ensured that they signed an informed consent. The data collected was based on self-reporting by the respondents on the relationship between various work shifts and their health status. In this regard, the researcher requested the respondents to be as sincere as possible in order to collect data that will have a positive effect on the nurses' health status once recommendations are implemented.

The research assistant gave the respondents humble time to fill the questionnaires due to their busy schedules and work load. Once filled, the assistant collected and counter checked them to ensure that all the required information was entered correctly.

3.11 Data management

3.11.1 Data storage

The collected data was entered by the data entry clerk in to the computer software and a backup created using a flash disk. The researcher cross checked the data entry with the clerk to ensure that all the information contained in the data collection tools was entered appropriately in the computer software. The data collection tools were filed and locked in a cabinet for safety and confidentiality purposes. Similarly, the computer password was only known to the data entry clerk and the researcher.

3.11.2 Data analysis and presentation

The data collected was analyzed using Statistical package for Social Scientists (SPSS) version 27. Descriptive statistics were computed to summarize the data, which was then presented inform of charts, tables and narratives.

For the qualitative data analysis, the study adapted Braun and Clarke's thematic analysis framework and used all the six phases (Clarke and Braun, 2017). This involved familiarization with the data following which the researchers listened to the audios and also read the notes that were made during the interviews. The information in the audio recorders was then transcribed verbatim to ensure all data was captured. Reading and re-reading of the transcripts was also done repeatedly to gain an overall sense of the content. Data coding was then carried out to enable identification of the key issues that were contained in the collected data in regard to nurses' work shifts. After this, the researcher developed codes that were inline with the common phrases from the data relevant and that were in line with the study objectives. The codes developed were subsequently collated to generate themes and subthemes based on the information that was gathered. The themes and subthemes generated formed comprehensive narrations in regard to the nurses' work shifts. The data was then reported in narrative to augment the information generated from the quantitative data.

Quantitative collected was keyed into the Epi data version 3.1 software, cleaned, validated and then moved to SPSS version 27 software for analysis. Descriptive analysis was computed to generate frequencies and percentages for categorical data. To address each of the three research objectives the responses were rated in a Likert scale, which had scores between 1 and 5. By indicating a score of one against a response, this meant that the respondent strongly disagreed with the item in question. A score of 2, demonstrated that the respondent disagreed with the statement while a score of 3 indicated a neutral perspective on the statement. Similarly, a score of 4 showed that the respondents agreed with the statement, while a score of 5 showed that the respondent strongly agreed with the

item in question. To determine the effects of various shifts on the respondents' health, mean scores for the various responses were computed. Any mean score above 2.5 was assumed to have an effect on the respondents' health status.

3.12 Ethical considerations

The study proposal was submitted to the Mount Kenya University (MKU) School of public health for clearance by the supervisors and the school management. A letter of clearance was also obtained from the school of post graduate studies. Once clearance letter was obtained, the proposal was submitted to the MKU ethical review committee (ERC) in order to be cleared for data collection. Authority to collect data was also obtained from the National Commission for Science, Technology and Innovation (NACOSTI). The researcher also obtained permission to collect data from the management of the Machakos Level 5 county referral Hospital and the ward in-charges. Authority to pretest data collection tools was also sought from the research ethics review committee of Thika level 5. Informed consent from all the respondents was sought in order to interview them. The respondents were not required to enter their names in the questionnaires since code numbers were used. The respondents were also informed that the information collected will be handled with maximum privacy and confidentiality, and hence the data collected was used for research purposes only. All the data was stored in a computer with a password known to the researcher and the data entry clerk only. In data presentation, no names or identifiers were used. This was safe-guard the respondents from victimization due to their responses during data collection. The researcher also ensured that all government COVID 19 regulations were observed during the research process, like social distancing, wearing of masks, hand washing and sanitization.

CHAPTER FOUR: RESULTS AND DISCUSSION

4.1. Response rate

The number of respondents were 167, out of 191 questionnaires that were distributed, making a response rate of 87.4%. According to Mugenda and Mugenda (2003), a response rate of 50 percent is adequate for data analysis and reporting; a rate of 60 percent is good and a response rate of 70% and over is excellent.

4.2 Respondents' Socio-demographic characteristics

The youngest respondent was 21 years old while the oldest was 59 years with a mean of 36.55 years. The nurses' years of experience ranged from 2 to 35 years with a mean of 12 years (table 2).

Table 2: Respondents' age and years of experience

Variable	N	Minimum	Maximum	Mean	95% Confidence Interval	
					Lower	Upper
Age in years	167	21	59	36.55	35.07	38.03
Years of Experience	167	2	35	12.04	10.63	13.45

Female gender formed the majority of the respondents (n=117; 70.1%). Similarly, most 74.9% (125) of the respondents were married. Apart from being employed as nurses, the respondents were also engaged in other sources of income like farming and business as shown in table 3.

Table 3: Other socio-demographic characteristics

Variable		Frequency	Percentage
Gender	Male	50	29.9
	Female	117	70.1
	Total	167	100
Marital status	Married	125	74.9
	Divorced	3	1.8
	Separated	10	6.0
	Single	29	17.3
	Total	167	100
Engaged with other activities	Yes	55	32.9
	No	112	67.1
	Total	167	100
Specific engagement	Farming	12	21.8
	Business	19	34.5
	Family	2	3.6
	Locum	9	16.5
	Study	8	14.5
	Church and Charity	3	5.5
	Sports	2	3.6
	Total	55	100

Majority of the respondents (53.3%, n=89) were diploma holders while 34 (20.3%) of them had a bachelor of science in nursing or above, among other qualifications. In terms of cadre, majority of the respondents (n=66; 39.5%) were at the level of nursing officer two. The study also showed that 17.3% (29) were allocated in the surgical wards, while 12.6% (21) were allocated in the medical ward, similar to the maternity ward. Among the nurses, 8.4% (14) were allocated in the intensive care unit, 7.2% (12) in the emergency department and 6.5% (11) in the emergency department. Other deployments were as illustrated in table 4. Almost half (n= 73, 43.7%) of the respondents lived more than three kilometers from their place of work while only 4.8% (8) of the respondents lived within the hospital quarters as shown in table 4.

Table 4: Respondent's employment information

Variable		Frequency	Percentage
Professional Qualifications	Certificate	20	12.0
	Diploma	89	53.3
	Higher Diploma	24	14.4
	Bachelor's degree and above	34	20.3
	Total	167	100
Designation	SNO	32	19.2
	NO1	40	24.0
	NO II	66	39.5
	NO III	15	8.9
	Others	7	16.3
	ACN	7	16.3
	Total	167	100
Unit allocated to work	Medical Ward	21	12.6
	Intensive Care Unit	14	8.4
	Psychiatry	6	3.6
	Orthopedic	3	1.8
	Training	2	1.2
	Maternal and child health/ Family planning	4	2.4
	Surgical Ward	29	17.3
	Maternity Ward	21	12.6
	Pediatric Ward	16	9.6
	Emergency Department	12	7.2
	Outpatient Department	11	6.5
	Others	14	8.4
	Newborn Unit	2	1.2
	Theatre	12	7.2
	Total	167	100
Distance from Work Place in Approximate km	Within the Hospital Quarters	8	4.8
	Less than 1 km	24	14.4
	1 to 3 km	62	37.1
	More than 3km	73	43.7
	Total	167	100

4.3 Shift Work among the respondents

4.3.1 Shifts allocated shifts to the respondents in the last four weeks

Most (50.9%; n=85) of the respondents were allocated to work in an eight hour shift, followed by 25.7% (43) of them who stated that they were allocated to work on night shift. Among the respondents, 15% (25) of them were allocated on 12 hours shift while 8.4% (14) were allocated on the six hours shift as shown in figure 4.

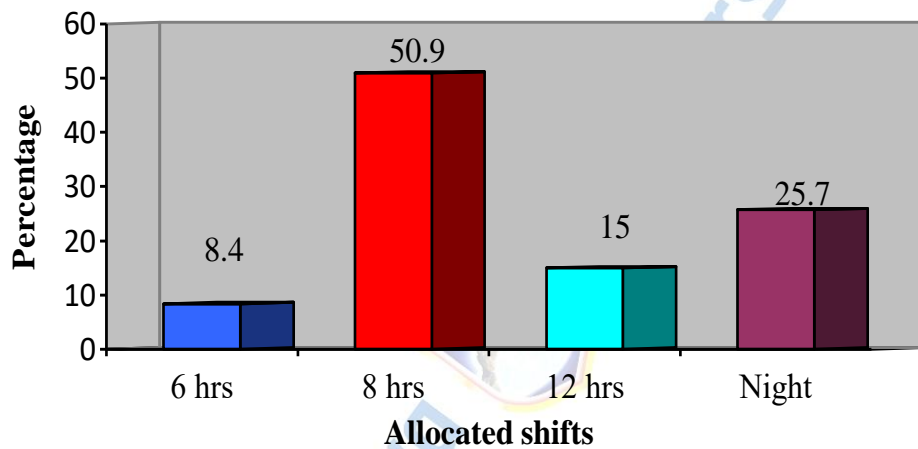


Figure 3: Respondent's allocated shifts

4.3.2 Preferred Working Shift

The respondents were asked to rate their preferences on various shifts in a scale of 1 to 5. This was on a Likert scale whereby a score of 1 showed that the respondents strongly disagreed in terms of their preference to the shift, a score of 2 showed disagreement with the shift, while a score of three indicated a neutral opinion. A score of 4 showed that the respondent agreed in terms of preference to the shift while a score of 5 indicated that the respondents strongly agreed in terms of their preference to the cited shift. When the

respondents were asked whether they preferred the six hours shift, 31.7% (62) of them strongly agreed, 25.1% (42) agreed, 12.6% (21) were neutral, with 10.2% (17) disagreeing while 15% (25) of them strongly disagreed on their preference to the shift.

In respect to their preference on the eight hours shift, 27.5% (43) of them strongly agreed, 29.3% (49) agreed, 15% (25) had a neutral opinion, with 12.6% (21) disagreeing while 17.4% (29) of them strongly disagreed on their preference to the shift. Likewise, the respondents were asked to rate their preference on the 12 hours shifts. In this case, 13.7% (23) of them strongly agreed while 15% (25) of them agreed, with the same number having a neutral opinion in terms of their preference to the shift. Among the respondents, 19.2% (32) of them disagreed on their preference to the 12 hours shift while 37.1% (62) strongly disagreed on the same aspect.

The respondents had varying views when they were asked whether they preferred to work during the night shift. In this regard, 38.3% (64) of them strongly agreed that they preferred the shift, 21.5% (36) agreed, while 12% (20) of them had a neutral opinion in terms of their preference to the night shift. However, 10.2% (17) of them disagreed with the fact that they preferred to work on night shift while 18% (30) strongly disagreed on the same.

Overall, when all the responses were collapsed to either agree or disagree and disregarding neutral opinions, 62.3% (104) of the respondents agreed that they prefer working in the six hours shift while 55.1% (92) of them preferred the eight hours shift (table 5 below).

Table 5: Preferred Working Shift

Preferred shifts	Respondents' responses					
	1 (Strongly Disagree)	2 (Disagree)	3 (Neutral)	4 (Agree)	5(Strongly agree)	
	No (%)	No (%)	No (%)	No (%)	No (%)	Total
I prefer 6 hours shift	25(15.0)	17 (10.2)	21 (12.6)	42 (25.1)	62 (31.7)	167 (100)
I prefer 8 hours shift	29 (17.4)	21 (12.6)	25 (15.0)	49 (29.3)	43 (25.7)	167 (100)
I prefer 12 hours shift	62 (37.1)	32 (19.2)	25 (15.0)	25 (15.0)	23 (13.7)	167 (100)
I prefer night shift	30 (18.0)	17 (10.2)	20 (12.0)	36 (21.5)	64 (38.3)	167 (100)

The above findings were supported by the respondents during the focused group discussion as summarized in table 6 below;

Table 6: Shift preference among respondents (FGDS)

Theme	Subtheme	Verbatim from respondents
Preferred shift	6 hours	Six hours shift is shorter, hence I can perform other duties during the day (FGD 2 in round one).
	6 hours	Young nurses prefer working for short shifts like six hours (KI 04)
	No preference	In my ward, I have not encountered nurses with specific preferences for shifts (KI 02)
Social life	Being with the family	As a young nurse, I prefer six or eight hours shift to nurse my baby a night (FGD 7 in round 2)
		Six or eight hours shift allow me time to be with my family at night (FGD 8, in round one).
		“Lactating mothers prefer working only in the afternoons so as to take care of their babies” (KI 08)
	Engage in other activities	I prefer working on night duty so that I can engage on side hustles during the night offs” (FGD 4 in round one)
	Further studies	“Night shifts are good because one gets adequate time to relax and even undertake further studies.”
Long working hours	Fatigue	When you work for long hours, you lose concentration” (FGD 7 in round one).
	Time spend in the hospital	I don’t like working in the 12 hours shift. You spend most of your precious time in the hospital (FGD 6, round 1).
	Retirement	Nurses who are almost retiring prefer night shift to have adequate time to prepare for retirement during their day offs” (KI 05, KI 02)
Management	Stress from supervisors	I don’t like day duty because of I am stressed by close supervision by my seniors” (FGD 1 in round one).
	In adequate resources	When working at day time, you are expected by your seniors to deliver results, yet there are no resources” (FGD 6, round 2)
	Available shifts	In my unit, the nurses have no option since there are only two available shifts, 12 hours and night (KI 03)

4.4 Shift work and physical wellness among nurses at the Machakos level five county referral hospital

The nurses were allocated to work on either night shift, 12 hours shift, eight hours shift or six hours shift. To assess the effect of the shift work on the nurses' physical wellness, Likert scale was used to gauge the level of agreement to various items in the data collection tool. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). Various responses were received from the respondents as described in the subsections below.

4.4.1 Night shift and physical wellness among the nurses at the Machakos level five county referral hospital

Regarding the effect of the night shift on their physical wellness, the respondents (n=43) who said that they are allocated on night shift gave varying views. When they were asked whether the shift decreased their quality of sleep, 11.6% (5) of them strongly agreed, 20.9% (9) agreed, 14% (6) disagreed, while 48.8% (21) strongly disagreed, with 4.7% (2) having a neutral view. When asked whether the shift exposed them to physical exhaustion, 2.3% (1) strongly agreed, while 18.6% (8) agreed. On the same issue, 16.3% (7) of the respondents had a neutral view while 51.2% (22) disagreed with 11.6% (5) strongly disagreeing. Likewise, the respondents provided varying responses on whether night shift led to increased job strain and burnout, whereby 4.7% (2) strongly agreed while 6.9% (3) agreed, with 18.6% (8) of the respondents having a neutral view. On the same aspect, 39.5% (17) of them strongly disagreed that night shift caused job strain and burn out while 30.3% (13) disagreed on the same. The respondents were also asked whether night shift exposed them to un healthy eating habits, whereby 27.9% (12) of them strongly agreed,

23.3% (10) agreed, 16.3% (7) had a neutral view, while 6.9% (3) disagreed with 25.6% (11) strongly disagreed.

In response to whether working on night shift affected their safety while walking home from work, 13.9% (6) of them strongly agreed, 16.3% (7) agreed, 6.9% (6) were neutral, 23.3% (10), disagreed while 32.6% (14) strongly disagreed. The respondents were also probed on whether working on night shift exposed them to long standing / walking hours in which case 4.7% (2) strongly agreed, 4.7% (2) agreed, 60.4% (26) disagreed, with 16.3% (7) strongly disagreeing while 13.9% (6) were neutral. Similarly, the researcher wanted to establish whether working on night shift reduced the respondents' rest time, whereby 2.3% (1) of them strongly agreed, 18.6% (8) agreed, 6.9% (3) were of neutral opinion, whereas 44.3% (19) disagreed while 27.9% (12) strongly disagreed. On the same aspect on night shift and nurses' physical health, the respondents were requested to provide their responses on whether the shift led to reduced professional fulfilment. In this regard, 23.3% (10) of the respondents strongly agreed, 9.3% (4) agreed, 14(6) had neutral opinion, 32.6% (14) disagreed while 20.9% (9) strongly disagreed. Another aspect on the association between night shift and nurses' physical health that was assessed was whether the shift predisposed the respondents to gastric ulcers. Among the respondents, 9.3% (4) of them strongly agreed, 6.9% (3) agreed with the same percentage having a neutral opinion, 18.6% (8) disagreed whereas 58.3% (25) strongly disagreed.

When the respondents were asked by the researcher whether night shift caused abdominal discomforts, 16.3% (7) of them strongly agreed, 9.3% (4) agreed, 11.6% (5) were neutral, 23.3% (10) disagreed while 39.5% (17) strongly disagreed. Likewise, the researcher wanted to establish whether night shift caused headaches among the respondents in which

case 9.3% (4) of them strongly agreed with the same number agreeing, 13.9% (6) were neutral, 25.6% (11) disagreed with 41.9% (18) of the strongly disagreeing. On whether night shift predisposed the respondents to chronic diseases, 11.6% (5) of them strongly agreed, 2.3% (1) agreed, 6.9% (3) were neutral, with 25.6% (11) of them disagreeing while 53.6% (23) strongly disagreed. On the same aspect of night shift and physical health among the respondents, the researcher sought to establish whether the shift work predisposed them to work related injuries, in which case 18.6% (8) strongly agreed, 4.7% (2) agreed, 16.3% (7) were neutral, while 23.3% (10) disagreed with 37.1% (16) strongly disagreeing. When the researcher enquired from the respondents on whether night shift caused an increase in body weight among them, 9.3% (4) strongly agreed, 4.7% (2) agreed, 13.9% (6) had a neutral view, 27.9% (12) disagreed while 44.2% (19) strongly disagreed. Similarly, 27.9% (12) of the respondents strongly agreed that night shift did not allow them time to exercise, 11.6% (5) of them agreed on the same, 16.3% (7) had a neutral view, 18.6% (8) of them disagreed while 25.6% (11) strongly disagreed as shown on table 7.

Table 7: Night shift allocation and the nurses' physical health

<i>Being allocated on night shift...</i>	Responses					Total	Mean score
	Strongly disagree(1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Decreased my quality of sleep	21 (48.8)	6 (14)	2(4.7)	9(20.9)	5(11.6)	43	2.32
Exposed me to physical exhaustion	5(11.6)	22(51.2)	7(16.3)	8(18.6)	1(2.3)	43	2.49
Led to increased job strain& burn out	17(39.5)	13(30.3)	8(18.6)	3 (6.9)	2(4.7)	43	2.07
Exposed me to un healthy eating habits	11(25.6)	3(6.9)	7(16.3)	10 (23.3)	12(27.9)	43	3.20
Affected my safety while walking home	14(32.6)	10(23.3)	6(13.9)	7(16.3)	6(13.9)	43	2.56
Exposed me to long standing/ walking hours	7(16.3)	26(60.4)	6(13.9)	2(4.7)	2(4.7)	43	2.21
Reduced my time of rest	12(27.9)	19 (44.3)	3(6.9)	8(18.6)	1(2.3)	43	2.23
Led to reduced professional fulfilment	9(20.9)	14(32.6)	6(13.9)	4(9.3)	10(23.3)	43	2.81
Cause gastric ulcers which I suffer from	25(58.3)	8(18.6)	3(6.9)	3(6.9)	4(9.3)	43	1.90
Caused abdominal discomforts	17(39.5)	10(23.3)	5(11.6)	4(9.3)	7(16.3)	43	2.40
Caused headaches I suffer from	18(41.9)	11(25.6)	6(13.9)	4(9.3)	4(9.3)	43	2.19
Predisposed me to chronic diseases	23(53.6)	11(25.6)	3(6.9)	1(2.3)	5(11.6)	43	1.93
Predisposed me to work related injuries	16(37.1)	10(23.3)	7(16.3)	2(4.7)	8(18.6)	43	2.44
Caused an increase in my body weight	19(44.2)	12(27.9)	6(13.9)	2(4.7)	4(9.3)	43	1.98
Did not allow me time to exercise	11(25.6)	8(18.6)	7(16.3)	5(11.6)	12(27.9)	43	2.98
Average mean score							2.38

To determine the effect of night duty on the respondents' physical health, 15 items were used to calculate the average mean score which was 2.38. This score is less than the average score (3), indicating that night duty did not affect their physical health. This was supported by respondents during the focused group discussion as shown in table 8 below

Table 8: Responses on effects of night shift on physical health during focused group discussions

Theme	Subtheme	Verbatim
Strain and burn out	Workload	During night shift, there are very few procedures, hence less strenuous FGD 4, in round 2).
		Some nurses prefer night duty because there are few procedures, hence they don't strain a lot (KI 01).
		"When some nurses work on night duty, they have adequate time to rest their by and recover from any burn out (KI 03)
		After working on night duty, I have adequate rest during the night offs (FGD 2, round two).

4.4.2 Twelve (12) hours shift and physical wellness among nurses at the Machakos level five county referral hospital

Among the respondents, (25) of them said that they were allocated to work on the 12 hours shift. The researcher sought to establish the effect of this shift on the physical wellness of the respondents. Various items, measured on a Likert scale were used. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The findings are illustrated in table 9. One of the items that was used to determine whether 12 hours shift had an effect on the physical health of the respondents was their quality of sleep. They were asked to provide their responses on whether 12 hours shift decreased

their quality of sleep, in which case 36% (9) strongly agreed, 16% (4) agreed, 24% (6) were neutral, while 12% (3) disagreed with 12% (3) strongly disagreeing. On the same aspect, the respondents were asked whether 12 hours shift exposed them to physical exhaustion, whereby 24% (6) strongly agreed, 16% (4) agreed, 24% (6) were neutral, with 16% (4) disagreeing while 20% (5) strongly disagreed. Likewise, the researcher enquired from the respondents on whether 12 hours shift caused increased job strain/ burn out among them. In respect to this, 24% (4) strongly agreed with the same number agreeing, while 24% (6) were neutral. Among the respondents, 20% (5) disagreed while 16% (4) strongly disagreed that 12 hours shift caused job strain/ burn out among them.

The respondents were also asked whether 12 hours shift exposed them to un healthy eating habits. Among them, 32% (8) strongly agreed, 8% (2) agreed, 28% (7) were neutral, while 16% (4) disagreed with 16% (4) strongly disagreeing.

Similarly, the researcher sought to establish whether the 12 hours shift affected the respondents' safety while walking home, whereby 12% (3) of them strongly agreed, 20.9% (9) agreed, 16% (4) were neutral, 28% (7) disagreed while 8% (2) strongly disagreed. Still regarding the 12 hours shift, the respondents were asked whether this exposed them to long standing/ walking hours. Regarding the latter, 20% (5) strongly agreed, 28% (7) agreed, 20% (5) were neutral, while 16% (4) disagreed with 16% (4) strongly disagreeing. Another item that was used to assess how the 12 hours shift affected the respondents' physical health was resting time. In this case, 16% (4) of the respondents strongly agreed that the shift reduced their resting time, 12% (3) of them agreed on the same while 28% (7) had a neutral view on this issue. Among the respondents, 20% (5) of them disagreed while 24% (6) strongly disagreed with the fact that the shift reduced their resting time.

Correspondingly, the researcher enquired from the respondents whether the 12 hours shift reduced their professional fulfilment, whereby 12% (3) strongly agreed, 32% (8) agreed, 16% (4) were neutral, while 8% (2) disagreed with 32% (8) strongly disagreeing.

As an aspect of probing the respondents more on the effect of 12 hours shift on their physical health, the researcher asked them whether the shift caused gastric ulcers among them. In response to this item, 52% (13) of them strongly agreed, 8% (2) agreed, 12% (3) were neutral, 24% (6) disagreed while 4% (1) of them strongly disagreed. Also, the respondents were asked whether the shift caused abdominal discomforts among them, with 48% (12) of them strongly agreeing on this aspect while 8% (2) of them agreed. Among the respondents, 16% (4) of them were neutral, 24% (6) disagreed while 4% (1) strongly disagreed. The researcher also asked the respondents whether the 12 hours shift predisposed them to headaches. In this case, 44% (11) strongly agreed, 12% (3) agreed, 16% (4) had an neutral view, while 20% (5) disagreed with 8% (2) strongly disagreeing.

In an attempt to probe more on the association between 12 hours shift and the respondents' physical health, the researcher enquired from them on whether the shift predisposed them to chronic diseases, in which case 48% (12) of them strongly agreed, 8% (2) agreed, 12% (3) of them were neutral, while 28% (7) disagreed with 4% (1) of them strongly disagreeing. Correspondingly, the respondents were asked whether the shift predisposed them to work related injuries. Among them, 36% (9) strongly agreed, 12% (3) agreed, 20% (5) were neutral, 24% (6) disagreed while 8% (2) strongly disagreed. Still, the researcher sought to establish whether the 12 hours shift caused an increase in body weight among the respondents, whereby 48% (12) of them strongly agreed, 8% (2) agreed, 12% (3) were neutral, while 28% (7) disagreed with 4% (1) strongly disagreeing. Likewise, the

researcher asked the respondents whether the shift allowed them time to exercise. In this regard, 32% (8) of them strongly agreed that the shift did not allow them to exercise, 16% (4) of them agreed on the same while 20% (5) of them had a neutral view. Among the respondents, 20% (5) disagreed while 12% (3) of them strongly disagreed, meaning that the shift did not affect their time to exercise as illustrated in table 9. The average means score was 3.32, which showed that most of the respondents agreed that the 12 hours shift affected their physical health.



Table 9: 12 hours shift and physical wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 12 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Decreased my quality of sleep	3(12)	3(12)	6(24)	4(16)	9(36)	25	3.52
Exposed me to physical exhaustion	5(20)	4(16)	6(24)	4(16)	6(24)	25	3.08
Led to increased job strain& burn out	4(16)	5(20)	6(24)	4(16)	6(24)	25	3.12
Exposed me to un healthy eating habits	4(16)	4(16)	7(28)	2(8)	8(32)	25	3.24
Affected my safety while walking home	2(8)	7(28)	4(16)	9(36)	3(12)	25	3.16
Exposed me to long standing/ walking hours	4(16)	4(16)	5(20)	7(28)	5(20)	25	3.20
Reduced my time of rest	6(24)	5(20)	7(28)	3(12)	4(16)	25	2.76
Led to reduced professional fulfilment	8(32)	2(8)	4(16)	8(32)	3(12)	25	3.00
Cause gastric ulcers which I suffer from	1(4)	6(24)	3(12)	2(8)	13(52)	25	3.00
Caused abdominal discomforts	1(4)	6(24)	4(16)	2(8)	12(48)	25	3.72
Caused headaches I suffer from	2(8)	5(20)	4(16)	3(12)	11(44)	25	3.64
Predisposed me to chronic diseases	1(4)	7(28)	3(12)	2(8)	12(48)	25	3.68
Predisposed me to work related injuries	2(8)	6(24)	5(20)	3(12)	9(36)	25	3.44
Caused an increase in my body weight	1(4)	7(28)	3(12)	2(8)	12(48)	25	3.88
Did not allow me time to exercise	3(12)	5(20)	5(20)	4(16)	8(32)	25	3.36
Average score							3.32

In support of the above findings, one of the respondents gave various views as shown in table 10 below;

Table 10: Responses on the effects of 12 hours shift on physical wellness during focused group discussion

Theme	Subtheme	Verbatim
Exhaustion	Strain and fatigue	You work for twelve hours daily, then when you take your offs, you are called back to work due to staff shortage, or you are told to carry forward your offs. This is very strenuous to the body. (FGD 8, in round two).
		After working for 12 hours for several days, some nurses take sick offs complaining of strain and fatigue (KI 02)
		In the 12 hour shift, one is on her feet throughout the day, leading to serious fatigue at the end of the shift (FGD 1, round one)
		We need to ensure that change over does not take long to allow nurses adequate time to go home and rest (KI 04)
	Pain	Working on the 12 hours shift leads to muscle strain, backache and varicose veins” (FGD 5, round one).
		12 hours are too many hence some nurses have associated backaches and varicose veins to the long standing hours (KI 06)
	Workload	There is need to deploy more nurses in the busy units due to heavy work load (K 07).

4.4.3 Eight hours shift and physical wellness among nurses at the Machakos level five county referral hospital

When the respondents were asked about the shifts that they were allocated, (85) of them said that they were allocated to work on the eight hours shift. Various items, measured on a Likert scale were used to determine the association between this shift and the respondents' physical wellness. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The findings are illustrated in table 11.

Various items were used to measure the association between eight hours shift and the physical wellness of the respondents. Among these items was the respondents' quality of sleep. They were asked to provide their responses on whether eight hours shift decreased their quality of sleep, in which case 9.4% (8) strongly agreed, 38.9% (33) agreed, 12.9% (11) were neutral, while 9.4% (8) disagreed with 24.9% (25) of the respondents strongly disagreeing. Correspondingly, the respondents were asked whether eight hours shift exposed them to physical exhaustion, whereby 22.4% (19) strongly agreed, 7.1% (6) agreed, 17.6% (15) were neutral, with 43.5% (37) disagreeing while 9.4% (8) strongly disagreed. Likewise, the researcher enquired from the respondents on whether the same shift caused increased job strain/ burn out among them. In respect to this, 8.2% (7) strongly agreed, 21.1% (18) agreed, while 24.7% (21) were neutral. Among the respondents, 7.1% (6) disagreed while 38.9% (33) of them strongly disagreed that eight hours shift caused job strain/ burn out among them.

The respondents were also asked whether the eight hours shift exposed them to un healthy eating habits. Among them, 8.2% (7) strongly agreed, 11.8% (10) agreed, 11.8% (10) were neutral, while 38.9% (33) disagreed with 29.3% (25) of them

strongly disagreeing. Similarly, the researcher sought to establish whether the eight hours shift affected the respondents' safety while walking home, whereby 11.8% (10) of them strongly agreed, 7.1% (6) agreed, 2.4% (2) were neutral, 42.3% (36) disagreed while 36.4% (31) strongly disagreed.

Still regarding the eight hours shift, the respondents were asked whether this exposed them to long standing/ walking hours. Regarding the latter, 5.9% (5) strongly agreed, 5.9% (5) agreed, 11.8% (10) were neutral, while 65.8% (56) disagreed with 10.6% (9) strongly disagreeing. Another item that was used to assess how the eight hours shift affected the respondents' physical health was resting time. In this case, 7.1% (6) of the respondents strongly agreed that the shift reduced their resting time, 11.8% (10) of them agreed on the same while 11.8% (10) had a neutral view on this issue. Among the respondents, 38.9% (33) of them disagreed while 30.4% (26) strongly disagreed with the fact that the shift reduced their resting time. On the same aspect, the researcher enquired from the respondents whether the eight hours shift reduced their professional fulfilment, whereby 15.4% (13) strongly agreed, 8.2% (7) agreed, 28.2% (24) were neutral, while 25.8% (22) disagreed with 22.4% (19) strongly disagreeing.

As an aspect of probing the respondents on the effect of eight hours shift on their physical health, the researcher asked them whether the shift caused gastric ulcers among them. In response to this item, 3.5% (3) of them strongly agreed, 1.2% (1) agreed, 10.6% (9) were neutral, 41.2% (35) disagreed while 43.5% (37) strongly disagreed. Also, the respondents were asked whether the shift caused abdominal discomforts among them, with 1.2% (1) of them strongly agreeing while 11.8% (10) of them agreed. Among the respondents, 3.5% (3) of them were neutral, 48.2% (41)

disagreed while 35.3% (30) strongly disagreed. The researcher also asked the respondents whether the eight hours shift predisposed them to headaches. In this case, 7.1% (6) of them strongly agreed, 15.4% (13) agreed, 7.1% (6) of them had a neutral view, while 34.1% (29) disagreed with 36.5% (31) strongly disagreeing.

In an attempt to probe more on the association between eight hours shift and the respondents' physical health, the researcher enquired from them on whether the shift predisposed them to chronic diseases, in which case 16.5% (14) of them strongly agreed, 4.7% (4) agreed, 3.5% (3) of them were neutral, while 27.2% (23) disagreed with 48.2% (41) strongly disagreeing. Correspondingly, the respondents were asked whether the shift predisposed them to work related injuries. Among them, 18.8% (16) strongly agreed, 3.5% (3) agreed, 7.1% (6) were neutral, 43.5% (37) disagreed while 27.1% (23) strongly disagreed. Still, the researcher sought to establish whether the eight hours shift caused an increase in body weight among the respondents, whereby 15.4% (13) of them strongly agreed, 3.5% (3) agreed, 20% (17) were neutral, while 25.8% (22) disagreed with 35.3% (30) strongly disagreeing. Likewise, the researcher asked the respondents whether the shift allowed them time to exercise. In this regard, 5.9% (5) of them strongly agreed that the shift did not allow them to exercise, 8.2% (7) of them agreed on the same while 11.8% (10) of them had a neutral view. Among the respondents, 52.9% (45) disagreed while 21.2% (18) of them strongly disagreed, meaning that the shift did not affect their time to exercise as shown in table 11.

Among the 167 respondents, 85 of them indicated that they were allocated on eight hours shift. To determine the overall effect of the eight hours shift on the respondents'

physical health, 15 items were used. The average mean score for all the items was 2.34, meaning that the eight hours shift did not affect their physical health.



Table 11: Eight hours shift and physical wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 8 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Decreased my quality of sleep	25(29.4)	8(9.4)	11(12.9)	33(38.9)	8(9.4)	85	2.89
Exposed me to physical exhaustion	8(9.4)	37(43.5)	15(17.6)	6(7.1)	19(22.4)	85	2.89
Led to increased job strain& burn out	33(38.9)	6(7.1)	21(24.7)	18(21.1)	7(8.2)	85	2.43
Exposed me to un healthy eating habits	25(29.3)	33(38.9)	10(11.8)	10(11.8)	7(8.2)	85	2.30
Affected my safety while walking home	31(36.4)	36(42.3)	2(2.4)	6(7.1)	10(11.8)	85	2.15
Exposed me to long standing/ walking hours	9(10.6)	56(65.8)	10(11.8)	5(5.9)	5(5.9)	85	2.31
Reduced my time of rest	26(30.4)	33(38.9)	10(11.8)	10(11.8)	6(7.1)	85	2.26
Led to reduced professional fulfilment	19(22.4)	22(25.8)	24(28.2)	7(8.2)	13(15.4)	85	2.68
Cause gastric ulcers which I suffer from	37(43.5)	35(41.2)	9(10.6)	1(1.2)	3(3.5)	85	1.80
Caused abdominal discomforts	30(35.3)	41(48.2)	3(3.5)	10(11.8)	1(1.2)	85	1.95
Caused headaches I suffer from	31(36.5)	29(34.1)	6(7.1)	13(15.2)	6(7.1)	85	2.22
Predisposed me to chronic diseases	41(48.2)	23(27.1)	3(3.5)	4(4.7)	14(16.5)	85	2.14
Predisposed me to work related injuries	23(27.1)	37(43.5)	6(7.1)	3(3.5)	16(18.8)	85	2.44
Caused an increase in my body weight	30(35.3)	22(25.9)	17(20)	3(3.5)	13(15.3)	85	2.38
Did not allow me time to exercise	18(21.2)	45(52.9)	10(11.8)	7(8.2)	5(5.9)	85	2.25
Average mean score							2.34

In respect to the eight hours shift, respondents during the focused group discussions provided their view as shown in table 12.

Table 12: Responses on the effects of Eight hours shift and physical wellness

Theme	Subtheme	Verbatim
Fatigue and strain	Inadequate resources	During the eight hour shift, one is forced to perform most of the procedures, yet there is shortage of personnel and resources, which leads to fatigue (FGD 2 in round 1).
		We are constrained by lack of resources, a situation which stresses most of the nurses as they struggle to provide the best patient care with limited resources (KI 08).
		Most nurses prefer the eight hours shift because it is less strenuous (KI 05).

4.4.4 Six hours shift and physical wellness among nurses at the Machakos level five county referral hospital

Among the respondents, (14) of them said that they were allocated to work on the six hours shift. To determine the relationship between the six hours shift work and the respondents' physical health, a Likert scale with various items was used. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). The findings are illustrated in table 9. One of the aspects of physical health that was measured was the respondents' quality of sleep. They were asked to provide their responses on whether the six hours shift decreased their quality of sleep, in which case 14.3% (2) of them strongly agreed with the same number agreeing. Similarly, the same number of respondents had a neutral view, with the same number disagreeing, while 21.4% (11) of them strongly disagreed. Correspondingly, the respondents were asked whether six hours

shift exposed them to physical exhaustion, in which case 21.4% (3) of them strongly agreed, 7.1 % (1) agreed, 14.3% (2) were neutral, with 21.4% (3) of them disagreeing while 35.8% (5) strongly disagreed. Likewise, the researcher enquired from the respondents on whether the same shift caused increased job strain/ burn out among them. In respect to this, 21.4% (3) of them strongly agreed, 7.1% (1) agreed, while 14.3% (2) were neutral. Among the respondents, 21.4% (3) disagreed while 35.8% (5) strongly disagreed with the fact that six hours shift caused job strain/ burn out among them.

The respondents were also asked whether the six hours shift exposed them to un healthy eating habits. Among them, 14.3% (2) of them strongly agreed, 7.1% (1) of them agreed with similar number being neutral, while 21.4% (3) of them disagreed with 50.1% (7) of them strongly disagreeing. Similarly, the researcher sought to establish whether the six hours shift affected the respondents' safety while walking home, whereby 21.4% (3) of them strongly agreed, 14.3% (2) agreed, 7.1% (1) of them had a neutral opinion, while 14.3% (2) disagreed with 21.4% (6) strongly disagreeing. Still regarding the six hours shift, the respondents were asked whether this exposed them to long standing/ walking hours. Regarding the latter, 7.1% (1) of them strongly agreed, 7.1% (1) agreed, 14.3% (2) were neutral, 26.8% (4) disagreed while 42.9% (6) strongly disagreed. Another item that was used to assess how the six hours shift affected the respondents' physical health was resting time. In this case, 7.1% (1) of the respondents strongly agreed that the shift reduced their resting time with similar number agreeing on the same while 14.3% (2) had a neutral view on this issue. Among the respondents, 26.8% (4) of them disagreed while 42.9% (6) strongly disagreed with the fact that the shift reduced their resting time. On the same aspect, the researcher enquired from the respondents whether the six hours shift reduced

their professional fulfilment, whereby 7.1% (1) of them strongly agreed with similar number agreeing, 21.4% (3) of them were neutral, while 28.6% (4) disagreed with 35.8% (5) strongly disagreeing. Still, while probing the respondents on the effect of six hours shift on their physical health, the researcher asked them whether the shift caused gastric ulcers among them. In response to this item, 7.1% (1) of them strongly agreed with equal number agreeing, while none of them had a neutral view. On the same aspect, 14.3% (2) of the respondents disagreed while 71.5% (10) of them strongly disagreed. Also, the respondents were asked whether the shift caused abdominal discomforts among them, whereby 7.1% (1) of them strongly agreed on this aspect while the same number either agreed or had a neutral opinion. Among the respondents, 14.3% (2) of them disagreed while 64.4% (9) strongly disagreed. The researcher also asked the respondents whether the six hours shift predisposed them to headaches. In this case, 7.1% (1) of them strongly agreed on this aspect while the same number either agreed or had a neutral opinion, while 14.3% (2) disagreed with 64.4% (9) of them strongly disagreeing.

In an attempt to probe more on the association between six hours shift and the respondents' physical health, the researcher enquired from them on whether the shift predisposed them to chronic diseases, in which case 7.1% (1) of them strongly agreed on this aspect with the same number agreeing. Among the respondents, 14.3% (2) of them had a neutral opinion, with equal numbers disagreeing on the fact that the shift exposed them to chronic diseases while 57.2% (8) of them strongly disagreed on the same. Correspondingly, the respondents were asked whether the shift predisposed them to work related injuries. Among them, 14.3% (2) strongly agreed, 7.1% (1) agreed while an equal proportion had a neutral view with 21.4% (3) of them disagreeing while 50.1% (7) strongly disagreed. Still, the

researcher sought to establish whether the six hours shift caused an increase in body six among the respondents, whereby 14.3% (2) of them strongly agreed, 7.1% (1) agreed while none of them had a neutral view. Among the respondents, 21.4% (3) disagreed with 50.2% (8) strongly disagreeing. Likewise, the researcher asked the respondents whether the shift allowed them time to exercise. In this regard, 7.1% (1) of them strongly agreed that the shift did not allow them to exercise with equal proportion agreeing on the same while 14.3% (2) of them had a neutral view. Among the respondents, 21.4% (3) disagreed while 50.1% (7) of them strongly disagreed, meaning that the shift did not affect their time to exercise as demonstrated in table 13.

Among the 167 respondents, 14 of them stated that they were allocated on six hours shift, with 15 items being used to determine the effect of this shift on their physical health. The computed average mean score for all the items was 2.13, meaning that the shift had no effect on their physical health.

Table 13: Six hours shift and physical wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on six hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Decreased my quality of sleep	6(42.8)	2(14.3)	2(14.3)	2(14.3)	2(14.3)	14	2.42
Exposed me to physical exhaustion	5(35.8)	3(21.4)	2(14.3)	1(7.1)	3(21.4)	14	2.57
Led to increased job strain& burn out	5(35.8)	3(21.4)	2(14.3)	1(7.1)	3(21.4)	14	2.57
Exposed me to un healthy eating habits	7(50.1)	3(21.4)	1(7.1)	1(7.1)	2(14.3)	14	2.14
Affected my safety while walking home	6(42.9)	2(14.3)	1(7.1)	2(14.3)	3(21.4)	14	2.57
Exposed me to long standing/ walking hours	6(42.9)	4(28.6)	2(14.3)	1(7.1)	1(7.1)	14	2.07
Reduced my time of rest	6(42.9)	4(28.6)	2(14.3)	1(7.1)	1(7.1)	14	2.07
Led to reduced professional fulfilment	5(35.8)	4(28.6)	3(21.4)	1(7.1)	1(7.1)	14	2.21
Cause gastric ulcers which I suffer from	10(71.5)	2(14.3)	0(0)	1(7.1)	1(7.1)	14	1.64
Caused abdominal discomforts	9(64.4)	2(14.3)	1(7.1)	1(7.1)	1(7.1)	14	1.79
Caused headaches I suffer from	9(64.4)	2(14.3)	1(7.1)	1(7.1)	1(7.1)	14	1.79
Predisposed me to chronic diseases	8(57.2)	2(14.3)	2(14.3)	1(7.1)	1(7.1)	14	1.93
Predisposed me to work related injuries	7(50.1)	3(21.4)	1(7.1)	1(7.1)	2(14.3)	14	2.14
Caused an increase in my body weight	8(57.2)	3(21.4)	0(0)	1(7.1)	2(14.3)	14	2.00
Did not allow me time to exercise	7(50.1)	3(21.4)	2(14.3)	1(7.1)	1(7.1)	14	2.00
Average mean score							2.13

The above findings were also supported by participants during the focused group discussions as illustrated in table 14.

Table 14: Responses on the effects of six hours shift on physical health

Theme	Subtheme	Verbatim
Strain	Rest	There is a lot of time to rest when one is allocated to work for six hours daily” (FGD 3 round 2)
		Six hour shift is less strenuous compared to the other shifts (FGD 5, round two)
		I allocate six hours shift to nurses with chronic diseases since they will have adequate time to rest (KI 04)

4.5 Shift work and the mental wellness among nurses at the Machakos level five county referral hospital

To determine the effect of shift work among the respondents, four shifts (night, 12 hours, eight hours and six hours) were included. These were the shift that were allocated to the respondents as described in the subsections below.

4.5.1 Night shift and mental wellness among nurses at the Machakos level five county referral hospital

While assessing the association between night shift and the respondents’ mental wellness, the researcher used various items as shown in table 15. One of the items used was drug use, whereby the respondents were asked whether the shift predisposed them to drug use. In response to this, 30.3% (13) of them strongly agreed that the shift predisposed them to drug use, 34.9% (15) agreed, while 11.6% (5) of them had a neutral view. Likewise, 11.6% (5) of the respondents disagreed with similar proportion strongly disagreeing. On the same aspect of night shift, the respondents were asked whether this shift caused them mental fatigue. In this case, 39.6% (17) of them strongly agreed, 11.6% (5) agreed, 13.9% (6) had

a neutral view, 16.3% (7) disagreed while 18.6% (8) of the respondents strongly disagreed. Another item assessed was whether night shift reduced the respondents' ability to concentrate, whereby 27.9% (12) of them strongly agreed, 25.7% (11) agreed, 20.9% (9) had a neutral view while 18.6% (8) disagreed with 6.9% (3) of the respondents strongly disagreeing. The respondents were also asked whether the night shift reduced their attention to patient care need, in which case, 23.3% (10) strongly agreed, 30.2% (13) agreed, 13.9% (6) were neutral, with 25.7% (11) disagreeing while 6.9% (3) of them strongly disagreed.

In an attempt to probe more on the association between night shift and the respondents' mental wellness, the researcher enquired from the respondents on whether the shift was very stressful. In their response, 25.7% (11) of the respondents strongly agreed that the shift was very stressful, 23.1% (10) agreed, 16.3% (7) of them had a neutral opinion, 9.2% (4) disagreed while 25.7% (11) of them strongly disagreed, meaning that the shift was not very stressful to them. Still on the issue of night shift, the respondents were asked whether they felt isolated from their colleagues, whereby 13.9% (6) strongly agreed, 30.3% (13) agreed, 16.3% (7) were neutral, 30.3% (13) of them disagreed while 9.2% (4) strongly disagreed. Similarly, the researcher enquired from the respondents whether the night shift affected their mood in which case 20.9% (9) of them strongly agreed, 9.3% (4) agreed, 23.3% (10) were neutral, 25.6% (11) disagreed, while 20.9% (9) of them strongly disagreed that the shift affected their mood. The researcher also asked the respondents whether the night shift made them not to be able to interact freely with others, whereby 20.9% (9) of them strongly agreed, 25.7% (11) agreed, 18.6% (8) were neutral, 27.9% (12) of them disagreed while 6.9% (3) strongly disagreed.

Another aspect which the researcher assessed in relation to the association between night shift and the respondents' mental wellness was whether working on the shift made them untidy, in which case 11.6% (5) of them strongly agreed, 46.6% (20) of them agreed, 11.6% (5) were neutral, 27.9% (12) disagreed while 2.3% (1) of them strongly disagreed. Correspondingly, when the respondents were asked whether working on night shift led to poor hygiene among them 9.3% (4) strongly agreed, 48.8% (21) agreed, 9.3% (4) had a neutral view, 30.3% (13) disagreed while 2.3% (1) of them strongly disagreed. Still on the same aspect, the respondents were asked whether the night shift made them become disoriented whereby 16.4% (7) of them strongly agreed, 34.9% (15) agreed, 20.9% (9) were neutral with the same number disagreeing while 6.9% (3) strongly disagreed as depicted in table 15.

The researcher utilized 11 items to determine the effect of night shift on the respondents' mental health. The average mean score for the 11 items was 3.27 denoting that the shift negatively affected their mental health.

Table 15: Night shift allocation and the nurses' mental health

<i>Being allocated on night shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Predisposed me to use of drugs	5(11.6)	5(11.6)	5(11.6)	15(34.9)	13(30.3)	43	3.60
Led to mental fatigue	8(18.6)	7(16.3)	6(13.9)	5(11.6)	17(39.6)	43	3.37
Reduced my ability to concentrate	3(6.9)	8(18.6)	9(20.9)	11(25.7)	12(27.9)	43	3.49
Reduced my attention to patient care needs	3(6.9)	11(25.7)	6(13.9)	13(30.2)	10(23.3)	43	3.37
Was very stressful	11(25.7)	4(9.2)	7(16.3)	10(23.1)	11(25.7)	43	3.14
Made me feel isolated by my colleagues	4(9.2)	13(30.3)	7(16.3)	13(30.3)	6(13.9)	43	3.09
Affected my mood	9(20.9)	11(25.6)	10(23.3)	4(9.3)	9(20.9)	43	2.84
Made me not to be able to interact freely with others	3(6.9)	12(27.9)	8(18.6)	11(25.7)	9(20.9)	43	3.35
Made me untidy	1(2.3)	12(27.9)	5(11.6)	20(46.6)	5(11.6)	43	3.37
Led to my poor hygiene	1(2.3)	13(30.3)	4(9.3)	21(48.8)	4(9.3)	43	3.33
Made me become disoriented	3(6.9)	9(20.9)	9(20.9)	15(34.9)	7(16.4)	43	3.33
Average mean score							3.27

The above findings were supported by participants during the focused group discussion as demonstrated in table 16.

Table 16: Responses during focused group discussion on the effects of night shift allocation and the nurses' mental health

Theme	Subtheme	Verbatim
Mental strain	Sleep and rest	Night shifts are normally busy and lead to sleep disturbances” (FGD 1 in round two).
		Night duties cause sleep disturbances hence may lead to disorientation among some of the nurses, especially if they work for a long time (KI 07)
		When you work on the night shift, you have enough day offs to rest and you can also do your own things (FGD 3 in round one)
Management	Staff support	There is need to rotate the shifts, such that a nurse does not work in one shift for more than one month(KI 01)
		There is need for supportive supervision to pick out any issues related to shift work and handle them appropriately (KI 03)
		Nurses managers need to promote team work among their staff so as to create a friendly environment among the nurses. This will ease mental tension, especially for nurses working on night shift (KI 06)

4.5.2: 12 hours shift and mental wellness among nurses at the Machakos level five county referral hospital

Among the respondents, (25) of them were allocated on the 12 hours shift. As illustrated in table 17, the researcher sought to establish the association between the 12 hours shift and the respondents' mental health using various items on a Likert scale. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5).

Among the items assessed was whether the shift predisposed them to drug use whereby 28% (7) of them strongly agreed, 56% (14) agreed, 8% (2) were neutral, 4% (1) disagreed with similar number strongly disagreeing. On the same aspect of 12 hours shift, the respondents were asked whether this shift caused them mental fatigue. In this case, 24% (6) of them strongly agreed, 32% (8) agreed, 16% (4) had a neutral view with the same number disagreeing while 12% (3) of the respondents strongly disagreed. Another item assessed was whether 12 hours shift reduced the respondents' ability to concentrate, whereby 20% (5) of them strongly agreed, 24% (6) agreed, 24% (6) had a neutral view while 20% (5) disagreed with 12% (3) of them strongly disagreeing.

The respondents were also asked whether the 12 hours shift reduced their attention to patient care need, in which case, 24% (6) of them strongly agreed, 32% (8) agreed, 8 (2) had a neutral view, with the same number disagreeing. Among them, 28% (7) strongly disagreed that 12 hours shift reduced their attention to patient care needs.

In an attempt to probe more on the association between 12 hours shift and the respondents' mental wellness, the researcher enquired from the respondents on whether the shift was very stressful. In their response, 28% (7) of the respondents strongly agreed that the shift was very stressful, 20% (5) agreed, 28% (7) of them had a neutral opinion, 8% (2) disagreed while 16% (4) of them strongly disagreed. Still on the issue of 12 hours shift, the respondents were asked whether they felt isolated from their colleagues, whereby 20% (5) strongly agreed, 36% (9) agreed, 8% (2) were neutral, 16% (4) of them disagreed while 20% (5) of them strongly disagreed. Similarly, the researcher enquired from the respondents whether the 12 hours shift affected their mood in which case 24% (6) of them strongly agreed, 28% (7) agreed, 12% (3) were neutral, 8% (2) of them disagreed with 28%

(7) strongly disagreeing. The researcher also asked the respondents whether the 12 hours shift made them not to be able to interact freely with others, whereby 20% (5) of them strongly agreed, 32% (8) agreed, 16% (4) were neutral, 12% (3) of them disagreed while 20% (5) strongly disagreed.

Another aspect which the researcher assessed in relation to the association between 12 hours shift and the respondents' mental wellness was whether working on the shift made them untidy, in which case 16% (4) of them strongly agreed with similar number agreeing. Likewise, 4% (1) were neutral, 24% (6) disagreed while 40% (10) of them strongly disagreed. Correspondingly, when the respondents were asked whether working on 12 hours shift led to poor hygiene among them, 20% (5) strongly agreed, 4% (1) agreed with the same proportion having a neutral view, 28% (7) disagreed while 44% (11) strongly disagreed, meaning that the shift did not lead to poor hygiene among them. Still on the same aspect, the respondents were asked whether the 12 hours shift made them become disoriented whereby 32% (8) of them strongly agreed, 4% (1) agreed while the same number were neutral. Similarly, 20% (5) of them disagreed while 40% (10) strongly disagreed as illustrated in table 17. Eleven items were used to assess the effect of 12 hours shift on the respondents' mental health. The average mean score for all the items was 3.03, which means that the respondents felt that the 12 hours shift negatively affected their mental health. Among the issues which the respondents agreed with, majority of them stated that the 12 hours shift led to mental fatigue, made them feel isolated, reduced their concentration to patient care and also it was very stressful. The respondents also agreed that the shift affected their mood and also affected their ability to interact with colleagues.

Table 17: Twelve (12) hours shift and mental wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 12 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Predisposed me to use of drugs	1(4)	1(4)	2(8)	14(56)	7(28)	25	4.00
Led to mental fatigue	3(12)	4(16)	4(16)	8(32)	6(24)	25	3.4
Reduced my ability to concentrate	6(24)	5(20)	6(24)	3(12)	5(20)	25	2.84
Reduced my attention to patient care needs	7(28)	2(8)	2(8)	8(32)	6(24)	25	3.16
Was very stressful	4(16)	2(8)	7(28)	5(20)	7(28)	25	3.36
Made me feel isolated by my colleagues	5(20)	4(16)	2(8)	9(36)	5(20)	25	3.20
Affected my mood	7(28)	2(8)	3(12)	7(28)	6(24)	25	3.00
Made me not to be able to interact freely with others	5(20)	3(12)	4(16)	8(32)	5(20)	25	3.20
Made me untidy	10(40)	6(24)	1(4)	4(16)	4(16)	25	2.44
Led to my poor hygiene	11(44)	7(28)	1(4)	1(4)	5(20)	25	2.08
Made me become disoriented	10(40)	5(20)	1(4)	1(4)	8(32)	25	2.68
Average mean score							3.03

Some of the above sediments were supported by the respondents during the focused group discussion as illustrated in table 18.

Table 18: Responses during focused group discussion on the effects of 12 hours shift on mental wellness

Theme	Subtheme	Verbatim
Mental health	Mental fatigue	There is need to employ more staff to prevent burn out and mental fatigue during the long shifts (KI 08)
		When you work for long hours, you lose concentration” (FGD 7 in round one).
	Management support	One source of stress in these long shifts is lack of patient care supplies. This means that the hospital management need to plan early to ensure that all the commodities are available (KI 06)
		To promote mental health among nurses who work for long shifts, we need to give extra offs and also compensate those who work beyond their normal working hours (KI 04)

4.5.3 Eight hours shift and mental wellness among nurses at the Machakos level five county referral hospital

Majority (n=85) of the respondents said that they were allocated to work on the eight hours shift. Table 19 shows the items that the researcher used to determine the association between the eight hours shift and the respondents’ mental health on a Likert scale. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). One of the items assessed was whether the shift predisposed the respondents to drug use whereby 9.4% (8) of them strongly agreed, 18.8% (16) agreed, 14.1% (12) were neutral, 23.5% (20) disagreed while 34.2% (29) strongly disagreed.

On the same aspect of eight hours shift, the respondents were asked whether this shift caused them mental fatigue. In this case, 12.9% (11) of them strongly agreed, 2.4% (2) agreed, 8.2% (7) had a neutral view, 45.9% (39) disagreed while 30.7% (26) of the respondents strongly disagreed. Another item assessed was whether eight hours shift reduced the respondents' ability to concentrate, whereby 2.4% (2) of them strongly agreed, 10.6% (9) agreed, 11.8% (10) had a neutral view while 51.7% (44) disagreed with 23.5% (20) of them strongly disagreeing. The respondents were also asked whether the eight hours shift reduced their attention to patient care need, in which case, 5.9% (5) of them strongly agreed, 4.8% (4) agreed, 18.8% (16) had a neutral view, 44.7% (38) disagreed while 25.8% (22) strongly disagreed that eight hours shift reduced their attention to patient care needs.

In an attempt to probe more on the association between eight hours shift and the respondents' mental wellness, the researcher enquired from the respondents on whether the shift was very stressful. In their response, 3.5% (3) of the respondents strongly agreed that the shift was very stressful, 9.4% (8) agreed, 20% (17) of them had a neutral opinion, 42.4% (36) disagreed while 24.7% (21) of them strongly disagreed, meaning that the shift was not very stressful to them.

Still on the issue of eight hours shift, the respondents were asked whether they felt isolated from their colleagues, whereby 8.2% (7) strongly agreed, 3.5% (3) agreed, 11.8% (10) were neutral, 29.4% (25) of them disagreed while 47.1% (40) of them strongly disagreed. Similarly, the researcher enquired from the respondents whether the eight hours shift affected their mood in which case 8.2% (7) of them strongly agreed, 9.4% (8) agreed, 5.9% (5) were neutral, 25.9% (22) of them disagreed while 50.6% (43) strongly disagreed with

the fact that the shift affected their mood. The researcher also asked the respondents whether the eight hours shift made them not to be able to interact freely with others, whereby 7% (6) of them strongly agreed, 10.6% (9) agreed, 5.9% (5) were neutral, 37.6% (32) of them disagreed while 38.9% (33) strongly disagreed.

Another aspect which the researcher assessed in relation to the association between eight hours shift and the respondents' mental wellness was whether working on the shift made them untidy, in which case 8.2% (7) of them strongly agreed while 7% (6) of them agreed. Among the respondents, 11.8% (10) of them were neutral, 30.6% (26) disagreed while 42.4% (36) of them strongly disagreed. Correspondingly, when the respondents were asked whether working on eight hours shift led to poor hygiene among them in which case 9.4% (8) of them strongly agreed, 10.6% (9) agreed, 9.4% (8) had a neutral view, 29.4% (25) disagreed while 41.2% (35) strongly disagreed, meaning that the shift did not lead to poor hygiene among them. Still on the same aspect, the respondents were asked whether the eight hours shift made them become disoriented whereby 9.4% (8) of them strongly agreed, 11.8% (10) agreed while the same number were neutral. Similarly, 27% (23) of them disagreed while 40% (34) strongly disagreed as shown in table 19.

To determine the effect of eight hours shift on the respondents' mental health, the researcher used 11 items. The average means score for all the 11 items was 2.14, meaning that the eight hours shift did not have a negative effect on the respondents' mental health.

Table 19: Eight hours shift and mental wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 8 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Predisposed me to use of drugs	29(34.2)	20(23.5)	12(14.1)	16(18.8)	8(9.4)	85	2.45
Led to mental fatigue	26(30.7)	39(45.9)	7(8.2)	2(2.3)	11(12.9)	85	2.21
Reduced my ability to concentrate	20(23.5)	44(51.7)	10(11.8)	9(10.6)	2(2.4)	85	2.16
Reduced my attention to patient care needs	22(25.8)	38(44.7)	16(18.8)	4(4.8)	5(5.9)	85	2.20
Was very stressful	21(24.7)	36(42.4)	17(20)	8(9.4)	3(3.5)	85	2.25
Made me feel isolated by my colleagues	40(47.1)	25(29.4)	10(11.8)	3(3.5)	7(8.2)	85	1.65
Affected my mood	43(50.6)	22(25.9)	5(5.9)	8(9.4)	7(8.2)	85	1.99
Made me not to be able to interact freely with others	33(38.9)	32(37.6)	5(5.9)	9(10.6)	6(7)	85	2.09
Made me untidy	36(42.4)	26(30.6)	10(11.8)	6(7)	7(8.2)	85	2.08
Led to my poor hygiene	35(41.2)	25(29.4)	8(9.4)	9(10.6)	8(9.4)	85	2.18
Made me become disoriented	34(40)	23(27)	10(11.8)	10(11.8)	8(9.4)	85	2.24
Average mean score							2.14

Table 20 shows some of the responses during focused group discussion in supported of the above findings.

Table 20: Responses on the effects of Eight hours shift on mental wellness

Theme	Subtheme	Verbatim
Mental health	Rest	When nurses work on the eight hours shift, they have adequate time to vent out any work related frustrations, hence promoting their mental health (KI 08)
		Working for eight hour a day allow one to relax and re-energize (FGD 5 in round two).

4.5.4: Six hours shift and mental wellness among nurses at the Machakos level five county referral hospital

Among the respondents, 8.4% (14) of them stated that they were allocated to work on the six hours shift. Table 21 shows the items that the researcher used to determine the association between the six hours shift and the respondents' mental health on a Likert scale. The scores were rated as strongly disagree (1), disagree (2), neutral (3), agree (4) and strongly agree (5). One of the items assessed was whether the shift predisposed the respondents to drug use whereby 7.1% (1) of them strongly agreed, none of them agreed, 14.3% (2) were neutral with the same proportion disagreeing while 64.3% (9) strongly disagreed. On the same aspect of six hours shift, the respondents were asked whether this shift caused them mental fatigue. In this case, 21.4% (3) of them strongly agreed, none of them agreed, 14.3% (2) had a neutral view, 21.4% (3) disagreed while 42.9% (6) of the respondents strongly disagreed. Another item assessed was whether six hours shift reduced the respondents' ability to concentrate, whereby 7.1% (1) of them strongly agreed, none of them agreed, 14.3% (2) had a neutral view while 28.6% (4) disagreed with 50% (7) of them strongly disagreeing. The respondents were also asked whether the six hours

shift reduced their attention to patient care need, in which case, 7.1% (1) of them strongly agreed with the same number agreeing. Likewise, 21.4% (3) of them had a neutral view, same to those who disagreed while 42.9% (6) strongly disagreed that six hours shift reduced their attention to patient care needs. In an attempt to probe more on the association between six hours shift and the respondents' mental wellness, the researcher enquired from the respondents on whether the shift was very stressful. In their response, 7.1% (1) of the respondents strongly agreed that the shift was very stressful, none of them agreed, 14.3% (2) of them had a neutral opinion, 28.6% (4) disagreed while 50% (7) of them strongly disagreed, meaning that the shift was not very stressful to them. Similarly, the researcher enquired from the respondents whether the six hours shift affected their mood in which case 7.1% (1) of them strongly agreed, none of them agreed, 14.3% (2) were neutral, 28.6% (4) of them disagreed while 50% (7) strongly disagreed with the fact that the shift affected their mood. The researcher also asked the respondents whether the six hours shift made them not to be able to interact freely with others, whereby 7.1% (1) of them strongly agreed, similar to those who agreed, 14.3% (2) of them were neutral, 21.4% (3) of them disagreed while 50% (7) strongly disagreed. Another aspect which the researcher assessed in relation to the association between six hours shift and the respondents' mental wellness was whether working on the shift made them untidy, in which case 7.1% (1) of them strongly agreed, none of them agreed, 7.1% (1) of them had a neutral view, 21.4% (3) of them disagreed, while 64.3% (9) of them strongly disagreed. Correspondingly, when the respondents were asked whether working on six hours shift led to poor hygiene among them in which case 21.4% (3) of them strongly agreed, 7.1% (1) agreed, similar to those who had a neutral view, 14.3% (2) disagreed while 50% (7) of

them strongly disagreed, meaning that the shift did not lead to poor hygiene among them. Still on the same aspect, the respondents were asked whether the six hours shift made them become disoriented whereby 7.1% (1) of them strongly agreed, same proportion agreed, similar to those who were neutral, 21.4% (3) of them disagreed while 57.3% (8) of them strongly disagreed as illustrated in table 21. To determine the effect of six hours shift on the respondents' mental health, the researcher used 11 items, which yielded an average mean score of 1.92, meaning that the six hours shift did not affect their mental health.

Table 21: Six hours shift and mental wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 6 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Predisposed me to use of drugs	9(64.3)	2(14.3)	2(14.3)	0(0)	1(7.1)	14	1.71
Led to mental fatigue	6(42.9)	3(21.4)	2(14.3)	0(0)	3(21.4)	14	2.36
Reduced my ability to concentrate	7(50)	4(28.6)	2(14.3)	0(0)	1(7.1)	14	1.86
Reduced my attention to patient care needs	6(42.9)	3(21.4)	3(21.4)	1(7.1)	1(7.1)	14	2.14
Was very stressful	7(50)	4(28.6)	2(14.3)	0(0)	1(7.1)	14	1.86
Affected my mood	7(50)	4(28.6)	2(14.3)	0(0)	1(7.1)	14	1.86
Made me not to be able to interact freely with others	7(50)	3(21.4)	2(14.3)	1(7.1)	1(7.1)	14	2.00
Made me untidy	9(64.3)	3(21.4)	1(7.1)	0(0)	1(7.1)	14	1.64
Led to my poor hygiene	7(50)	2(14.3)	1(7.1)	1(7.1)	3(21.4)	4	2.36
Made me become disoriented	8(57.3)	3(21.4)	1(7.1)	1(7.1)	1(7.1)	14	1.86
Average mean score							1.92

Similar views were voiced by respondents during the focused group discussion as illustrated in table 22.

Table 22: Responses during focused group discussion on the effects of Six hours shift on mental health

Theme	Subtheme	Verbatim
Mental health	Rest and socialize	After working for only six hours, one has adequate time to rest the brain, before reporting for the next shift (FGD 06, round one)
		Six hours shift is even healthy for the mind, since you work and also have enough time to relax and interact with friends (KI 05)

4.6 Shift work and social wellness among nurses at the Machakos level five county referral hospital

To determine the effect of shift work on the social of the respondents, four shifts (night, 12 hours, eight hours and six hours) were included. These were the shift that were allocated to the respondents. The responses received from the respondents are detailed in the subsections below.

4.6.1: Night shift and social wellness among nurses at the Machakos level five county referral hospital

Among the respondents, (43) said that they were allocated to work on the night shift. While assessing the association between night shift and the respondents’ social wellness, the researcher used various items as shown in table 23. One of the items used was whether the shift affected their ability to make friends. In response to this, 32.7% (14) of them strongly agreed that the shift affected their ability to make friends, 6.9% (3) agreed, 20.9% (9) had a neutral view with the same proportion agreeing while 18.7% (8) of them strongly disagreed. On the same aspect of night shift, the respondents were asked whether this shift negatively affected their relationship with the children. In this case, 30.3% (13) of them

strongly agreed, 11.6% (5) agreed, 18.7% (8) had a neutral view, 25.6% (11) disagreed while 13.9% (6) of the respondents strongly disagreed.

Another item assessed was whether night shift caused disagreements between the respondents and other close family members, whereby 27.9% (12) of them strongly agreed, 6.9% (3) agreed, 3.6% (6) had a neutral view while 23.4% (10) disagreed with 27.9% (12) of the respondents strongly disagreeing. The respondents were also asked whether the night shift negatively affected their children's behaviour, in which case, 20.9% (9) strongly agreed, 13.9% (6) agreed, 16.3% (7) were neutral, with 25.6% (11) disagreeing while 23.3% (10) of them strongly disagreed.

In an attempt to probe more on the association between night shift and the respondents' social wellness, the researcher enquired from the respondents on whether the shift made them not to engage in social activities with other family members/relatives. In their response, 34.9% (15) of the respondents strongly agreed, 11.6% (5) agreed, 20.9% (9) of them had a neutral opinion, 13.9% (6) disagreed while 18.7% (8) of them strongly disagreed with the fact that the shift made them not to engage in social activities with other family members. Still on the issue of night shift, the respondents were asked whether the shift interfered with their study schedules, whereby 34.9% (15) strongly agreed, 20.9% (9) agreed, 11.6% (5) were neutral, 16.3% (7) of them disagreed while the same proportion strongly disagreed. Similarly, the researcher enquired from the respondents whether the night shift interfered with their religious schedules in which case 39.6% (17) of them strongly agreed, 1% (63.9) agreed, 18.7% (8) were neutral, 13.9% (6) disagreed, while the same proportion of respondents strongly disagreed. The researcher also asked the respondents whether the night shift interfered with their social appointments and other

routine functions, whereby 37.2% (16) of them strongly agreed, 20.9% (9) agreed, 18.7% (8) were neutral, 13.9% (6) of them disagreed while 9.3% (4) of them strongly disagreed as shown in table 23. To determine the effect of night shift on the respondents' social health, an eight item tool was used, with the responses being measured on a likert scale. The average mean score for the eight items was 3.23, indicating that the shift negatively affected their social health.

Table 23: Night shift and social wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on night shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Has negatively affected my ability to make friends	8 (18.6)	9(20.9)	9(20.9)	3(6.9)	14(32.7)	43	3.14
Has negatively affected my relationship with my children	6(13.9)	11(25.6)	8(18.6)	5(11.6)	13(30.3)	43	3.19
Caused disagreement between me and other close family members	12(27.9)	10(23.4)	6(13.9)	3(6.9)	12(27.9)	43	2.84
Negatively affected my children's behaviour	10(23.3)	11(25.6)	7(16.3)	6(13.9)	9(20.9)	43	2.84
Made me not to engage in social activities with my family members/relatives	8(18.7)	6(13.9)	9(20.9)	5(11.6)	15(34.9)	43	3.30
interfered with my study schedules	7(16.3)	7(16.3)	5(11.6)	9(20.9)	15(34.9)	43	3.42
Interfered with my religious schedules	6(13.9)	6(13.9)	8(18.7)	6(13.9)	17(39.6)	43	3.51
Interfered with my social appointments and other routine functions	4(9.3)	6(13.9)	8(18.7)	9(20.9)	16(37.2)	43	3.63
Average mean score							3.23

In respect to the above findings, responses during focused group discussion are demonstrated in the table 24.

Table 24: Responses during focused group discussion on the effect of night shift on social wellness

Theme	Subtheme	Verbatim
Family strain	Mistrust	Nurses' marriages are breaking due to mistrust especially because of night duties (FGD 4 in round 2)
		The community views nurses as promiscuous especially when they work on night duty for a long time (FGD 8 in round 2)
	Time	Night duty causes a lot of family problems since taking care of the children is limited (FGD 7 in round one)
Management	Support	There is need to hold regular meetings with the staff to ventilate all their feelings, with an aim of promoting mental healing (KI 02)
		Some of the shifts like night duty can be allocated on individual preferences if there are adequate nurses (KI 05)

4.6.2: 12 hours shift and social wellness among nurses at the Machakos level five county referral hospital

The respondents who stated that they were allocated to work on the 12 hours shift comprised 15% (25) of the total study participants. While assessing the association between 12 hours shift and the respondents' social wellness, the researcher used various items as shown in table 25. One of the items used was whether the shift affected their ability to make friends. In response to this, 16% (4) of them strongly agreed that the shift affected their ability to make friends. A similar proportion agreed, with the same number having a neutral view. Likewise, 28% (7) agreed while 24% (6) of them strongly disagreed. On the same aspect of 12 hours shift, the respondents were asked whether this

shift negatively affected their relationship with the children. In this case, 16% (4) of them strongly agreed, 36% (9) agreed, 16% (4), similar to those who had a neutral view, or disagreed and even strongly disagreed. Another item assessed was whether 12 hours shift caused disagreements between the respondents and other close family members, whereby 16% (4) of them strongly agreed, 28% (7) agreed, 4% (1) had a neutral view while 32% (8) disagreed with 20% (5) of the respondents strongly disagreeing. The respondents were also asked whether the 12 hours shift negatively affected their children's behaviour, in which case, 12% (3) of them strongly agreed, 16% (4) agreed, 28% (7) were neutral, with 24% (6) disagreeing while 20% (5) of them strongly disagreed.

In an attempt to probe more on the association between 12 hours shift and the respondents' social wellness, the researcher enquired from the respondents on whether the shift made them not to engage in social activities with other family members/relatives. In their response, 20% (5) of the respondents strongly agreed, 24% (6) agreed, 20% (5) of them had a neutral opinion, same to those who disagreed while 16% (4) of them strongly disagreed with the fact that the shift made them not to engage in social activities with other family members.

Still on the issue of 12 hours shift, the respondents were asked whether the shift interfered with their study schedules, whereby 24% (6) of them strongly agreed, same to those who agreed. On the same issue, 16% (4) of the respondents were neutral while the same proportion disagreed, with 20% (5) of them strongly disagreeing. Similarly, the researcher enquired from the respondents whether the 12 hours shift interfered with their religious schedules in which case 32% (8) of them strongly agreed, 28% (7) agreed, 16% (4) were neutral, 12% (3) disagreed, while the same proportion of respondents strongly disagreed.

The researcher also asked the respondents whether the 12 hours shift interfered with their social appointments and other routine functions, whereby 36% (9) of them strongly agreed, 20% (5) agreed, 12% (3) were neutral, similar to those who disagreed while 20% (5) of them strongly disagreed as shown in table 25.

To determine the effect of 12 hours shift on the respondents' social health, an eight item tool was used, with the responses being measured on a likert scale. The average means core of the eight items was 3.10, indicating that the 12 hours shift negatively affected their social health.



Table 25: 12 hours shift and social wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 12 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Has negatively affected my ability to make friends	6(24)	7(28)	4(16)	4(16)	4(16)	25	2.72
Has negatively affected my relationship with my children	4(16)	4(16)	4(16)	9(36)	4(16)	25	3.20
Caused disagreement between me and other close family members	5(20)	8(32)	1(4)	7(28)	4(16)	25	2.88
Negatively affected my children's behaviour	5(20)	6(24)	7(28)	4(16)	3(12)	25	2.76
Made me not to engage in social activities with other family members/ relatives	4(16)	5(20)	5(20)	6(24)	5(20)	25	3.12
Interfered with my study schedules	5(20)	4(16)	4(16)	6(24)	6(24)	25	3.16
Interfered with my religious schedules	3(12)	3(12)	4(16)	7(28)	8(32)	25	3.56
Interfered with my social appointments and other routine functions	5(20)	3(12)	3(12)	5(20)	9(36)	25	3.40
Average mean score							3.10

During the focused group discussion, the respondents who agreed that the 12 hours shift affected their social life voiced out some issues as shown table 26.

Table 26: Responses during focused group discussion on the effect of 12 hours shift on social wellness

Theme	Subtheme	Verbatim
Isolation	Fatigue	Working for long hours makes one be isolated by neighbours and friends because you spend your free time resting due to strain and fatigue (FGD 4 in round one)
		One requires understanding from family and friends, due to absence in some major social activities due to fatigue (FGD 6 in round one).
		The shift is very long. By the time you leave work, you are so tired that you have no time to interact even with your family members (KI 03).
Management	Support	We need to hold team building activities to allow nurses to socialize (KI 01)
		Nurses should not work on 12 hours shift for long time. In fact, if this was not a personal request, such nurse should work on six hours shift after the 12 hours one (KI 06)

4.6.3 Eight hours shift and social wellness among nurses at the Machakos level five county referral hospital

The respondents who stated that they were allocated to work on the eight hours shift comprised (85) of the total study participants. For the researcher to assess the association between eight hours shift and the respondents' social wellness, various items were used as shown in table 27. One of the items used was whether the shift affected their ability to make friends. In response to this, 15.4% (13) of them strongly agreed that the shift affected their ability to make friends. On the same issue, 18.8%(16) of the respondents agreed, 22.3% (19) were neutral, same to those who disagreed while 21.2% (18) of them strongly

disagreed. Likewise, the respondents were asked whether this shift negatively affected their relationship with the children. In this case, 14.1% (12) of them strongly agreed, 7.1% (6) agreed, 20% (17) had a neutral view, 21.2% (18) disagreed while 37.6% (32) strongly disagreed. Another item assessed was whether eight hours shift caused disagreements between the respondents and other close family members, whereby 3.5% (3) of them strongly agreed, 2.4% (2) agreed, 17.6% (15) had a neutral view while 28.2% (24) disagreed with 48.3% (41) of the respondents strongly disagreeing. The respondents were also asked whether the eight hours shift negatively affected their children's behaviour, in which case, 1.2% (1) of them strongly agreed, 16.5% (14) agreed, 10.6% (9) were neutral, with 36.4% (31) disagreeing while 35.3% (30) of them strongly disagreed.

In an attempt to probe more on the association between eight hours shift and the respondents' social wellness, the researcher enquired from the respondents on whether the shift made them not to engage in social activities with other family members/relatives. In their response, 3.5% (3) of the respondents strongly agreed, 2.4% (2) agreed, 5.8% (5) of them had a neutral opinion, 35.3% (30) disagreed while 53% (45) of them strongly disagreed with the fact that the shift made them not to engage in social activities with other family members. Still on the issue of eight hours shift, the respondents were asked whether the shift interfered with their study schedules, whereby 3.5% (3) of them strongly agreed, 11.8% (10) agreed, 5.8% (5) of the respondents were neutral, 24.7% (21) disagreed, while 54.2% (46) of them strongly disagreed. Similarly, the researcher enquired from the respondents whether the eight hours shift interfered with their religious schedules in which case 7.1% (6) of them strongly agreed, 5.8% (5) agreed, 7.1% (6) were neutral, 20% (17) disagreed, while 60% (51) of respondents strongly disagreed.

The researcher also asked the respondents whether the eight hours shift interfered with their social appointments and other routine functions, whereby 11.8% (10) of them strongly agreed, 3.5% (3) agreed, 2.4% (2) were neutral, 40% (34) disagreed while 42.3% (36) of them strongly disagreed as illustrated in table in table 27.

For the researcher to determine the effect of eight hours shift on the respondents' social health, an eight item tool was used, with the responses being measured on a likert scale. The average mean score was 2.08, which showed that the eight hours shift did not have a negative effect on their social health.



Table 27: Eight hours shift and social wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 8 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Has negatively affected my ability to make friends	18(21.2)	19(22.3)	19(22.3)	16(18.8)	13(15.4)	85	2.84
Has negatively affected my relationship with my children	32(37.6)	18(21.2)	17(20)	6(7.1)	12(14.1)	85	2.39
Caused disagreement between me and other close family members	41(48.3)	24(28.2)	15(17.6)	2(2.4)	3(3.5)	85	1.85
Negatively affected my children's behaviour	30(35.3)	31(36.4)	9(10.6)	14(16.5)	1(1.2)	85	2.18
Made me not to engage in social activities with other close family members/ relatives	45(53)	30(35.3)	5(5.8)	2(2.4)	3(3.5)	85	1.68
Interfered with my study schedules	46(54.2)	21(24.7)	5(5.8)	10(11.8)	3(3.5)	85	1.89
Interfered with my religious schedules	51(60)	17(20)	6(7.1)	5(5.8)	6(7.1)	85	1.80
Interfered with my social appointments and other routine functions	36(42.3)	34(40)	2(2.4)	3(3.5)	10(11.8)	85	2.02
Average mean score							2.08

During the focused group discussions, various respondents also echoed the same as indicated in table 28.

Table 28: Responses during focused group discussion on the effect of 8 hours shift on social wellness

Theme	Subtheme	Verbatim
Working time	Rest	I really enjoy working in the eight hours shift. The shift is not stressful (FGD 7 in round one)
		You feel fresh in mind when reporting the following day after eight hours shift in the previous day since you had enough time to relax your mind (FGD 3 in round two).
	Socialization	Nurses who work on eight hours shift have adequate time to interact with their friends and close relatives (KI 07)

4.6.4 Six hours shift and social wellness among nurses at the Machakos level five county referral hospital

Among the respondents, (14) of them indicated that they were allocated to work on the six hours shift. In order for the researcher to assess the association between the six hours shift and the respondents' social wellness, various items were used as shown in table 29. One of the items used was whether the shift affected their ability to make friends whereby 7.1% (1) of them strongly agreed that the shift affected their ability to make friends. On the same issue, 7.1 (1) of the respondents agreed, 21.4% (3) were neutral, 28.6% (4) disagreed while 35.8% (5) of them strongly disagreed. Correspondingly, the respondents were asked whether this shift negatively affected their relationship with the children. In this case, none of them strongly agreed while 7.1 (1) agreed. On the same item, 21.4% (3) of the respondents had a neutral view, 28.6% (4) disagreed while 42.9% (6) strongly disagreed. Another item assessed was whether six hours shift caused disagreements between the respondents and other close

family members, whereby 7.1 (1) of them strongly agreed same to those who agreed, 14.3% (2) had a neutral view while 28.6% (4) disagreed with 42.9% (6) of the respondents strongly disagreeing. The respondents were also asked whether the six hours shift negatively affected their children's behaviour, in which case, 7.1% (11) of them strongly agreed with the same number of respondents agreeing, 14.3% (2) were neutral, with 28.6% (4) disagreeing while 42.9% (6) of them strongly disagreed.

In an attempt to probe more on the association between six hours shift and the respondents' social wellness, the researcher enquired from the respondents on whether the shift made them not to engage in social activities with other family members/relatives. In their response, 7.1% (1) of the respondents strongly agreed, 14.3% (2) agreed same to the ones who had a neutral opinion, 35.7% (5) of them disagreed while 28.6% (4) of them strongly disagreed with the fact that the shift made them not to engage in social activities with other family members. Still on the issue of six hours shift, the respondents were asked whether the shift interfered with their study schedules, whereby 14.3% (2) of them strongly agreed, 7.1% (1) agreed, 21.4% (3) of the respondents were neutral, while 28.6% (4) of them disagreed, same to the respondents who strongly disagreed. Similarly, the researcher enquired from the respondents whether the six hours shift interfered with their religious schedules in which case 7.1% (1) of them strongly agreed with the same proportion agreeing, 28.6% (4) were neutral, 21.4% (3) disagreed, while 35.8% (5) of them strongly disagreed. The researcher also asked the respondents whether the six hours shift interfered with their social appointments and other routine functions, whereby 21.4% (3) of the respondents strongly agreed, 7.1% (1) agreed, with the same number being

neutral, 28.6% (4) disagreed while 35.8% (5) of them strongly disagreed as indicated in table 29.

For the researcher to determine the effect of eight hours shift on the respondents' social health, an eight item tool was used, with the responses being measured on a likert scale. For all the eight items, the average mean score was 2.24, meaning that the six hours shift did not have a negative effect on their social health.

Table 29: Six hours shift and social wellness among nurses at the Machakos level five county referral hospital

<i>Being allocated on 6 hours shift...</i>	Responses					Total	Mean score
	Strongly disagree (1)	Disagree (2)	Average (3)	Agree (4)	Strongly agree (5)		
	No (%)	No (%)	No (%)	No (%)	No (%)		
Has negatively affected my ability to make friends	5(35.7)	4(28.6)	3(1.8)	1(7.1)	1(7.1)	14	2.21
Has negatively affected my relationship with my children	6(42.9)	4(28.6)	3(21.4)	1(7.1)	0(0)	14	1.93
Caused disagreement between me and other close family members	6(42.9)	4(28.6)	2(14.3)	1(7.1)	1(7.1)	14	2.07
Negatively affected my children's behaviour	6(42.9)	4(28.6)	2(14.3)	1(7.1)	1(7.1)	14	2.07
Made me not to engage in social activities with other close family members/ relatives	4(28.6)	5(35.7)	2(14.3)	2(14.3)	1(7.1)	14	2.36
interfered with my study schedules	4(28.6)	4(28.6)	3(21.4)	1(7.1)	2(14.3)	14	2.50
Interfered with my religious schedules	5(35.7)	3(21.4)	4(28.6)	1(7.1)	1(7.1)	14	2.29
Interfered with my social appointments and other routine functions	5(35.7)	4(28.6)	1(7.1)	1(7.1)	3(21.4)	14	2.50
Average mean score							2.24

In support of the above findings table 30 shows the responses during focused group discussion and key informant interviews.

Table 30: Responses during focused group discussion and key informant interviews on the effect of 6 hours shift on social wellness

Theme	Subtheme	Verbatim
Working Hours	Rest and socialization	I only work for few hours then I go home to rest (FGD 4 in round one)
		Short working shifts allows the nurse to spend time away from stressful presence of the supervisors (FGD 6 in round two)
		In fact the nurses who work on six hours shift have all the time to mingle with their friends (KI 08).

4.7 Discussion

4.7.1 Introduction

The study had three specific objectives which included determination of the relationship between shift work and the nurses' physical, mental and social wellness at the Machakos Level five county referral hospital in Kenya. The study findings showed that about half (50.9%) of the respondents were allocated to work in an eight hour shift. Almost similar findings were realized in a study by Emmanuel et al (2020) which showed that 33.0% of the nurses worked for eight hours or less. On the contrary, a study conducted by Stimpfel and Aiken (2013) showed that majority (65%) of the nurses were allocated the 12 to 13 hours shift.

When the respondents were asked about their preferred shifts, 62.3% of them said that they were comfortable with the six hours shift, 55.1% of them preferred the eight hours shift while 59.8% said that they preferred night shift. Only 28.5% of them preferred the 12

hours shift. However, a study carried out by Alsharari (2019) on psychosocial impacts related to working at night among nurses in Saudi Arabia showed that only 15.5% of the respondents liked night shift work. The high (62.3%) preference for six hours shift among the respondents was associated with the fact that the shift is short, hence one is able to perform other personal duties during the day. Some of the nurses said that since they were still young, they were happy with the six or eight hours shifts, since they will have adequate time to be with their babies, while others said that these shifts allowed them to be with their families at night.

From the current study, there was also a large number (59.8%) of nurses who preferred working on night shift, saying that they don't like day duty so as to avoid being stressed by close supervision from their seniors, especially in situations where there are limited resources yet they are expected to deliver results. Other respondents said that they preferred night duty to have adequate time to engage on side hustles during the night offs.

4.7.2 Relationship between shift work and the nurses' physical health

The shifts allocated to the nurses included night, 12 hours, eight hours and six hours. The effect of these shifts on nurses' physical health was assessed using various items on a Likert scale measuring from 1 as the lowest score (strongly disagree) to the highest score of 5 (strongly agree). Average mean score for night, 12 hours, eight hours and six hours were 2.38, 3.32, 2.34 and 2.13 respectively. This showed that there was a relationship between 12 hours shift and the respondents' physical health. Some of the health related issues cited by the respondents in relation to the 12 hours shift included muscle strain, backache and varicose veins. This was similar to study in Iran to determine the association between shift working and musculoskeletal symptoms among nursing personnel which

showed that the common musculoskeletal symptoms among the nurses included lower backache, knees joint pains, and upper back pains.

In the study, other respondents cited serious fatigue at the end of the shift. Some of the respondents said that they were called back to work during their day offs to cover shortage instead of resting, a situation which is very strenuous. These findings corresponded to the results of a study by Buja et al, (2013) which was carried out a study in a university hospital in North-East Italy, whereby the nurses complained of job strain and fatigue after working for night shift.

Regarding 12 hours shift and physical illness, some nurses said that they are forced to take sick-offs due to strain and fatigue. These findings were supported by a one-year trial study to examine the experiences of 24 nurses on 12-hours duty allocation in a non-intensive care unit and an intensive care unit in a public hospital whereby most of the respondents reported physical and mental fatigue compared with 8-hour shift, due to long periods walking and standing (Ose et al, 2019). Likewise, a study carried out to determine the factors connected to fatigue at work place and recovery among nurses allocated on the 12-hours duty showed that nurses suffered from work related fatigue (Han et al, 2014). In regard to the other shifts some of the respondents indicated that during night shift, there are very few procedures, hence less strenuous. Others stated that they have adequate time to rest during the night offs, reporting back on duty having had adequate time to recover from burn out. Similar findings were realized in a study by Richards et al, (2018) to determine the differences in performance and perception of night shift preparation among emergency medicine nurses, residents, and faculty, whereby all the respondents indicated that night shifts did not affect them. However, this was contrary to a study conducted by Valerie

(2010) to determine the experience of night shift among nurses at an emergency care facility in U.S.A, whereby most of the respondents complained about decreased quantity of sleep and physical exhaustion. The study results demonstrated that there was no significant relationship between eight hours shift and the respondents' physical health. This was supported by some of the nurse managers who indicated that most of the nurses prefer the eight hours shift since it is less strenuous. This statement by the nurse managers is supported by the findings of a study by Philibert et al (2013) that established that the eight hours shift reduced burnout and fatigue among the staff compared to the night shift, hence promoting work performance. Similar results were realized among the nurses who worked during the six hours shift who stated that the shift was less strenuous compared to the others shifts, since there is a lot of time to rest after work. Some of the nurse managers were also in support by indicating that they normally allocate this shift to the nurses with special needs since it is short.

4.7.3 Relationship between shift work and the nurses' mental health

In respect to the effect of various shifts on the nurses' mental health, a five scores Likert scale was used. The average mean scores for the common shifts allocated to the nurses (night, 12 hours, eight hours and six hours) were 3.27, 3.03, 2.14 and 1.92 respectively. This indicated that there was a significant relationship between both night and the 12 hours shifts and the nurses' mental health. Despite the fact that some of the respondents said that they were happy with night duty since they had adequate time to perform personal tasks during the night offs, most of them indicated that night shifts are normally busy leading to sleep disturbances which may predispose them to disorientation. Similar findings were realized in a study by Vasquez-Trespacios et al (2016) to determine the association

between current shift work and work-related stress symptoms among health care workers in a tertiary hospital in Medellin, Colombia which showed that nurses working on night shift had more severe mental symptoms compared to those on day duty. Likewise, the results of a cross-sectional study to determine the relationship between shift work and Job satisfaction among 84 nurses working at the Ilam province (Western Iran) showed that most of the nurses working on the night shift experienced sleep disorders compared to those who were working in the other day shifts (Moradi et al, 2014). In regard to the 12 hours shift the respondents stated that the shift led to mental fatigue, made them feel isolated, reduced their concentration to patient care and also it was very stressful and also affected their mood. In support of these sediments were the findings of a study conducted in 488 hospitals in 12 European countries to assess the relationship between working for long hours which showed that working for 12 hours increased emotional stress by 26%, in comparison with those working for eight hours or less (Dall'Ora et al, 2015). On the same aspect, another survey conducted among nurses working in various hospitals in the United States to assess the effects of night shift on their health, whereby most of them strongly agreed that the shift was a risk factor to family stress and mood changes (Books et al, 2017).

4.7.4 Relationship between shift work and the nurses' social health

The effect of the various shifts (night, 12 hours, eight hours and six hours) on the nurses' social health was measured using an eight item tool with the responses being measured on a five scores Likert scale. The average mean scores for the four shifts were 3.23, 3.10, 2.08 and 2.24 respectively. This demonstrated that night and 12 hours shifts had negative effect on the respondents' social health. Regarding the night shift, some the respondents voiced

out that their marriages were breaking due to mistrust especially because of night duties. They stated that they were being viewed by the community as promiscuous especially when they work on night duty for a long time. Others indicated that the night shift was causing a lot of family strain since taking care of the children is limited and more so among the newly married ones. Contrary to these findings, a qualitative case study carried out in Australian hospitals among 14 nurses on night shifts in medical and surgical wards showed that the shift allowed them time to participate in various social and family undertakings (Powell, 2013). However, a study by Rathore et al (2012) to assess problems associated with shift work and its effects on female nurses in Udaipur, Rajasthan in India showed that the nurses, especially those working on night shift could not give much time to their family members especially their children who sleep early. Some of the nurses said that their family members (children and husband) in some cases were uncooperative causing a lot of frustration to them. Various respondents also gave their views regarding the 12 hours shift some of the respondents said that working for long hours makes one be isolated by neighbours and friends because of spending their free time resting due to strain and fatigue. They also said that the 12 hours shift requires understanding family and friends, due to absence in some major social activities in the family and also in the community. Likewise, other respondents indicated that the shift is very long and by the time they leave work, they are so tired that they have no time to interact even with their family members.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

The study aimed to determine the relationship between different work shifts and the physical, mental, and social wellness of nurses at Machakos Level Five County Referral Hospital. In regard to physical wellness, the 12-hour shift had the most significant negative impact on nurses' physical health, with an average mean score of 3.32. It was associated with fatigue, muscle strain, backaches, and varicose veins. Some nurses had to take sick leave due to exhaustion. The night shift was seen as less physically strenuous by some, as there were fewer procedures, and night offs allowed for recovery. The 8-hour and 6-hour shifts were perceived as less physically demanding, with most nurses preferring them due to adequate rest time. In terms of the nurses' mental wellness, the night (3.27) and 12-hour (3.03) shifts negatively affected mental health. Nurses reported sleep disturbances, disorientation, mental fatigue, stress, mood changes, and reduced concentration on patient care. Despite some nurses favoring night shifts for personal tasks, the busy schedule and lack of rest impacted mental well-being. The 8-hour (2.14) and 6-hour (1.92) shifts were linked to better mental wellness due to reduced stress levels. On social wellness among the nurses, night shift (3.23) and 12-hour (3.10) shifts all negatively affected social health. Nurses experienced family strain, marital mistrust, and isolation from social circles. Some reported their families being uncooperative due to their work schedules. The long 12-hour shift reduced time for family and social activities, leading to isolation. The 8-hour (2.08) and 6-hour (2.24) shifts allowed better work-life balance, with nurses having more time for family and personal engagements.

Overall, the findings indicate that shorter shifts (6 and 8 hours) are preferable for nurses' physical, mental, and social well-being, while night and 12-hour shifts have more negative effects.

5.2 Conclusion

The study findings showed that;

- There was a significant relationship between 12 hours shift and the respondents' physical health with most respondents saying that the shift caused various illnesses like muscle strain, backache varicose veins and fatigue.
- There was a significant relationship between night duty and also the 12 hours shift and the respondents' mental health. The respondents stated that the shifts led to sleep disturbances, disorientation, mental fatigue, feeling of being isolated, poor concentration to patient care and also mood disorders
- There was a significant relationship between night duty and also the 12 hours shift and the respondents' social health. Some of the negative effects of these shifts on social health included marriage instabilities, being viewed by the community as promiscuous, family strains, and also being isolated by neighbours and friends. Others included being absent in some major social activities in the family / community and lack of time to interact with family members.

5.3 Recommendations

The following are the recommendations based on the study findings.

5.3.1 Recommendations to the management

The senior management of Machakos county health services should;

- Prioritize implementing shorter shifts (6 or 8 hours) to improve nurses' overall wellness and performance.
- Ensure a fair and structured shift rotation system should be established to prevent prolonged night and 12-hour shifts, reducing burnout.
- Strive to recruit more nursing staff to avoid overburdening existing employees and reduce the need for extended shifts.

5.3.2 Recommendations for nursing practice

- There is need to educate the nurses on strategies to manage fatigue, including proper rest and ergonomic practices to prevent musculoskeletal issues.
- For mental health support, counseling services and stress management programs should be introduced to help nurses cope with the psychological impact of night and long-hour shifts.
- Nurses should be encouraged to communicate their preferred shifts where feasible to maintain a balance between work, family, and personal time.
- The nurse managers should allocate friendly duties depending on the health status of the nurse

5.3.3 Recommendations for further research

- The research was based at Machakos level five county hospital and hence there is need to replicate the same study to other health care facilities in the county and in Kenya as whole, so as to promote wellness among nurses.
- This was a cross-sectional study, hence other study methodologies can also be applied to assess whether they will yield the similar findings to the current study

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APPENDICES

APPENDIX I: CONSENT FORM FOR THE STUDY PARTICIPANTS

I am Rosemary Mutindi Mutua, a student pursuing Master of Science degree in Health Systems Management (MHSM) at the Mount Kenya University. In partial fulfilment of the requirements for the award of the Masters degree, I am carrying out a study entitled **“Relationship between shift work and the health status among nurses in Machakos level five county referral hospital in Kenya”**. Your participation in this study will not expose you to any risks neither will you receive any direct benefits from your participation. In the process of your participation, you will be free to withdraw from the study without any victimization. This study will be of benefit to all nurses in relation to their acceptance of various working shifts and hence you are encouraged to complete the study interview. The researcher assures you of utmost privacy and confidentiality during your participation. You are also assured that all the data collected and the information generated will only be used for research purposes only.

For any clarifications or enquiries, please feel free to contact the principal researcher (Mobile No: 0722651278).

Respondent's consenting to participate in the study

The study process has been clearly explained to me and I hereby accept to be interviewed by the researcher/ research assistant.

Respondent's signature _____ Date _____

Researcher/ research assistant

Signature _____ Date _____

CODE: _____

APPENDIX II- PARTICIPANTS' QUESTIONNAIRE

Tick the right responses in the provided spaces

Part I: Socio-demographic data

1. Respondent's age (years):
2. Respondent's gender: 1. Male 2. Female
3. Respondent's marital status 1. Married () 2. Divorced () 3. Separated () 4. Others (specify)-
4. Distance from the work place in approximate kilometers (KM)
 1. Within the hospital quarters
 2. Less than 1 km
 3. 1 to 3 KM
 4. More than 3 KM
5. Professional qualifications:
 1. Certificate ()
 2. Diploma ()
 3. Higher Diploma ()
 4. Bachelors ()
 5. Other qualifications (specify)-----
6. Designation: 1. SNO () 2. NO I () 3. NO II () 4. NO III () 5. Others (Specify)-----
7. Years of experience (in years) -----
8. unit allocated to work in
 1. Medical ward ()
 2. Surgical ward ()
 3. Maternity ward ()
 4. Paediatric ward ()
 5. Emergency department ()
 6. Out patient department ()
 7. Others (Specify)-----
9. Are you engaged with any other activity after work apart from the normal house chores?
 1. Yes ()
 2. No ()
10. If your response to question (8) is yes, please specify -----

Part II: Shift allocation among the nurses

Kindly tick (\checkmark) the nursing shift which you were allocated in the last two weeks

		Tick (\checkmark) appropriately
1.	Six hours shift	
2.	Eight hours shift	
3.	Twelve hours shift	
4.	Night shift	

Using a score of 1 to 5 kindly rate your preferred shift. - (1 =strongly disagree, 2= Disagree, 3= neutral, 4=Agree, 5 =strongly agree)

		1	2	3	4	5
<i>I prefer working on the</i>						
1.	Six hours shift					
2.	Eight hours shift					
3.	Twelve hours shift					
4.	Night shift					

Part III: Shift work and nurses’ physical health

Using a score of 1 to 5 kindly rate the effect of the shift work on your physical health status.

(1 =strongly disagree, 2= Disagree, 3= neutral , 4=Agree, 5 =strongly agree)

		1	2	3	4	5
<i>Working on night Duty</i>						
1.	Decreased my quality of sleep					
2.	Exposed me to physical exhaustion					
3.	Led to increased job strain and burn out					
4.	Exposed me to unhealthy eating habits					
5.	Affected my safety when walking home from work					
6.	Exposed me to long standing/ walking hours					
7.	Reduced my time to rest					
8.	Led to reduced professional fulfilment					
9.	Was the cause of the gastric ulcers I am suffering from					
10.	Caused abdominal discomforts					
11.	Was the cause of the headache I have been having					
12.	Predisposed me to chronic diseases (specify).....					
13.	Predisposed me to work related injuries					
14.	Caused an increase in my body weight					
15.	Did not allow me time to exercise					

		1	2	3	4	5
<i>Working in the 12 hours shift</i>						
1.	Decreased my quality of sleep					
2.	Made me have disturbing dreams					
3.	Exposed me to physical exhaustion					
4.	Led to increased job strain and burn out					
5.	Exposed me to unhealthy eating habits					
6.	Affected my safety when walking home from work					
7.	Exposed me to long standing/ walking hours					
8.	Reduced my time to rest					

9.	Led to reduced professional fulfilment					
10.	Was the cause of the gastric ulcers I am suffering from					
11.	Caused abdominal discomforts					
12.	Was the cause of the headache I have been having					
13.	Predisposed me to chronic diseases (specify).....					
14.	Predisposed me to work related injuries					
15.	Caused an increase in my body weight					
16.	Did not allow me time to exercise					

		1	2	3	4	5
Working in the eight hours shift						
1.	Decreased my quality of sleep					
2.	Made me have disturbing dreams					
3.	Exposed me to physical exhaustion					
4.	Led to increased job strain and burn out					
5.	Exposed me to unhealthy eating habits					
6.	Affected my safety when walking home from work					
7.	Exposed me to long standing/ walking hours					
8.	Reduced my time to rest					
9.	Led to reduced professional fulfilment					
10.	Was the cause of the gastric ulcers I am suffering from					
11.	Caused abdominal discomforts					
12.	Was the cause of the headache I have been having					
13.	Predisposed me to chronic diseases (specify).....					
14.	Predisposed me to work related injuries					
15.	Caused an increase in my body weight					
16.	Did not allow me time to exercise					

		1	2	3	4	5
Working in the 6 hours shift						
1.	Decreased my quality of sleep					
2.	Made me have disturbing dreams					
3.	Exposed me to physical exhaustion					
4.	Led to increased job strain and burn out					
5.	Exposed me to unhealthy eating habits					
6.	Affected my safety when walking home from work					
7.	Exposed me to long standing/ walking hours					
8.	Reduced my time to rest					
9.	Led to reduced professional fulfilment					
10.	Was the cause of the gastric ulcers I am suffering from					
11.	Caused abdominal discomforts					
12.	Was the cause of the headache I have been having					
13.	Predisposed me to chronic diseases (specify).....					
14.	Predisposed me to work related injuries					

15.	Caused an increase in my body weight					
16.	Did not allow me time to exercise					

Part IV: Shift work and nurses' mental health

Using a score of 1 to 5 kindly rate the effect of the shift work on your mental health (1 =strongly disagree, 2= Disagree, 3= neutral, 4=Agree, 5 =strongly agree)

		1	2	3	4	5
<i>Working in the nighty duty shift</i>						
1.	Predisposed me to use of drugs like caffeine					
2.	Led to mental fatigue					
3.	Reduced my ability to concentrate					
4.	Reduced my attention to patient care needs					
5.	Was very stressful					
6.	Depressed me					
7.	Made me feel isolated by my colleagues					
8.	Affected my mood					
9.	Has made me not to be able to interact freely with others					
10.	Affected my behaviour towards others					
11.	Made me be untidy					
12.	Led to my poor hygiene					
13.	Made me become disoriented in-terms of (time, space...)					

		1	2	3	4	5
<i>Working in the 12 hours shift</i>						
1.	Predisposed me to use of drugs like caffeine					
2.	Led to mental fatigue					
3.	Reduced my ability to concentrate					
4.	Reduced my attention to patient care needs					
5.	Was very stressful					
6.	Depressed me					
7.	Made me feel isolated by my colleagues					
8.	Affected my mood					
9.	Has made me not to be able to interact freely with others					
10.	Affected my behaviour towards others					
11.	Made me be untidy					
12.	Led to my poor hygiene					
13.	Made me become disoriented in-terms of (time, space...)					

		1	2	3	4	5
<i>Working in the 8 hours shift</i>						
1.	Predisposed me to use of drugs like caffeine					
2.	Led to mental fatigue					

3.	Reduced my ability to concentrate					
4.	Reduced my attention to patient care needs					
5.	Was very stressful					
6.	Depressed me					
7.	Made me feel isolated by my colleagues					
8.	Affected my mood					
9.	Has made me not to be able to interact freely with others					
10.	Affected my behaviour towards others					
11.	Made me be untidy					
12.	Led to my poor hygiene					
13.	Made me become disoriented in-terms of (time, space...)					

		1	2	3	4	5
<i>Working in the 6 hours shift</i>						
1.	Predisposed me to use of drugs like caffeine					
2.	Led to mental fatigue					
3.	Reduced my ability to concentrate					
4.	Reduced my attention to patient care needs					
5.	Was very stressful					
6.	Depressed me					
7.	Made me feel isolated by my colleagues					
8.	Affected my mood					
9.	Has made me not to be able to interact freely with others					
10.	Affected my behaviour towards others					
11.	Made me be untidy					
12.	Led to my poor hygiene					
13.	Made me become disoriented in-terms of (time, space...)					

Part V: Shift work and nurses' social health

Using a score of 1 to 5 kindly rate the effect of the shift you on your social health status. (1 =strongly disagree, 2= Disagree, 3= neutral, 4=Agree, 5 =strongly agree)

		1	2	3	4	5
<i>Working in the night duty shift</i>						
1.	Has negatively affected my ability to make friends					
2.	Has negatively affected my relationship with my children					
3.	Caused disagreement between me and my spouse					
4.	Negatively affected the behaviour of my children					
5.	Made me not to engage in social activities with my family					
6.	Made me not to attend my friends'/relatives social functions					
7.	Interfered with my study schedules					
8.	Interfered with my religious schedules					
9.	Interfered with my social appointments and other routines					

Working in the 12 hours shift		1	2	3	4	5
1.	Has negatively affected my ability to make friends					
2.	Has negatively affected my relationship with my children					
3.	Caused disagreement between me and my spouse					
4.	Negatively affected the behaviour of my children					
5.	Made me not to engage in social activities with my family					
6.	Made me not to attend my friends'/relatives social functions					
7.	Interfered with my study schedules					
8.	Interfered with my religious schedules					
9.	Interfered with my social appointments and other routines					

Working in the 8 hours shift		1	2	3	4	5
1.	Has negatively affected my ability to make friends					
2.	Has negatively affected my relationship with my children					
3.	Caused disagreement between me and my spouse					
4.	Negatively affected the behaviour of my children					
5.	Made me not to engage in social activities with my family					
6.	Made me not to attend my friends'/relatives social functions					
7.	Interfered with my study schedules					
8.	Interfered with my religious schedules					
9.	Interfered with my social appointments and other routines					

Working in the 6 hours shift		1	2	3	4	5
1.	Has negatively affected my ability to make friends					
2.	Has negatively affected my relationship with my children					
3.	Caused disagreement between me and my spouse					
4.	Negatively affected the behaviour of my children					
5.	Made me not to engage in social activities with my family					
6.	Made me not to attend my friends'/relatives social functions					
7.	Interfered with my study schedules					
8.	Interfered with my religious schedules					
9.	Interfered with my social appointments and other routines					

APPENDIX III: FOCUSED DISCUSSION CONSENT FORM

I am a Master of Science (MSc) student (Health Systems Management) at the Mount Kenya University, conducting a research entitled **“Relationship between shift work and the health status among nurses in Machakos level five county referral hospital in Kenya”** as part of fulfillment for the award the masters degree. You have been selected as one of the participants to take part in the focused group discussion, being part of the data collection mode for this study. Your participation will be voluntary, hence you are free to withdraw your participation. The current study will have no direct benefits to you but it will be of importance in promoting the uptake of various work shifts among nurses. The discussion will take about 30 minutes and there will be no identifications used in any documentation during the proceedings. Information gathered will only accessible to the researcher/ research assistants. Feel free to share any information in relation to this study since utmost confidentiality will be upheld and the data collected will be used for study purposes only. During the discussions, information will be recorded and also the researcher will make some notes, all of which will be used for the study purpose only.

In case of any clarifications please feel free to contact with the researcher;

Rosemary M. Mutua (Mobile No: 0722651278; Email: rosemarymutua72@yahoo.com).

Study participant’s declaration

I voluntarily accept to participate in the group discussions, since the nature of the study and its process has been clearly explained to me.

Participant’s signature..... Date.....

Researcher’s/ research assistant’s signature.....Date.....

APPENDIX IV: FOCUSED GROUP DISCUSSION INTERVIEW GUIDE

1. Which work shifts were you allocated in the last two weeks? (**Probes:** six hours, eight hours, 12 hours, night)?
2. What is the average distance travelled by most of the nurses from their residence to work place?
3. Do you feel that the family size may exaggerate the effect of the working shifts on nurses' health?
4. Explain your response in question 3.
5. Do you think that the distance travelled by nurses to work in a given shift contributes to negative health effects?
6. Kindly elaborate of your response to question 5.
7. Which work shifts do most of the nurse prefer to be allocated? (**Probes:** six hours, eight hours, 12 hours, night)? Explain why they prefer such shifts
8. What contributed to the allocation of the shift which you mentioned in question 1 above? (**Probes:** own interest, to have time for other activities, forced by management,others)
9. What are the effects of the various work shifts to the nurses' physical health?
10. What are the effect of the various work shifts to the nurses' mental health?
11. What are the effect of the various work shifts to the nurses' social health?
12. What are the measures that should be implemented to mitigate against the effect of the various shifts on nurses' health status?
13. Do you have any other comments in relation to the work shifts in the hospital?.....

APPENDIX V: KEY INFORMANTS' CONSENT FORM

I am a Master of Science student in Health systems management at the Mount Kenya University, carrying out a study entitled **“Relationship between shift work and the health status of nurses in Machakos level five county referral hospital in Kenya”** as part of my academic requirements. Being one of the managers in the hospital, your participation in this study (as a key informant), will aid the researcher to gain an in-depth knowledge on the study topic. Taking part in this study will be voluntary, hence you can withdraw your participation at any step of the study process. The current study will have no direct benefits to you. However, it will be of great importance in promoting the uptake of various work shifts among nurses in the hospital, hence you are encouraged to participate up to the end of the interview. The interview will take about 30 minutes and there will be no identifications used in any documentation during the proceedings.

You are encouraged to provide all the required information regarding this study without any fear. You are also assured that your names will not be indicated in any of the data collection/ research documents and that, any information gathered will be used for study purposes only. During the interview, the proceedings will be recorded and also the researcher will make some notes, all of which will be used for the study purposes only. In case of any clarifications please feel free to contact with the researcher;

Rosemary M. Mutua (Mobile No: 0722651278; Email: rosemarymutua72@yahoo.com).

Respondent's acceptance to take part in the study

I declare that I have agreed to take part in this study without coercion.

Participant's signature..... Date.....

Researcher's/ research assistant's signature.....Date.....

APPENDIX VI: KEY INFORMANT INTERVIEW GUIDE

1. What are the working shifts available for nurses in this hospital?.....
2. What do you consider when deciding on the shift to allocate a specific nurse?
(**Probes:** Voluntary choices by staff, patient care demands, availability of staff, others).....
3. Do you feel that nurses in this hospital have preferences for some specific shifts?
4. If your response is “YES” to question 3 above, kindly explain.....
5. Are there any shifts that may have negative effect on the nurses’ health?.....
6. If your response to question 5 above is “YES”, kindly explain (comment on the specific shifts and the associated effects).....
7. Have you received any complaints from the nurses pertaining the various shifts in the hospital in respect to the nurses’ health?.....
8. Comment on the quality of supportive supervision for staff on each shift
(**Probes:** effective, not achievable, others).....
9. If your response to question 7 above is “YES” kindly explain (explain on the specific shifts and the nurses’ comments).....
10. What are the measures that should be implemented by the hospital management to mitigate against the negative effects of the various shifts to nurses’ health status?

APPENDIX VII: LETTER OF INTRODUCTION FROM MOUNT KENYA UNIVERSITY



DIRECTORATE OF GRADUATE STUDIES

MHSM/2018/36712

26th January, 2022

*The Director, Research Coordination Division
National Commission for Science, Technology & Innovation
Utalii House, 8th & 9th Floor
P.O Box 30623- 00100
NAIROBI*

Dear Sir/Madam,

RE: ROSEMARY MUTINDI MUTUA - REGISTRATION NO. MHSM/2018/36712


The purpose of this letter is to introduce the above named student who is pursuing Master of Science in Health System Management in the Department of Epidemiology and Biostatistics in the School of Public Health.

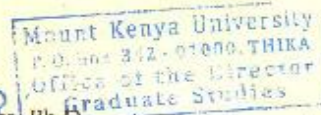
The title of her research is "Impact of Shift Work on The Health Status of Nurses Working at The Machakos Level Five County Referral Hospital, Machakos County, Kenya."

She has been cleared by the University's Ethics Review Committee (Certificate attached) and now has to proceed to the field to collect data for her research between January and March, 2022.


Any assistance accorded to her will be highly appreciated.

Thank you.


Dr. Samuel M. Karenga, Ph.D.
Director, Graduate Studies
Enc.



APPENDIX VIII: ETHICAL CLEARANCE FROM MOUNT KENYA UNIVERSITY



Mount Kenya University

REF: MKU/ERC/1943
TO: ROSEMARY MUTINDI MUTUA

Date: 21 October 2021

REG: MHSM/2018/36712

Dear Sir/Madam,

RE: IMPACT OF SHIFT WORK ON THE HEALTH STATUS OF NURSES WORKING AT THE MACHAKOS LEVEL FIVE COUNTY REFERRAL HOSPITAL, MACHAKOS COUNTY, KENYA

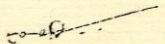
This is to inform you that **Mount Kenya University** has reviewed and approved your above research proposal. Your application approval number is **1016**. The approval period is **21/10/2021 - 20/10/2022**.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including informed consents, study instruments, MTA will be used
- ii. All changes including amendments, deviations and violations are submitted for review and approval by **Mount Kenya University**
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to **Mount Kenya University** within 72 hours of notification
- iv. Any changes, anticipated or otherwise that may increase the risks or affect the safety or welfare of study participants and others or affect the integrity of the research must be reported to **Mount Kenya University** within 72 hours
- v. Clearance for export of biological specimens must be obtained from relevant institutions
- vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal
- vii. Submission of an executive summary report within 90 days upon completion of the study to **Mount Kenya University**

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,


The Chairman
Mount Kenya University
Ethics Review Committee
P. O. Box 342 - 0100, Thika

Dr. Peter G. Kirira
Chairman, Mount Kenya University IERC

Main Campus, General Kago Road, P.O. Box 342-01000 Thika. Tel: +254 67 2820 000,
Cell: +254 720 790 796, 0709 153 000
Email: info@mku.ac.ke, Web: www.mku.ac.ke
Chartered and ISO 9001 : 2015 Certified Institution.
Unlocking Infinite Possibilities

APPENDIX IX: LETTER OF AUTHORIZATION FROM MACHAKOS LEVEL FIVE HOSPITAL

REPUBLIC OF KENYA



**GOVERNMENT OF MACHAKOS COUNTY
DEPARTMENT OF HEALTH AND EMERGENCY SERVICES
*Office of the County Director of Medical Services***

Telephone: +254-44-20575
Fax: 254-44-20655

Machakos Highway
P.O. Box 2574-90100
Machakos, Kenya

Ref No. MKS/DHES/RSCH/VOLI/152

24th February 2022

Dear Rosemary Mutindi,

RE: LETTER OF AUTHORIZATION FOR CONDUCTING PROPOSED RESEARCH

Reference is made to your request to conduct a research Study on **“impact of shift work on the health status among nurses working at Machakos Level 5 hospital”**

Note is taken of the letter of Ethical clearance from Mount Kenya University, **REF: MKU/ERC/1943** for the approval period **21st October 2021 to 20th October 2022** as well as the Research License from the National Commission for Science, Technology & Innovation number **NACOSTI/P/22/15532** for the period ending **1st February 2023**.

You are hereby authorized to proceed with the research and urged to share the findings with the Department of Health and Emergency Services; Machakos County, through this office via email: research.machakos@gmail.com

Sincerely,

A handwritten signature in blue ink, appearing to read 'Henry Kilemi'.

Henry Kilemi

For: Research Committee


MACHAKOS LEVEL 5 HOSPITAL




Cc:

- Medical Superintendent – Machakos Level 5 Hospital
- Research Coordinator – Machakos Level 5 Hospital


APPENDIX X: RESEARCH PERMIT FROM NATIONAL COMMISSION FOR SCIENCE TECHNOLOGY AND INNOVATION


REPUBLIC OF KENYA


NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

RefNo: 148381 Date of Issue: 01/February/2022


RESEARCH LICENSE




This is to Certify that Ms. ROSEMARY MUTINDI MUTUA of Mount Kenya University, has been licensed to conduct research in Machakos on the topic: Impact of shift work on the health status of nurses working at the Machakos level five county referral hospital, Machakos county, Kenya for the period ending : 01/February/2023.

License No: NACOSTI/P/22/15532

148381
Applicant Identification Number

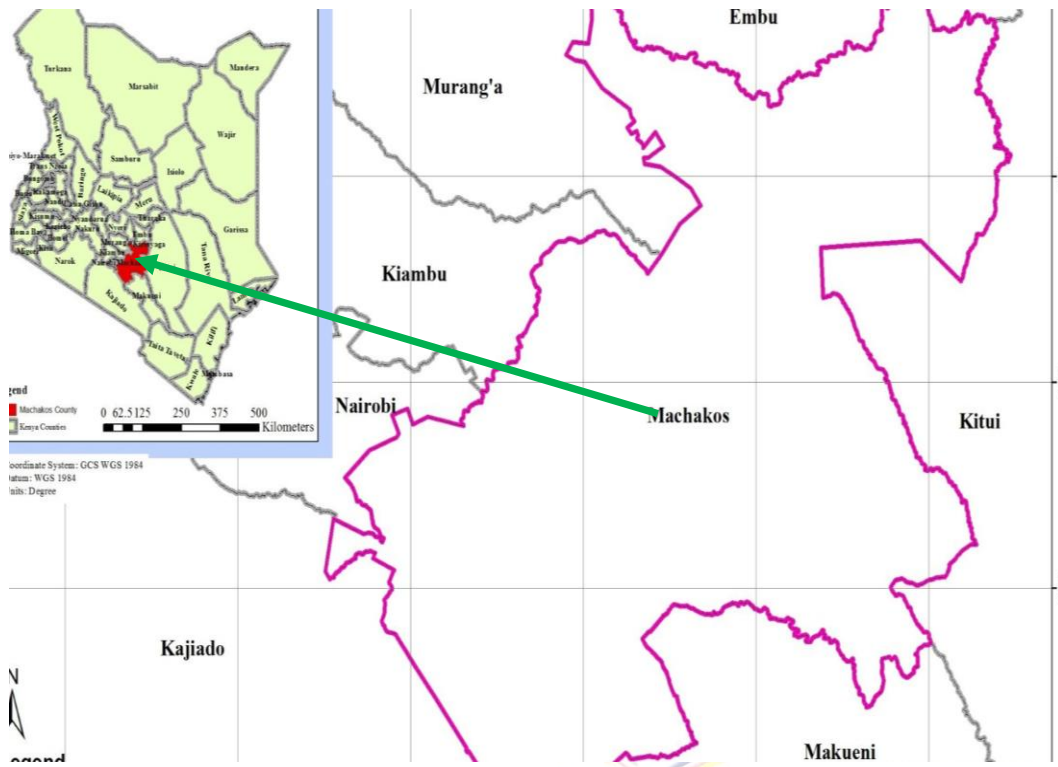

Director General
NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY &
INNOVATION

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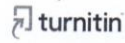
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APPENDIX XI: MAP SHOWING THE STUDY AREA



Mount Kenya

APPENDIX XII: SIMILARITY INDEX REPORT



George Njoroge

MBITHI

- NURSING
- nursing 2025
- Mount Kenya University

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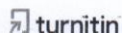
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