ASSESSMENT OF FACTORS WHICH INFLUENCING NURSES' PERFORMANCES ON CARING FOR TRAUMATIC BRAIN INJURY PATIENTS IN TERTIARY FACILITIES, TANZANIA

REHEMA DANFORD MLAY, (BScN)

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Assessment of factors which influencing nurses' performances on caring for traumatic brain injury patients in tertiary facilities, Tanzania

By

Rehema Danford Mlay, (BScN)

A dissertation submitted in (partial) fulfillment of the requirements for the Degree of Masters of Science in Critical Care and Trauma Nursing of

Muhimbili University of Health and Allied Sciences

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CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled **"*Assessment of Factors which Influencing Nurses' Performances on Caring for Traumatic Brain Injury Patients in Tertiary Facilities, Tanzania*"** in partial fulfillment of the requirements for the degree of Masters of Science in Critical Care and Trauma Nursing of Muhimbili University of Health and Allied Sciences.

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Dr. Edith A. M. Tarimo, **RN, BScN, MPhil., PhD**

Main Supervisor

_____

Date

_____

Mr. Menti Ndile, **RN, BScN, Msc CCT.**

Co-supervisor

_____

Date

DECLARATION AND COPYRIGHT

I, **Rehema Danford Mlay**, declare that this **dissertation** is my own original work. It is being submitted for the Degree of Masters of Science in Critical Care and Trauma Nursing of the MUHAS. It has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature…… **Date**……

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DEDICATION

This work is dedicated to all nurses who are working at Muhimbili Orthopaedic Institute (MOI) and Muhimbili National Hospital (MNH) at Mloganzila, specifically those who are working in General wards, Private wards, Neuro wards, Medical wards, Emergency wards and in the Intensive Care Unit (ICU).

ABSTRACT

Background: Traumatic brain Injury (TBI) represents a significant cause of morbidity and mortality worldwide. Road traffic crashes accounts for a substantial proportion of TBI injuries; however, access to neurosurgical care in low-income countries is poor. A retrospective observational study of Traumatic brain injury patients attended at Muhimbili Orthopedic Institute (MOI) showed that some of the TBI hospitalized patients died due to the severity of the condition and others due to aspiration pneumonia. Nurses' performance on the caring of patients with TBI is important to improve patients' outcome and reduce mortality.

Aim: To assess factors which influencing nurses' performances of caring for traumatic brain injuries patients at tertiary facilities in Tanzania.

Methods: The study used a descriptive cross-sectional design. The sample size was 181 nurses, selected from two tertiary hospitals, namely; Muhimbili Orthopaedic Institute (MOI) and Muhimbili National Hospital (MNH) at Mloganzila. Simple random sampling was used to select potential study respondents. Data was collected using a self-administered questionnaire and rating checklist. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 23.0. Mean score was used to measure nurses' performance in caring for TBI patients. Chi-square test assessed factors influenced the nurses' performance in caring for TBI patients. A p-value less than 0.05 was considered to have influenced the dependent and independent variables.

Results: Of 181 respondents (54, 29.8%) were male. Respondents' age varied between 24 years and 56 years with a mean age of 34.2 years and standard deviation ±6.49. A large proportion of respondents (89, 49.2%) were educated up to diploma level. More than half (96, 53%) had poor performance in caring for the TBI patients due to individual and organizational factors, individual factors were: - age, gender, level of education, working area, working experience in the working station, working load, required TBI education, attending in-service training on TBI while the organizational factors included;- equipment used to take care of TBI patients, nurses special training on TBI caring , staff-patient ratio. Overall nurses' performances mean score was (10143, 74.7%).

Conclusions and recommendations:

Majority of nurses had poor performance on TBI care. The poor performance may have been influenced by individual and organizational factors. Tertiary health facilities should provide specialized and regular in-service training, add staff members to reduce the workload and ensuring adequate equipment for nurses to provide optimal care for the TBI patients.

Key words: Performance, Caring, Traumatic Brain Injury, Patients and Nurses

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CONCEPTUAL DEFINITIONS

Traumatic Brain Injury (TBI) is an injury to the brain that results from an external impact or force and can lead to disruption of normal cognitive function (CDCP, 2014).

Caring refers to actions, attitude and practices to assist or help others towards healing and wellbeing (Leininger, 2006)

Performance is defined as an action or a process of performing a task or a function (Oxford University Press, 2012).

Intensive Care Unit is defined as a hospital unit in which seriously ill patients undergo resuscitation, monitoring and treatment (Dr. Harvey M., 2005).

OPERATIONAL DEFINITIONS

A nurse

This is defined as any trained person who has attained a certificate, diploma, undergraduate or graduate level degree and working at Muhimbili Orthopaedic Institute and Muhimbili National Hospital (MNH)-Mloganzila in Emergency Department, Intensive Care Unit, Private wards and General wards, Neuro ward and Medical ward.

Performance

Is defined as how well nurses' provide care to traumatic brain injury patients

Poor performance

Is defined as failure of nurse to score well that is below 80% cutoff point on the given 15 vital procedures areas of practice on caring of TBI Patients

Good performance

Is defined as how effective nurses score well that is equal or above 80% cutoff point on the given 15 vital procedures areas of practice on caring of TBI Patients

Influence

Is defined as the power of having an effect on 15 Vital Procedures areas of practice on caring of TBI patients

LIST OF ABBREVIATIONS

ARN	Association of Rehabilitation Nurses
CI	Confidence interval
ED	Emergence Department
ICU	Intensive Care Unit
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopaedic Institute
MUHAS	Muhimbili University of Health and Allied Sciences
ORs	Odds ratios
SD	Standard deviation
SPSS	Statistical Package for Social Sciences Software version 23
TBI	Traumatic Brain Injury
VAP	Ventilator-Associated Pneumonia
χ^2	Chi-square

CHAPTER ONE

INTRODUCTION

BACKGROUND

Traumatic brain injury (TBI) is defined as a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain (Thomas et al., 2014). TBI is expected to be the major cause of death and disability by 2020 (Adnan et al., 2007). It is estimated that 71% of TBI hospitalizations are for patients with severe injuries necessitating critical care monitoring (Russo et al., 2007). Also, in the high-income countries, TBI remains a major health problem, with approximately 2.5 million people hospitalized each year and up to 52,000 deaths annually (Thomas et al., 2014). Worldwide, traumatic brain injury (TBI) represents a major public health problem (Jean et al., 2006). Epidemiological data indicate that the overall TBI incidence is estimated at 262 per 100,000 people per year (Wouter et al., 2015). Therefore, people with TBI experience varying levels of emotional, behavioral and physical challenges, including physical disabilities which may impact on their quality of life and social functioning (Thomas et al., 2014).

Contexts and Prevalences of Traumatic Brain Injuries Patients

In Low-income countries, the incidence of TBI is 150 to 170 per 100 000 people compared to the global average of 106 per 100 000 (Laing et al., 2014). Tanzania is one of the low and middle-income countries in Africa with a significantly high rate of traffic-related deaths and disabilities, most of which result from traumatic brain injuries. Hospital-Based injury surveillance involved six public hospitals in Tanzania between November 2011 and December 2012 which revealed the road traffic crashes to be the leading cause of injuries accounting for 47.5% of all injuries seen and 60.5% of injuries mortality (Boniface et al., 2013). The previous study shows that the mortality of patients with severe Traumatic Brain Injuries (TBI) at Bugando Medical Centre, Tanzania, is approximately twice of that in high-income countries (Chalya *et al.*, 2012). Patients with severe TBI had significantly high mortality rates (64.2%, 113 deaths) compared with patients who had moderate (33.0%, 58 deaths) and mild (2.8%, 5 deaths) TBI (Chalya *et al.*, 2012). A retrospective observational study of Traumatic brain

injury patients attended at Muhimbili Orthopedic Institute between January 2014 and June 2014 revealed that Majority 401/627 (64%) sustained mild TBI, 114/627 (18.2%) moderate TBI and 112/627 (17.8%) severe TBI. Among patients with moderate and severe TBI; 19.1% had a good recovery, 50.2% recovered with disabilities and 30.7% died (Respicious et al., 2017).

Previous studies show that improving outcomes after severe TBI will require concerted investment in pre-hospital care (current not existing in Tanzania) and improvement in the availability of intensive care unit resources, computed tomography and expertise in multidisciplinary care (Luke et al.,2017). There had been evidence that treatment in centers with neurosurgical support especially in settings where protocol-driven neuro-intensive care units operate based on pre-hospital care guidelines is associated with better patient outcomes (Luke et al., 2017). The efforts of improving a simultaneous assessment, monitoring, stabilization and therapeutic intervention of hypoxia and hypotension is essential since a single episode of hypotension increases the risk of disability and death (Boniface et al., 2013) as observed from hospital records (Traumatic Brain Injury 2016/2017; 2017/2018 at MOI) which indicated that, the number of death of Traumatic Brain Injury Patients at MOI for the year 2016/2017 and the year 2017/2018 was as follows.

Table01: The Prevalence of Traumatic Brain Injury Patients at MOI

Year	Number of patients admitted	Number of the death of Traumatic Brain Injury Patients at MOI							Total Patients died due to Aspiration Pneumonia
		Severe TBI	Aspiration pneumonia	Moderate TBI	Aspiration pneumonia	Mild TBI	Aspiration pneumonia	Total Death due to TBI	
2016/ 2017	1777	50	10	22	10	19	03	91	23
2017/ 2018	1483	88	15	34	09	12	07	134	31
Total	3260	138	25	56	19	31	10	225	54

Most TBI patients died due to the severity of injury and aspiration pneumonia, which is preventable. However, aspiration pneumonia appears as one of the causes of death in TBI

patients at MOI. Aspiration pneumonia results when orogastric secretions colonized with bacteria produce an infectious response in the lungs (Marik, 2011). Aspiration pneumonia is the major cause of deaths in patients with difficulties in swallowing (dysphagia) resulting from neurological disorders (Marik, 2011). At Muhimbili Orthopaedic Institute hospital records showed a huge number of deaths from severe, moderate and mild TBIs patients. The number of TBIs patient who died due to aspiration pneumonia increased from 23(42.6%) to 31(57.4%) in the year 2016/2017 and 2017/2018 respectively.

The primary aim of neuromonitoring in patients with TBI is early detection of secondary brain insults so that timely interventions can be instituted to prevent or treat secondary brain injury. ICP monitoring has been a stalwart in neuromonitoring (Lee et al., 2010). Measurement of ICP and arterial BP is used to derive CPP and to guide targeted therapy of severe traumatic brain injury (STBI) necessitating ICU admission (Ristic et al., 2015). Cerebral oxygenation and near infrared spectroscopy are also established as an important parameter for monitoring. Multimodal monitoring allows different parameters of brain physiology and function to be monitored and can improve identification and prediction of secondary cerebral insults (Lee et al., 2010). Cerebral microdialysis is an invasive laboratory device for analyzing brain tissue biochemistry. It is used to measure biochemical changes in the area of brain which are at higher risk to secondary insults and its use is very limited (Haddad et al., 2012). Vestibulo ocular monitoring is an indicator of brainstem function. It helps identify brainstem lesions by imaging techniques (Schlosser *et al.*, 2009).

An understanding of medical complications during the care from injury to rehabilitation and discharge is important for the care of patients, for healthcare planning and for formulating interventions that could improve outcome (Godbolt *et al.*, 2015). The most commonly encountered medical conditions in patients with TBI are eyes, ears, nose and throat problems, psychiatric or behavioral disturbances, hypertension and musculoskeletal injury at mild to moderate severity (Erin et al., 2012). If left untreated, patients can develop certain complications such as posttraumatic seizures, hydrocephalus, deep vein thrombosis (DVT),

heterotopic ossification, spasticity, gait abnormalities, agitation and chronic traumatic encephalopathy (Varghese et al., 2017).

In clinical settings worldwide, the everyday care needs of patients with TBI are primarily provided by nurses working within multidisciplinary healthcare teams. The setting for this care includes Emergency Departments (ED), Intensive Care Units (ICU), specialist Brain Injury Units (BIU), general ward environments and community outreach services. The clinical care tasks of nurses varied according to the patients' needs and whether they present with mild, moderate or severe TBI. Effective nursing care also relies on a therapeutic relationship with family members to maximize positive care outcomes (Jennifer et al., 2012).

PROBLEM STATEMENT

Nurses as health care team members are the best positioned personnel to detect and prevent secondary brain injury, which may result in significant improvements in patient's morbidity and mortality (Mcnett et al., 2010). The unpublished reports (table 01) showed the high rate of morbidity and mortality to patients with traumatic brain injuries in Tanzania, especially after being admitted to the tertiary health facilities. Since the mortality rate increased in the hands of health care providers; the researcher thought that there was a need to find out the factors influencing nurses' performance in caring for patients with TBI. However, there was limited information regarding the factors influencing the nurses' performance in caring for the TBIs patient at tertiary facilities in Tanzania. Therefore this study assessed the factors influencing nurses' performance in caring for patients with TBI at tertiary facilities in Dar es Salaam, Tanzania. The results may help in improving the care of TBI patients at the health facilities in Tanzania.

Research Questions

Main research question

What are the factors influencing nurses' performance in caring for TBI patients at tertiary facilities in Tanzania?

Specific research Questions

a. What is the nurses' performance in caring for TBI patients at tertiary facilities in Tanzania?
b. What are the individual factors influencing nurses' performance on caring for TBI patients at tertiary facilities in Tanzania?
c. What are the organizational factors influencing nurses' performance in caring for TBI patients at tertiary facilities in Tanzania?

OBJECTIVES

Broad Objective

To assess factors which influencing nurses' performance of caring for traumatic brain injuries patients at tertiary facilities in Tanzania.

Specific Objectives

a. To determine the nurses performance on vital procedures for caring for TBI patients at tertiary facilities in Tanzania.
b. To determine the individual factors which influencing nurses' performances on caring for TBI patients at tertiary facilities in Tanzania.
c. To determine the organizational factors influencing nurses' performances in caring for TBI patients at tertiary facilities in Tanzania.

Rationale

Nurses' practice

The findings are expected to be useful among health care providers in practising care of TBI patient's to provide quality health care.

Further Research

The results are expected to underscore gaps for further research.

Policy

This study is expected to influence policymakers in implementing strategies to improve care of TBI patients

CONCEPTUAL FRAMEWORK

The Competency Model for Professional Rehabilitation Nursing (Association of Rehabilitation Nurses, 2014) was modified for a holistic practice that nurses embrace. The modified conceptual framework reflects the three objectives focused on the nurses' performance on vital procedures, individual which factors influence on nurses' performances, and the organizational factors which influence on nurses' performance in caring for TBI patients (figure 01). The objectives guided the nurses' practices necessary to promote rehabilitation nursing in the current healthcare environment that is MOI and MNH-Mloganzila. Hence the three variables provided clarity about the nurses' performance regarding skills on caring of patients with TBI at tertiary facilities in Tanzania.

The nurses' performance: The variable on nurses' performance on the delivering of support and service provision to patients with TBI was assessed through; measuring oxygen saturation, insertion of the oropharyngeal airway, performing suction, monitoring intracranial pressure, checking neurological status (GCS), administering nutrition, cerebral perfusion pressures, use of manitol and prevention of seizure for the improvement of patients' outcome.

The individual factors: The individual factors which comprised of the socio-demographic information played a greater role on the influence of the nurse's performances due to the age, gender, the level of education, years of experience of nursing professional, participant working areas, workload and required TBI education or attending in-service training on TBI that will be due to the specific expertise on the caring of patients with TBI. This variable enables the nurse's interventions to be effective during the prolonged time on the TBI critical care provision.

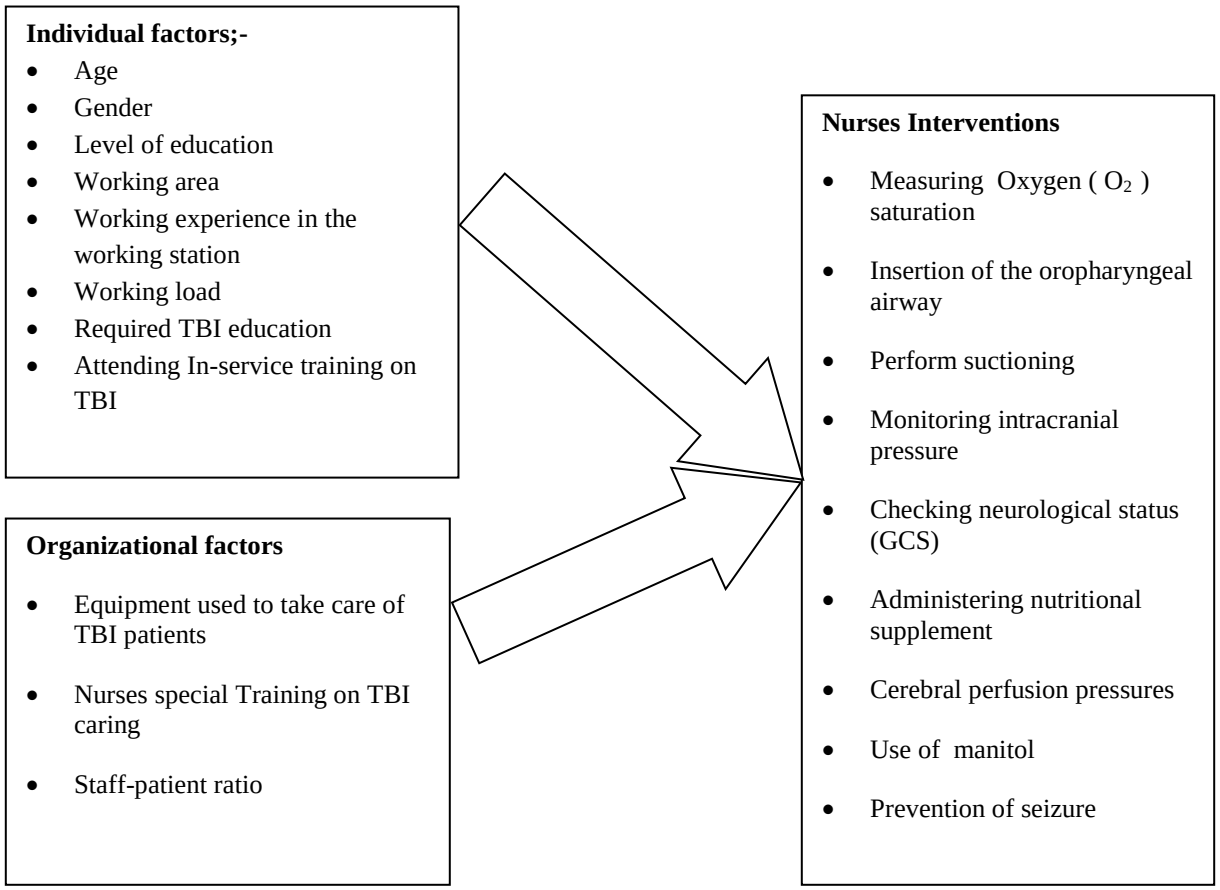

Figure01: A modified conceptual framework for caring patients with TBI

Organization factors: The organization variables influencing the nurses' performance on the daily provision of care to patients with TBI at tertiary facilities in Tanzania. These are: use of equipment for taking care of TBI patients, nurses training, and nurse's patient ratio. These factors have a greater influence on the nurses' interventions for caring TBI patients through measuring of oxygen (O_2) saturation, insertion of the oropharyngeal airway, performing suctioning, monitoring intracranial pressure, checking neurological status (GCS), administering nutritional supplement, cerebral perfusion pressures, use of manitol and prevention of seizure for the improvement of patients' outcomes.

CHAPTER TWO

LITERATURE REVIEW

Nurses' Performance on Caring Traumatic Brain Injuries Patients

Proper patient positioning is a basic nursing responsibility and for patients with severe TBI, rise head of the bed to 30 degrees is suggested to reduce intracranial pressure by facilitating cerebral venous outflow (Price et al., 2003; Mittal *et al.*, 2009). For every ten degrees of head elevation, it is reported that the mean intracranial pressure drops by 1mmHg. Hence the patients with severe TBI must be nursed in an about 30 degrees head-up position if other injuries permit (Price et al., 2003; Mittal *et al.*, 2009).

Nurses are accountable for monitoring and maintaining different physiological parameters to ensure neurological stability of the patient. Assessment of the main physiological values related with secondary brain injury such as blood pressure, Intra Cranial Pressure (ICP), Cerebral Perfusion Pressure (CPP), oxygen saturation, body temperature and addressing psychosocial needs must be improved for TBI patients. These values within acceptable limits, nurses were preventing secondary brain injury and promoting neurological stability. Additional interventions to monitor neurological stability included performing neurological assessments at a minimum of every hour (Mcnett et al., 2010). For dysphagia patient; aspiration can mostly be prevented through dietary intervention by regulating texture, consistency and quantity of food and fluids, regular oral care and positioning a mechanically ventilated patient in semi-recumbent (45-degree angle) (Dibardino et al., 2015).

Critical care specialists and professionals providing care for TBI patients must have a thorough understanding of pathophysiology, diagnostic methodologies, treatment alternatives and overall impact on patient's outcomes. Neurologic related respiratory failure from severe central nervous system dysfunction is one of the most frequent reasons for initiating mechanical ventilation (Susan et al., 2007). Adequacy ventilation is vital to patients with severe traumatic brain injury as hypoventilation causes hypercapnia that raises cerebral vasodilatation and intracranial pressure (Price et al., 2003; Mittal *et al.*, 2009).

A nurse plays a significant role in caring patients with TBI, as these patients and their families are frequently concerned with anticipations about improvement and seek information from nurses (Andrew et al., 2002). Though nurses may differ in the frequency with which they care for patients with traumatic brain injury, all nurses must be knowledgeable on caring for these patients as they are all over hospital units around the world (Brown et al., 2016). As soon as a patient has specific medical situations, nurses should hold specific knowledge, to attain outcomes predicted by best practice research (Asta et al., 2010). Pneumonia is a common complication of severe brain injury and can occur in up to 60% of patients (Mary et al., 2009) as these patients are prone to aspirate stomach contents. Similarly, Ventilator-Associated Pneumonia (VAP) is a preventable secondary consequence of prolonged intubation and mechanical ventilation. VAP is a pneumonia that develops in an intubated patient after 48 hours or more of ventilator support (Fakhry *et al.*, 2004).

Critically-ill neurological patients that are mechanically ventilated are at an increased risk of VAP due to factors such as decreased level of consciousness, dry-open mouth and micro aspiration of secretions (Mary et al.,2009). Patients with severe brain injury tend to be on mechanical ventilation longer than medically intubated patients and VAP in the neurologic ICU can further increase the length of stay (Moppett, 2007). The experiences of people with TBI feel excluded from decision-making receive conflicting information regarding treatment and feel mistreated by professional caregivers who fail to listen or who give care impatiently (Jennifer et al., 2012).

An initial review of the literature indicates the experience of both receiving and providing care for TBI is complex. Patients hospitalized with TBI can experience challenges to care, describing multiple examples of feeling disempowered (Jennifer et al., 2012). The physical and psychological impact of TBI can be distressing for the entire family members who commonly describe a combination of insufficient information and an overwhelming care burden (Jennifer et al., 2012). Nurses may struggle to meet the care needs of patients with TBI, particularly when they exhibit challenging behavior (Jie et al., 2011).

Individual factors which influencing nurses' performances on caring TBI patients

Nurses' performance on caring TBI patients depends on the knowledge, skills and motivation of individual employees. Employers should provide working conditions which support the performance of nurses on caring TBI patients (Magdalene et al., 2013). Education of nurses on TBI care is important for improving the care of TBI patients in tertiary hospitals (Luke et al., 2017). The study conducted in Malawi shows that the staff is working under difficult conditions but committed to serving the population, identifying the main factors contributing to performance such as limited opportunities for career development and further education, inadequate or nonexistent human resources management systems (Schlosser *et al.*, 2009).

The excessive workload for nurses may lead to poor quality of care to TBI patients; while the acceptable level of workload is defined as levels that an individual can carry on a given work shift in a physiologically steady state with no exhaustion or discomfort (Hsin-Chieh et al., 2001). The reality in today's hospitals is that too few nurses take care to many critically ill patients; nurses often describe their work as heavy, overwhelming, busy and exhausting (Jeanne et al., 2010). When the workload moves beyond the acceptable level, physiological strain example elevated heart rate and adaptive behaviors example slower pace may occur, adversely impacting individuals well-being and work performance (Claire et al., 2004).

Organizational factors which influencing nurses' performances

Evidence-based practice guideline emphasizes on the significance of having suitable resources available to care for TBI patient, including specialized training of staff members which aids in protecting the wellbeing of patients (Asta et al., 2010; Luke et al., 2017). Failures to provide close monitoring of TBI patients due to inadequate staff-patient ratio leads to the poor prognosis of TBI patients and inappropriate monitoring of vital signs especially blood pressure which is associated with mortality (Luke et al., 2017). To add the burden to nurses, inadequate staffing ratios can sometimes lead to heavy workloads (Jie et al., 2011).

According to Ahida et al., 2015 study on selected organizational factors affecting performance of professional nurses in North West Bank Governmental Hospitals , Palestine revealed that organizational factors are considered to be the cornerstone in achieving psychological and professional security at work, which in turn is positively reflected in job performance. The study assesses workload, available recourses and managerial support in order to improve its current and future performance of professional nurses; used the quantitative descriptive study utilized stratified random sampling of 185 nurses (Ahida et al., 2015). A self administered questionnaire was developed, utilized and the data were analyzed using SPSS. The results showed that the performance of professional nurses was high; the workload rated the highest among the study dimensions as perceived by nurses, managerial support and resources availability (Ahida et al., 2015). The study recommended the improving of the performance of professional nurses in governmental hospitals such as: managers should ensure the adequate number of staff and qualification according to the work condition and sufficient number of professional nurse's in the hospital at all times and shifts (Ahida et al., 2015).

Therefore, chronic shortage of human and materials resources has the biggest impact on the working environment. Inadequate staff members in that country have led to exaggerated working hours, heavy workloads lack of “off duties” and more frequently night shifts. Lack of material resources adds to workloads by causing time-consuming struggles to improvise and affecting the patient outcomes or increasing the length of staying. For this study, it is important to assess the factors which influencing nurses' performance in caring for traumatic brain injury patients in Tanzania.

CHAPTER THREE

MATERIALS AND METHODS

Study Design

This was a descriptive cross-sectional design. The descriptive cross-sectional design involves the collection of data at one point in time. It enables the capturing of the phenomena under study at one point of data collection (Denise et al., 2003). Each participant was assessed at a single time during the study period.

Study setting

The study was conducted at Muhimbili Orthopedic Institute (MOI) and MNH-Mloganzila. MOI is an Orthopaedic Institute providing care and treatment to all patients with orthopedics, traumatic and neurological problems. The study was done at MOI due to the nature of providing care to the patients with Traumatic Brain Injuries in Tanzania. Also, MOI is the National referral hospital for TBI patients. It is located in Ilala district Dar-es-salaam city council in Tanzania. Also, the study was conducted at Muhimbili National Hospital (MNH)-Mloganzila because MNH-Mloganzila is a new national referral hospital which provides health care services to all kind of patients with Medical, surgical and trauma conditions including TBI patients. It is located in Ubungo district Dar es Salaam city council. Both are the University teaching hospitals.

Study population

The study population is the aggregate or totality of those conforming to a set of specifications where the researcher is interested in (Denise et al., 2003). In this study, the researcher was interested in nurses working at MOI and MNH-Mloganzila. A total of 276 nurses were included (MOI had 183 nurses, and MNH-Mloganzila had 93 nurses respectively) work in EMD, ICU, Private Wards, General Wards, Medical wards and Neuro Wards. These nurses were involved in the study because they were responsible on the daily provision of care for the TBI patients. They spend a lot of working hours with TBI patients compared to other health care personnel.

Sample size estimation

The formula for sample size estimation for finite population (Yamane 1967:886) was calculated as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where;

n = Minimum required Sample size.
N = Population Size.
e = margin of error estimated at 5% (0.05).
Thus:

$$n = \frac{276}{1 + 276(0.05)^2}$$

$$n = \frac{276}{1.69}$$

$$n = 163$$

Therefore the minimum number of nurses to participate in the study was 163.

This sample size was adjusted for a 10% non-response rate:

$$n = \frac{163 \times 100\%}{100\%-10\%}$$

$$= 181$$

Therefore the adjusted sample of nurses to participate in the study was 181 nurses.

The allocation of the sample to MOI and MAMC was made proportionally basing on the number of nurses working in the respective settings by using the following formula;

$$n = \frac{\text{Number of nurses in selected settings}}{\text{Number of nurses in all settings}} \times 181$$

Where n = Number of nurses to be taken as a sample in each selected settings

So: At MOI, the sample was (183/276)*181 = 120 nurses

At MAMC, the sample was (93/276)*181 = 61 nurses

The researcher was able to administer a questionnaire to all 181 qualified respondents.

Sampling procedure

The researcher and research assistants enrolled the potential respondents in the study by using simple random sampling. A simple random sampling is a method in which each element of the population has an equal and independent chance of being chosen (Denise et al., 2003). The sample size was 181 nurses. Lottery procedures were used by writing names of all study respondents (nurses) in small pieces of paper which were fold and mixed together and eventually were chosen randomly until the required sample size was reached. The researcher visited the study area and found the working schedule of nurses whose names were selected during the lottery procedure. A questionnaire was administered on the days scheduled for data collection. The nurses were approached after receiving the report during shift exchange; and the consent to participate in the study was sought. Those who agreed to participate were taken through the consent process that was to explain to them on the benefits and risks of participating in the study.

Inclusion criteria

- Registered nurses (RN) by Tanzania Nurses and Midwives Council.
- Working experience more than six months in the respective area.

Exclusion criteria

The registered nurses who were in the fulltime study schedule.

Dependent variable

Performance

The main outcome for this study was the performance on the 15 areas of practice checklist with five levels of Likert scale; rated from very low =1; Low = 2; Moderate = 3; Good = 4; Very good = 5. The performance ranged from low with a score of 15*181(2715) and a high score of 75*181(13575). The overall performance of the study respondents was analyzed using the sum score of each outcome based on Bloom's cut-off point (80-100%) (Yimer *et al.*, 2014).

Those who scored (10860, 80%) and above or equal to (10860, 80%) were categorized as having good performance, and those who scored below (10860, 80%) were categorized as having poor performance.

Independent variable

Individual factors:

These included Socio-demographic characteristics which had continuous variables such as age and other categorical variables such as gender, level of education, years of experience in the nursing profession, respondents' working area, workload and required TBI education or attending in-service training on TBI.

Organization factors:

These included organization factors which were measured as multivariable such as; training, types of equipment and nurse-patient ratio.

Data collection tools

Data was collected using a structured questionnaire (Denise et al., 2003) and a checklist. The self-administered questionnaire (Appendix 1) was given to the respective nurses and the checklist was used by research team to rate the nurses performance. The checklist was made according to the MOI protocol of managing TBI patients. This questionnaire comprised of closed-ended questions and it was used to assess the factors which influencing nurses' performance regarding the care for TBI patients. Also, the questionnaire was used to capture the socio-demographic information. There were three research questions with 14 items that consisted of 6 demographic information questions; five organizational factors affecting nurses when caring TBI patients and three individual factors affecting nurses when caring TBI patients. The checklist comprised of 15 areas of nurses practice. English language version was available and used because all nurses were conversant in this language.

Recruitment and training of research assistants

The researcher recruited and trained two research assistants for two days on the research topic, objectives and on how to collect required data from respondents.

The research assistants were the undergraduate degree holder in general nursing and graduate degree holder in Critical Care and Trauma.

Pre-testing of questionnaire

The instrument was pre-tested to 18 Nurses working at Muhimbili Emergency Department. Data obtained from pre-test were not included in the data analysis for this report. The questionnaire was modified by adding item number six (Appendix 1) after pre-test.

Validity and Reliability of the Tools

Validity

Content validity of the tools used in this study was assessed by three experts who were experienced nurses with critical care specialty from MUHAS School of Nursing. They checked if tools had suitable content that covered objectives, literature and whether the suggested questions were logical and clear forward. Any modification of the tool or questions was done afterward. Content validity is the degree to which an instrument has an appropriate sample of items for the construction being measured and is based on expert judgment (Denise et al., 2003).

Reliability

Reliability of the tool is the consistency with which it measures the targeted attributes (Denise et al., 2003). Internal consistency was used to measure reliability of 15 items measuring the performance of nurses in caring for TBI patients in the questionnaire. Cronbach's alpha (α) of 0.943was obtained; this value reflects a higher internal consistency of the tool.

To determine if the participants in this study would be able to understand the instructions, the items and respond correctly, the pre-test was done to 18 nurses at Muhimbili Emergency Department. There were no major difficulties in responding to the questionnaire because the researcher clarified questions and the instructions were descriptive. The necessary corrections and adjustment of the questions were made before the commencement of the data collection. The approximated time to fill the questionnaire was between 15 to 20 minutes.

Data Collection Procedure

On the days of data collection, the research team introduced itself and the purposes of the study. A respondent who was available was chosen through the lottery procedure and agreed to participate in the survey was given the consent form to read and sign if agreed to participate in the study. Data was collected during working hours using self-administered questionnaires and rated checklists administered under the research team during the practice.

Data Management

The filled questionnaires and checklists were examined to check for the quality of responses received on daily basis. This arrangement enabled the research team to trackback the missed information from the questionnaires and checklists. The data collected were verified for completeness. Data were cleaned, entered into a computer using SPSS version 23.0. The Questionnaires and checklists were stored safely in the data storage box while the soft copy data were stored in a laptop, flash and backed up in the external hard disk.

Data Analysis

Statistical Package for Social Sciences (SPSS) version 23.0 was used to analyze the nurses' performance on caring for the TBI patients. Mean score was used to measure nurses' performance in caring for TBI patients. Descriptive statistics were used to summarize data through frequencies, percentages and graphs. Chi-square test was used to test the relationship between dependent and independent variables where P-value was reported. Odds Ratio at 95% Confidence Interval (CI) was computed. Therefore, A p-value of less or equal to 0.05 was considered to have significant influence of nurses' performance between the dependent and independent variable.

Ethical Consideration

Ethical approval was sought from the Institutional Research and Ethics Committee of Muhimbili University of Health and Allied Sciences Ref.No. DA.287/298/01A/ (Appendix 4). Permission to conduct the study was obtained from Executive Director of MOI Ref.No. MOI/PF.494/107 (Appendix 5) and MNH-Mloganzila management, Ref.No MNH-

MLG/TRCU/permission/2019/002 Appendix 6. The written consent (Appendix 2 of the English language version with Appendix 3 of the Swahili language version) was sought from the potential respondents before their participation in the study. The aim of the study was well explained to the potential study respondents. Also, confidentiality and privacy were observed. The consent form was signed by respondents upon agreement to participate in the study. Anonymity was guaranteed by using numbers to identify respondents instead of names.

Dissemination of the Results

A manuscript and the final dissertation report were submitted to MUHAS for evaluation. The dissertation report will be disseminated to reach many readers at the medical library of MUHAS, MOI, MNH-Mloganzila, published in academic journals and presented in scientific meetings and conferences in Tanzania and other parts of the world. Also, the results will be shared with the Ministry of Health, Community Development, Gender, Elderly, and Children.

CHAPTER FOUR

RESULTS

This chapter presents the results of the data collected from the field. The results are presented according to the research objectives. The chapter presents the socio-demographic characteristics of the respondents, nurses' performance on vital procedures, the individual factors influencing nurses' performance and the organizational factors influencing nurses' performance in caring for TBI patients at tertiary facilities in Tanzania.

Socio-demographic characteristics of respondents

Respondents in this study were heterogeneous with a minimum sample of 181 and a response rate of 100%. Out of 181 respondents (127, 70.2%) were females. Respondents' age varied between a minimum of 24 years and a maximum of 56 years with a mean age of 34.2 years and standard deviation of ±6.49. The most prominent age group was between 24-34 years. A large proportion of respondents' level of education was diploma holders (89, 49.2%).

The distribution of the respondents per working area was; out of 181 respondents, a majority (43, 23.8%) were from general wards. Again out of 181 respondents' years of experience, majority (85, 47%) had 1-5 years. Among 181 respondents, 134(74%) had not attended TBI training (Table 02). Most of the respondents (65.96%) attended TBI training at MOI (Figure 02).

Table 02. Socio-demographic characteristics (Univariate analysis)

Characteristics	Frequency	Valid Percent
Gender		
Male	54	29.8
Female	127	70.2
Age category		
24 – 33	103	56.9
34 – 43	66	36.5
44+	12	6.6
Age mean (SD)		***34.2±6.49***
Level of education		
Diploma	89	49.2
Degree	87	48.1
Masters	5	2.8
Participant working area		
Emergence department	29	16
ICU	38	21
Private ward	36	19.9
General ward	43	23.8
Neuro ward	34	18.8
Medical ward	1	0.6
Participant years of experience in the current working station		
Six months to 1 year	27	14.9
1-5 years	85	47
5-10 years	33	18.2
Above ten years	36	19.9
TBI training attendance		
Yes	47	26
No	134	74
Where did you attend?		
Agha khan university	1	2.1
Cairo	1	2.1
Muhimbili Academic Medical Center	1	2.1
Muhimbili Orthopaedic Institute	31	66
Muhimbili University of Health and Allied Sciences	9	19.2
South Africa	4	8.5

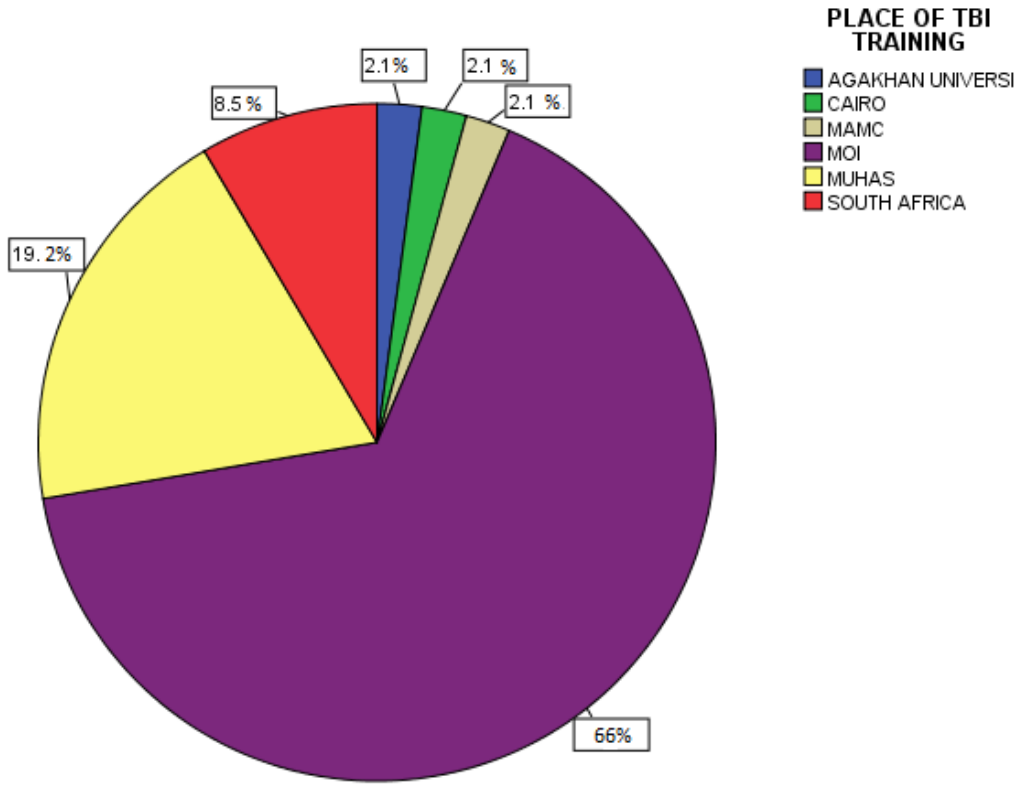

Figure 02: Place of TBI Training

The score of nurses' performance on vital procedures for caring of TBI patients

The checklist of performances of nurses on the 15 areas of practice in the vital procedures for caring of TBI patients had five levels of Likert scale (1 through 5) scores, indicating the nurse's performances ranging from poor to good performances. The results showed that the patterns of nurses' performances on the selected areas of practice were scored differently as indicated below (see Table 03).

The nurses' performance on vital procedures for caring of TBI patients that scored poor performance were as follows: Monitoring Arterial Blood Gas (ABG) using ABG machine scored (414, 45.7%).

Monitoring increased intracranial pressure scored (551, 60.9%), a manual opening of the airway by using jaw thrust maneuver scored (587, 64.9%), insertion of oral pharyngeal airway scored (633, 69.9%), administering nutritional supplementation through the nasal gastric tube within 24hrs of admission scored (651, 71.9%), administering antithrombotic drugs to prevent deep vein thrombosis scored (681, 75.2%), performing suctioning to a patient on room air or connected to the ventilator machine scored (696, 76.9%), administering nutritional supplementation through a nasal gastric tube after every 3hrs scored (701, 77.5%) and assessing neurological status every 3 hours using the Glasgow Coma Scale scored (707, 78.1%).

However, the nurses' performances on vital procedures for caring of TBI patients that scored good performances were as follows: Monitoring Temperature after every one hour scored (734, 81.1%), maintaining elevation of the head of the bed to 30° - 45° to decrease intracranial pressure and increase cerebral perfusion scored (737, 81.4%), assessing signs of aspiration as coughing cyanosis scored (746, 82.4%), monitoring Blood pressure after every one hour scored (747, 82.5%), monitoring blood glucose using glucometer machine scored (777, 85.9%) and measuring oxygen saturation using the pulse oximeter scored (781, 86.3%). In general, the results of the total nurses' performances on vital procedures on caring for TBI patients showed that the overall mean scores of all 15 areas of practices scored (10143, 74.7%) as shown on Table 03. Based on these results, concluded that nurses' had poor performance in caring for TBI patients at tertiary facilities in Tanzania.

Table 03: Nurses' performance in 15 vital procedures areas of practice on TBI patients

Variables	Scores	Percentage (%)
A manual opening of the airway by using jaw thrust maneuver	587	64.9
Insertion of oral pharyngeal airway	633	69.9
Measuring oxygen saturation using the pulse oximeter	781	86.3
Performing suctioning to a patient on room air or connected to the ventilator machine	696	76.9
Monitoring increased intracranial pressure	551	60.9
Assessing signs of aspiration as coughing, cyanosis	746	82.4
Administering antithrombotic drugs to prevent deep vein thrombosis	681	75.2
Monitoring Blood pressure after every one hour	747	82.5
Monitoring Temperature after every one hour	734	81.1
Assessing neurological status every 3 hours using the Glasgow Coma Scale	707	78.1
Maintaining elevation of the head of the bed to 30° - 45° to decrease intracranial pressure and increase cerebral perfusion	737	81.4
Administering nutritional supplementation through the nasal gastric tube within 24hrs of admission	651	71.9
Administering nutritional supplementation through a nasal gastric tube after every 3hrs	701	77.5
Monitoring Arterial Blood Gas (ABG) using ABG machine	414	45.7
Monitoring blood glucose using glucometer machine	777	85.9
Total score	**10,143**	**74.7**

Proportion of the nurses' performance on vital procedures for caring of TBI Patients

Concerning nurses' performance on the vital procedures for caring of TBI patients in tertiary health facilities in Tanzania, more than half of nurses scored poor performance (n=96, 53%). (Table 4)

Table04: The proportion of nurses' performance on vital procedures for caring of TBI patients

TBI care Performance	Frequency	Percentage (%)
Poor performance	96	53.0
Good performance	85	47.0
Total	**181**	**100**

Factors which Influencing Nurses' Performance in Caring for TBI Patients

The factors influencing nurses' performance in caring TBI patients was determined using the following items: age, gender, education, working area, time of experience, TBI training attendance, workload, knowledge on specialized TBI training, shortage of oxygen measuring device, shortage of blood pressure measuring device and staff shortage(Table 05)

Table05: Factors Influenced Nurses' Performance in Caring for TBI Patients

Factors	TBI care performance				χ^2	p-value
	Poor performance		Good performance			
	N	%	n	%		
Age in years						
24 – 33	67	65.05	36	34.95	13.925	0.001
34 – 43	25	37.88	41	62.12		
44+	4	33.33	8	66.67		
Gender						
Male	40	74.07	14	25.93	13.672	0.000
Female	56	44.09	71	55.91		
Level of education						
Diploma	41	46.07	48	53.93	6.776	0.034
Degree	54	62.07	33	37.93		
Masters	1	20.00	4	80.00		
Participant working station						
Emergence department	19	65.52	10	34.48	11.531	0.042
ICU	20	52.63	18	47.37		
Private ward	12	33.33	24	66.67		
General ward	21	48.84	22	51.16		
Neuro ward	23	67.65	11	32.35		
Medical ward	1	100.00	0	0.00		
Participant years of experience						
6 months to 1 year	14	51.85	13	48.15	16.053	0.001
1-5 years	55	64.71	30	35.29		
5-10 years	18	54.55	15	45.45		
10+ years	9	25.00	27	75.00		

TBI care training attendance						
Yes	7	14.89	40	85.11	37.086	0.000
No	89	66.42	45	33.58		
Workload						
Yes	94	53.11	83	46.89	0.015	0.902
No	2	50.00	2	50.00		
Lack of education, in-service and specialized TBI training						
Yes	93	60.00	62	40.00	20.994	0.000
No	3	11.54	23	88.46		
Other reasons						
lack/shortage of equipment	8	36.36	14	63.64	6.212	0.045
long working hours	8	80.00	2	20.00		
Advanced state	1	100.00	0	0.00		
Shortage of oxygen measuring device, example Pulse oximeter						
Yes	80	67.80	38	32.20	29.644	0.000
No	16	25.40	47	74.60		
Shortage of blood pressure(BP) measuring device, example Bp machine						
Yes	66	77.65	19	22.35	38.964	0.000
No	30	31.25	66	68.75		
Shortage of staffing about a nurse-patient ratio						
Yes	92	53.80	79	46.20	0.722	0.395
No	4	40.00	6	60.00		

Nurses' work station performance level of vital procedures for caring of TBI Patients

The level of performances differs significantly across nurses working stations. It seems that on average, the nurses who work in private wards scored the highest (59.528) performance on vital procedures for caring of TBI patients. The results that determine whether nurses working from five departments have equal level of performance on vital procedures for the caring of traumatic brain injury patients revealed, the level of performances for the five departments or working areas were not equally distributed in the population, χ^2 (5) = 37.35, $p < .0001$. Based on these results it can be concluded that there are statistically significant differences in performance on vital procedures for caring of traumatic brain injury patients across nurses working stations, with higher performance mean score for nurses in private wards (59.5 mean scores) followed by ICU (57.6 mean scores) and general wards (57.2 mean scores). Performance scores of vital procedures for caring of traumatic brain injury patients were reasonably higher for nurses who work in the emergency department (53.9 mean sores) than those who work in neuro wards (51.3 mean sores) and medical wards (44.0 mean sores) as shown in table 06.

Table 06: Respondents performance means score by working stations

Participant working station	***Mean Score***	***95% Confidence Interval***	
		Lower Bound	***Upper Bound***
Emergence department	53.897	49.529	58.264
ICU	57.632	53.816	61.447
Private ward	59.528	55.608	63.448
General ward	57.186	53.599	60.773
Neuro ward	51.294	47.26	55.328
Medical ward	44.00	20.48	67.52

However, results obtained from one-way analysis of variance suggest that the level of education did not have a significant impact on nurses' performances on vital procedures for caring for TBI patients. This suggests that there is no statistically significant difference in

performance scores for the level of education on vital procedures for caring for traumatic brain injury patients (see Table 06). However, respondents with higher education (master's degree) tend to perform good, followed by individuals with diploma level as well as the lowest performance to individuals with bachelor degree (undergraduates).

Individual factors which influencing nurses' performances on TBI patient care

The workload is among the individual factors that influencing nurse's performance during caring of TBI patients. The individual administered questionnaire results showed the poor performance of nurses on TBI care that scored (94, 53.11%); as well as good performance of nurses on TBI care that scored (83, 46.89%) due to workload in the selected tertiary health facilities. Therefore, the workload had influenced on nurses' performance on caring for TBI patients at tertiary health facilities in Tanzania (see Table 07).

Also, the results showed that lack of education, in-service or specialized TBI care training influenced nurses' performance during care of TBI patients. As a result majority (93, 60%) of nurses had poor performance on caring TBI patients while (62, 40%) had good performance. Therefore the education gained by nurses through in-service or specialized training has the influence on the performance of vital procedures for caring of traumatic brain injury patients in tertiary health facilities.

Table 07: Proportion of Individual factors which influencing nurses' performances on TBI patient care

Factors	Poor performance				Good performance			
	Yes		No		Yes		No	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Workload	94	53.1	2	50	83	46.9	2	50
Lack of education, in-service or specialized TBI care training	93	60	3	11.5	62	40	23	88.5

Other individual reasons that contributed to the poor performance of nurses in providing care to patients with TBI at tertiary facilities in Tanzania were mostly attitude and long shift of 12 hours (26.3%) and back pain (5.3%), inexperience (5.3%), rotation from working station (5.3%), shortage of cardiac monitor machine (5.3%) and shortage of elevated bed were the least. The long shift and attitude were dominant to both male and female (see Table 08). Figure 03 indicates the individual factors which contributing to poor performance according to gender.

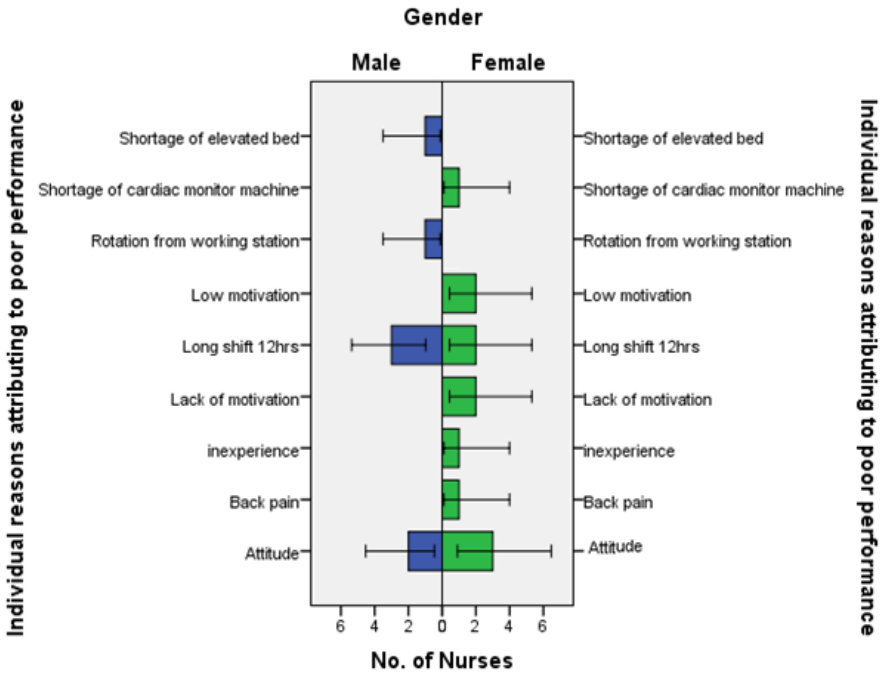

Figure 03: Other individual reasons given by Nurses

Table 08: Proportion of other individual reasons given by Nurses

Reasons	*Frequency*		*Total Percent*
	Male	*Female*	
Attitude	2	3	29.4
Back pain		1	5.9
Inexperience		1	5.9
Lack of motivation		2	11.8
Long shift 12 hrs	3	2	29.4
Low motivation		2	11.8
Rotation from working station	1		5.9
Total	**6**	**11**	**100**

Organization factors that influencing nurses' performance in caring for TBI patients

The shortage of staffing is among the organizational factors which influencing nurses' performance during caring of Traumatic Brain Injury (TBI) patients. The individual administered questionnaire results showed the poor performance of nurses on caring TBI patients that scored (92, 53.8%) as well as good performance of nurses on caring TBI patients that scored (79, 46.2%) due to shortage of staffing for caring of patients with TBI in the selected tertiary health facilities. Therefore, the shortage of staffing had the influence on nurses' performance on caring for traumatic brain injury patients at tertiary health facilities in Tanzania. This inferred that nurses' performance on caring for traumatic brain injury patients in health facilities is influenced with a nurse-patient ratio. Also, the results showed that poor performance of nurses on caring TBI patients that scored (80, 67.8%); as well as good performance of nurses on caring TBI patients that scored (38, 32.2%) due to shortage of oxygen measuring device (see Table 09) for caring of patients with TBI in the selected tertiary health facilities in Tanzania.

Results of this study also revealed other factors that had influenced nurses' performance on caring for traumatic brain injury patients in health facilities. These factors are lack or shortage of equipment, long working hours and late arrival of patients with advanced disease state in health facilities as shown table 05.

Table 09 organization factors which influencing nurses' performances on TBI care

Factors	Poor performance				Good performance			
	Yes		No		Yes		No	
	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
Shortage of oxygen measuring device	80	67.8	16	25.4	38	32.2	47	74.6
Shortage of blood pressure machine	66	77.7	30	31.3	19	22.4	66	68.8
Shortage of staffing about a nurse patient ratio	92	53.8	4	40	79	46.2	6	60

Other reasons that contributed to the poor performance of nurses in providing care to patients with TBI at tertiary facilities in Tanzania included lack and or shortage of equipment in health facilities which constituted 66.7%, long working hours (30.3%) and advanced state of patients who came to health facilities (3.0%) as shown on figure 04.

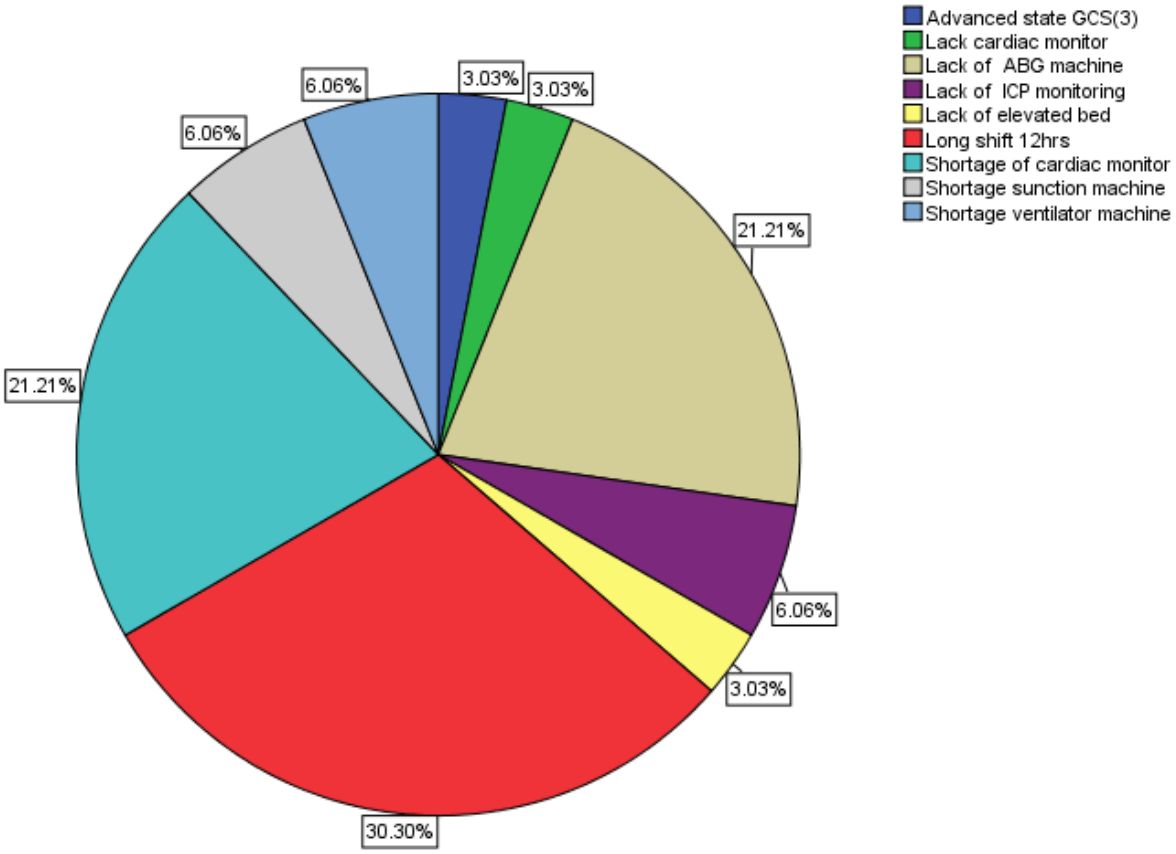

Figure 04: Proportion of other organization reasons given by Nurses

CHAPTER FIVE

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

Discussion

A descriptive cross-sectional study was carried out at MOI and MNH-Mloganzila in Tanzania to assess factors which influenced nurses' performance in providing care to patients with TBI at tertiary facilities. Specifically, the study aimed at assessing the nurses' performances on vital procedures; the individual factors which influencing nurses' performance; and the organizational factors influencing nurses' performance in caring for TBI patients at tertiary facilities in Tanzania. The study showed that more than half of the respondents were female. A majority consisted of age group of 24 to 56 and mean age was 34.2 years. Majority of the respondents' level of education was a diploma. More than half of nurses had poor performances on caring for TBI patients. Shortage of devices for measuring oxygen, measuring of blood pressure, workload and shortage of staffing had a significant influence on nurses' performance in caring TBI patients.

Socio-demographic characteristics

The results of the study showed that the socio-demographic characteristics were heterogeneous with more female's than male's representations in caring of traumatic brain injury patients in tertiary health facilities that is more than half of the respondents were female nurses). This high proportion of female nurses is most probably attributed to the fact that nursing professional has been dominated by females since the long time in memorial. However, in a few years ago, the notion that nursing is a dominant female profession had started to change and more males are joining the nursing education at various levels.

The results of the study showed that nurses with higher education (master's degree level) performed very good, followed by nurses with diploma level as well as the lowest performance to those with first degree (bachelor). The fact that majority of the respondents were diploma holders reflects the current proportion of nurses in the labor market in Tanzania, with few Undergraduate and Graduate degree holders. The results agreed with Dorraine et al., (2011) that Critical Care Nurse Specialist should be provided with the knowledge, skills and

abilities to care for this important segment of the neuroscience patient population to achieve the best practices and optimal outcomes for traumatic brain injury patients. This means that the increasing level of education to individual nurses in TBI patient care can bring positive outcomes to patients and the nation in general.

Also, this study found that most respondents had 1-5 years of experience suggesting that, most of them were newly recruited in the current work station; while very few nurses had more than 15 years working experiences. The results in this study differ with a study conducted by Ahmed et al., (2014) that showed more than half of the studied subjects had 15 or more years of experience. Furthermore Jie et al., (2011) argued that nurses may struggle to meet the care needs of patients' with TBI, particularly when they exhibit challenging behavior. Therefore, the less the years of experiences the poor the knowledge and understanding to handle the behaviours during provision of the care to the TBI patients in tertiary health facilities.

The results about the socio-demographic characteristics of the nurses showed that majority of the nurses had not attended training on caring TBI patients. The results contradicted with Magdalene et al., (2013) contended that the employers should provide working conditions which support the performance of nurses on caring TBI patients. Also, Asta et al., (2010) argued that as soon as a patient has specific medical situations, nurses should hold specific knowledge to attain outcomes predicted by best practiced research. Therefore, there is a need for the tertiary health facilities to put forward and emphasize the training to nurses for the good performance on caring of TBI patients.

The results of study on the socio-demographic characteristics showed that the majority of nurses were from general ward with responsibility of caring of TBI patients in the tertiary health facilities; that contradicted with Oyesanya et al., (2018) who reported that education and training for individual nurses in specific units, or all nurses at the hospital level on TBI patients care could be tailored accordingly. This implies that the nurse's performance influenced and works effectively with specific areas of working such as the traumatic brain injury department or had specific training on caring of TBI patients that will lead to improvement of patient's outcomes. Furthermore, education to nurses on TBI care is important for improving the care of TBI patients in tertiary hospitals (Luke et al., 2017).

Nurses' performance on vital procedures for caring of TBI patients

The study showed that more than half of the respondents had poor performance in caring for TBI patients. This implies that nurses' performance on TBI patients caring at tertiary facilities is poor. This result tallies with the study done by Ahmed et al., (2014) which revealed that nurses' performance on caring TBI patient was unsatisfactory due to the absence of training or workshops regarding the care of traumatic brain injury patients. Hence there is a need for the tertiary health facilities to provide training regularly to nurses who take care of patients with traumatic brain injury in order to improve the current situation for the improvement of the patient's outcomes.

The results of the study showed the proportion of nurses with poor performance constituted more than half of the nurses at working place influence the caring of patients with TBI in the tertiary health facilities. The results could agree with Jennifer et al., (2012) contended that the experiences of people with TBI feel excluded from decision-making receive conflicting information regarding treatment and feel mistreated by professional caregivers who fail to listen or who give care impatiently (Jennifer et al., 2012). Therefore, the results reflect that the nurses' performances should be given priority by updating them through in-service training from the responsible institutions that providing TBI patients care.

The results of the study showed huge proportion of nurses with poor performance that influencing the caring of patients with TBI in the tertiary health facilities. The results concurred with Luke et al., (2017) who argued that failures to provide close monitoring of TBI patients due to poor prognosis of TBI patients and inappropriate monitoring of vital signs especially blood pressure influencing mortality of TBI patients. Therefore, nurse's poor performance should be taken into consideration for the major follow up for the improvement of the Traumatic brain injury patients.

The results of the study showed the huge proportion of nurses had poor performance on taking care to patients with TBI in the tertiary health facilities due to lack of motivations, long shifts and shortage of equipment. The study concurred with Bradley and Mcauliffe, (2009) that the

staff was working under difficult conditions but committed to serving the population, identifying the main factors contributing to performance such as limited opportunities for career development and further education, inadequate or nonexistent human resources management systems. Hence, the tertiary health facilities should review the nurses' demands and work up on for the Traumatic Brain Injury patients' improvement outcomes.

Individual factors which influenced nurses' performances on caring for the TBI patients

The results of the study revealed that the education gained by nurses through specialized training has a significant predictive attributes on the performances of vital procedures for caring of TBI patients in tertiary health facilities. As Varghese et al., (2017) evidenced that the training on the caring of TBI patient is beneficial for all nurses who care TBI patients for improvement of patient outcomes. This gives an impression that nurses who attended specialized training on caring TBI patients are more likely to have good performance than those who did not attend for the training.

Also, the results of the study indicated that most of the respondents did not attend traumatic brain injury care training. Similarly, in a previous study conducted by Ahmed et al., (2014) argued that the majority of the respondents had not trained on TBI care. Hence, Brown et al., (2016) argued that though nurses may differ in the frequency with which they care for patients with traumatic brain injury, all nurses must be knowledgeable on caring for these patients as they are all over hospital units around the world. This implies that the poor performance of nurses on caring of patients with traumatic brain injury could be improved when there would be enough training to each individual who deals with the TBI patients.

The results of the study showed that staff-patient ratio had influence to nurses' performance on vital procedures for caring for traumatic brain injury patients in tertiary health facilities. The results agreed with Müller *et al.*, (2017) that there was a significant influence between the staff-patient ratio which demonstrated that as the number of patients per professional increases, the satisfaction of patients with the care received decreases; hence had an impact on the quality of caring of the patients with TBI. Also, the inadequate staff-patient ration add the burden to nurses, at times, lead to heavy workloads (Jie et al., 2011).

Therefore, for the TBI patients to be satisfied with caring they received at Intensive Care Unit (ICU); there is a need to observe and take measures on the nurse-patient ratio to enhance the patient's outcomes.

Also, the staff-patient ratio had the influence to nurses' performance on vital procedures for caring of traumatic brain injury patients in tertiary health facilities since the staff with large number of TBI patients could have distant monitoring of the patients situation or delayed to provide the care effectively. The results concurred with Luke et al., (2017) argued that failures to provide close monitoring of TBI patients due to inadequate staff-patient ratio leads to the poor prognosis of TBI patients and inappropriate monitoring of vital signs especially blood pressure which is associated with mortality. Therefore, there is a need for quick mechanisms to be followed for the balance of staff-patient ratio for the caring of TBI patients because the situation had influence to nurses' performance on vital procedures for caring for TBI patients in tertiary health facilities.

Organization factors which influencing nurses' performances in caring for TBI Patients

The results of the study showed the organizational factors that influenced nurses' performance on caring for traumatic brain injury patients were shortage of equipment, workload and shortage of staffing on caring of Traumatic Brain Injury patients that led to minimal performance.

The study showed that lack and/ or shortage of equipment in the health facility contributed to the poor performance of nurses' in providing care to patients with traumatic brain injuries. For example; there was a shortage of oxygen measuring devices which had significant influence on nurses' performance in caring for TBI patients at tertiary health facilities. The results were concurred with the study done by Magdalene et al., (2013) that the unavailability of equipment in the working area was the hindrance factor for nurses' performance. Also Merriam et al., (2017) found that the critical shortage of medical equipment at the hospital occurred in the form of unavailability of equipment, low quality and poor maintenances of the few equipment that were available and described that shortage impacted negatively on nursing care, nursing

profession and the hospital in general. Therefore the nurses should be provided with enough and functional medical equipment in order to provide quality nursing care; not as an individual issue to deal with, but also with the entire institutional management responsible for the TBI medical care.

The results of the study revealed that there was a shortage of staffing at tertiary health facilities in Tanzania had influence on providing care to the patients with traumatic brain injuries. This result agreed with Jeanne et al., (2010) that the reality in today's hospitals is that too few nurses take care of many critically ill patients; nurses often describe their work as heavy, overwhelming, busy and exhausting (Jeanne et al., 2010). Also, evidence-based practice guideline emphasizes the significance of having suitable resources available to care TBI patients, including specialized training of staff members, which aids in protecting the wellbeing of patients (Asta et al., 2010; Luke et al., 2017).

The results of the study showed that workload had influence to nurses' performance on vital procedures for caring of traumatic brain injury patients in tertiary health facilities. The result concurs to the study done by Hsin-Chieh et al., (2001) that claimed as the workload increases performance decreases. Also, the excessive workload for nurses may lead to poor quality of care to TBI patients; while the acceptable level of workload is defined as the level that an individual can carry out on a given work shift in a physiologically steady state with no exhaustion or discomfort (Hsin-Chieh et al., 2001). Hence, the present results agreed with Müller *et al.*, (2017) that there was a significant influence between nurses' workload on the quality of caring of the patients with TBI. Furthermore, when the workload moves beyond the acceptable level, physiological strain example elevated heart rate) and adaptive behaviors example slower pace) may occur, adversely impacting individuals well-being and work performances (Claire et al., 2004). The results concluded that the nurses' performance on caring for traumatic brain injury patients in health facilities influenced with a nurse-patient ratio and workload.

Limitation of the study

Nurses' busy schedule

Data collection took more time due to busy working and personal schedules of the selected nurses. Hence, fewer nurses were contacted per day than what was expected. However, days for data collection were extended and all potential respondents were able to participate in the study.

Conclusion

This study shows low level of nurses' performance in caring TBI patient. The TBI training, working hours and the shortage of equipment showed to influence nurses' performances. The respective institutions providing care to patients with Traumatic Brain Injuries should address the identified factors which affect the nurses' practice for the provision of the best care to TBI patients. Therefore, due to these results, in-service training for nurses taking care of patients with traumatic brain injuries should be given a priority to reduce mortality and improve patients' outcome.

Recommendations

The following recommendations can guide the future activities related to nurses' performance in caring for TBI patients:

Practice

Individual nurse: There is a need for providing the specialized and regular in-service training to nurses who care the traumatic brain injury patients in order to improve their expertise.

Organization: The tertiary health care facilities (MOI & Muhimbili MAMC) administration have a mandate to ensure an adequate supply of Traumatic brain injury (TBI) equipment, staffs and incentives to appraise the nurses when providing care to TBI patients.

Education

Special training on caring TBI patients from the recognized institution should be provided to nurses who care for TBI patients. Regular in-service training on caring for TBI patient at work place should be provided to all nurses by those who are expert on TBI caring.

Research

More studies should be conducted in other facilities to understand the magnitude of TBI and factors associated with nurses' performance in care of the patients.

Policy

The study is expected to address the identified gaps in order to influence policy makers in implementing strategies to improve care of Traumatic Brain Injury (TBI) patients.

Also, the Ministry of Health has a mandate to increase the number of nurses by employing nurses who qualified in caring of TBI patients to the hospitals that provide care to TBI patient for optimal patients' outcome.

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APPENDICES

Appendix i: Questionnaire

FACTORS INFLUENCING NURSES PERFORMANCE ON CARING TRAUMATIC BRAIN INJURY PATIENTS (English version)

INSTRUCTIONS:

- Thank you for your willingness to respond to my questions.
- Please answer all questions to the best of your knowledge.
- This questionnaire has three parts which contain 29 questions; you're free to respond to all questions.
- Any information you give will be used for the purpose of this study only and will be treated as confidential.
- Your full participation will greatly contribute to this study.
- Thank you.

Serial No……

Date ……

Part I: Questionnaire

DEMOGRAPHIC INFORMATION (Circle the appropriate answer)

1. Age ……..
2. Gender
    a. Male
    b. Female
3. Level of education
    a. Diploma
    b. Degree
    c. Masters
4. Participant working area
    a. Emergence department
    b. ICU
    c. Private ward

d. General ward
e. Neuro ward
f. Medical ward

5. Participant years of experience in the working station:
    a. Six months to 1 year
    b. 1-5 years
    c. 5-10 years
    d. Above 10years
6. Have you attended any training regarding how to care for the patients with TBI? .....
    If **Yes**, please specify where did you attended …….....

Part II: Checklists

Nurses' performances on caring TBI patients' (Put tick where applicable)

What is the nurse performance on the following procedures?					
	Very low	Low	Moderate	Good	Very good
1. A manual opening of the airway by using jaw thrust maneuver					
2. Insertion of oral pharyngeal airway					
3. Measuring oxygen saturation using the pulse oximeter					
4. Performing suctioning to a patient on room air or connected to the ventilator machine					
5. Monitoring increased					

intracranial pressure.					
6. Assessing signs of aspiration as coughing, cyanosis					
7. Administering antithrombotic drugs to prevent deep vein thrombosis					
8. Monitoring Blood pressure after every one hour					
9. Monitoring Temperature after every one hour					
10. Assessing neurological status every 3 hours using the Glasgow Coma Scale					
11. Maintaining elevation of the head of the bed to 30˚ - 45° to decrease intracranial pressure and increase cerebral perfusion					
12. Administering nutritional supplementation through the nasal gastric tube within					

24hrs of admission					
13. Administering nutritional supplementation through a nasal gastric tube after every 3hrs					
14. Monitoring Arterial Blood Gas(ABG) using ABG machine					
15. Monitoring blood glucose using glucometer machine					

Part III: Questionnaire

Organizational factors influencing Nurses' during caring of Traumatic Brain Injury (TBI) patients (Put tick where applicable)

What are the organizational factors facing nurses' when providing care to TBI patients'?			
1.	Lack of in-service training on TBI care	Yes	No
2.	Shortage of oxygen measuring device, e.g., Pulse oximeter	Yes	No
3.	Shortage of blood pressure measuring device, e.g., Bp machine	Yes	No
4.	Shortage of staffing about a nurse-patient ratio	Yes	No
5. Others specify; ……... …… …… …… ……			

Individual factors influencing Nurses' during caring of Traumatic Brain Injury (TBI) patients (Put tick where applicable)

What are the individual factors facing nurses during providing care to TBI patients'?			
1.	Workload	Yes	No
2.	Lack of education, in service or specialized training on caring TBI patients	Yes	No
3. Others specify …….. …….. ……..			

Appendix ii: Consent Form

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

Greeting,

My name is Rehema D. Mlay, a student from Muhimbili University of Health and Allied Sciences; I would like to welcome you to participate in this study.

Study goal

To assess factors influencing nurse's performance on caring traumatic brain injury patients.

Type of data and procedure

If you agree to join the study, you will be asked to answer a series of questions in the questionnaire prepared.

Participant selection

You have been selected to be part of this study, and that is why we would like to interview you. This study is conducted by Rehema D. Mlay in collaboration with the Muhimbili University of Health and Allied Sciences, School of Nursing and this study is currently taking place at Muhimbili Orthopaedic Institute and Muhimbili National Hospital-Mloganzila in Dar es Salaam.

Potential Risk

I do not expect that any harm will happen to you because of joining this study however if any physical injury resulting from participation in this research happen, I will guide you to obtain medical treatment according to the current standard of care in Tanzania. There will be no additional compensations for you.

Potential benefits

If you agree to take part in this study, your contribution will help us to explore the factors influencing nurse's performance on caring traumatic brain injury patients and will help the government and community on their plan in health sectors; also it will be an opportunity for you to volunteer in this study for the benefit of others and the country. It helps the individual to identify nursing management for traumatic brain injury patients that can help in improving patient outcome and decrease the cost.

The results of this study will be used to assist the Ministry of Health, Muhimbili Orthopaedic Institute and Muhimbili National Hospital-Mloganzila in developing public health programs that target efforts to improve patients' outcome and decrease the mortality rate of the patients with traumatic brain injury.

Confidentiality

The information you provide is confidential and will not be disclosed to anyone. It will only be used for research purposes. Your personal information will not be disclosed. You may be contacted by the survey team again only if it is necessary to complete the information on the survey. Refusal to participate or withdraw from the study will not involve penalty or loss of any benefit which you are otherwise entitled.

Voluntary participation

Your participation is voluntary, and you can withdraw from the survey after having agreed to participate. You are free to refuse to answer any question that is asked and the questionnaire.

Contact information

If you have any questions about this survey, you may ask me or contact to Rehema D. Mlay telephone0716621255. If you have questions about your rights as a participant and need further clarification, you may call Director of Research and Publication Dr. Bruno Sungunya, Muhimbili University of Health and Allied Science (MUHAS), P. O. Box 65001, Dar es Salaam, Tel. no +255222152467. Fill free to ask the question.

Consent to participate

Signing this consent indicates that you understand what will be expected of you and are the willingness to participate.

Name of participant ……..…….

Signature of participant ……. Date…….

Name of researcher……...……

Appendex iii: Fomu ya Ridhaa

Kiambatanisho Fomu nambari ……

CHUO KIKUU CHA AFYA NA SAYANSI YA TIBA SHIRIKISHI MUHIMBLI

Fomu ya ridhaa

Habari.

Naitwa Rehema D. Mlay ni mwanafunzi wa Chuo Kikuu cha Afya na Sayansi ya Tiba Shirikishi Muhimbili. Ni mwanafunzi wa shahada ya uzamili mwaka wa pili. Napenda kukukaribisha kushiriki katika utafiti huu ambapo utasaidia nchi yetu pamoja na watu wake katika utendaji na umahiri wa wauguzi juu ya kutoa huduma kwa wagonjwa wenye majeraha kichwani na kwenye ubongo katika Taasisi ya mifupa Muhimbili. Utafiti huu utafanyika kwa wauguzi wanaofanya kazi katika wodi ya mapokezi ya dharura, wodi ya wagonjwa mahututi na wodi za kawaida.

Malengo ya utafiti

Malengo ya utafiti huu ni kuweza kutambua sababu zinazoweza kusababisha utendaji na umahiri wa wauguzi kuhusu kuhudumia wagonjwa wenye majeraha kichwani na kwenye ubongo katika Taasisi ya mifupa Muhimbili

Njia ya utafiti:

Kama utashiki katika utafiti huu, utaombwa kujaza dodoso ya maswali uliyopewa. Hakutakuwa na kitendo chochote ambacho kitakusababishia maumivu kama vile kuchomwa sindano, kutolewa damu na kadhalika.

Uteuzi wa ushiriki

Umebahatika kuwa ni miongoni mwa waliochaguliwa katika kushiriki utafiti huu, hivyo tunahitaji kukudodosa pamoja na ushirikiano kutoka kwako. Utafiti huu unafanywa na Rehema Danford Mlay kutoka Chuo Kikuu cha Afya na Sayansi ya Tiba Shirikishi Muhimbili, shule ya uuguzi na kwa sasa utafiti huu unafanyika hapa Muhimbili katika taasisi ya mifupa na Hospitali ya Taifa Muhimbili- Mloganzila

Madhara

Hatutegemei kutokea kwa madhara yoyote kwa kushiriki utafiti huu.hata hivyo kama itatokea maumivu yoyote kwa kushiriki utafiti, basi tutatoa maelekezo pamoja na kushirikiana na wewe katika huduma kama utaratibu wa mpango wa huduma ya afya Tanzania unavyoelekeza. Hakutakuwa na fidia ya ziada katika kushiriki kwako.

Faida

Kama umekubali kushiriki katika utafiti huu, ushiriki wako utapelekea kugundua uelewa na ujuzi wa wauguzi kuhusu kuhudumia wagonjwa wenye majeraha kichwani,pia itasaidia serekali na wadau wengine kupanga katika kuboresha huduma ya afya. Vile vile itakuwa ni fursa kwako kujitolea kwa ajili yako na wauguzi wengine kuipa changamoto hospitali pamoja na wizara ya afya ili iweze kufundisha manesi wakati wakiwa makazini. Matokeo ya utifiti huu utasaidia wizara ya afya, Tasisi ya Mifupa Muhimbili na hospitali Chuo kikuu cha afya na sayansi ya tiba shirikishi Muhimbili katika kupanga mipango ya kundeleza wauguzi wakiwa makazini ili kuweza kufanya kazi kwa umakini wakiwa na uelewa wa kutosha.

Faragha

Taarifa utakazotoa zitakuwa ni siri na hazitotolewa kwa mtu yeyote. Zitatumika pekee kwa lengo la utafiti .Vile vile taarifa zako binafsi hazitatolewa.unaweza kutembelewa na mtafiti pindi itakapobidi ili kukamilisha taarifa zako.

Ridhaa/ hiari wa kushiriki

Ushiriki wako ni wa hiari, unaweza kujitoa katika utafiti hata baada ya kukubali kushiriki. Una uhuru wa kutojibu swali lolote litakaloulizwa wakati wa utafiti.

Mawasiliano

Kama una swali lolote kuhusiana na utafiti huu unaweza kupiga simu ya mkononi nambari 0716621255 au barua pepe: aikareym1980@gmail.com

Kwa mawasiliano zaidi

Kama una maswali zaidi unaweza kuwasiliana na **Mkurugenzi wa Utafiti na Uchapishaji, Dr Bruno Sungunya** - Chuo Kikuu cha Afya na Sayansi ya Tiba Shirikishi Muhimbili, S.L.P. 65001 DSM. Simu namba+255222152467 . Jisikie huru kuuliza swali.

Ridhaa ya kushiriki

Kusaini fomu hii ya ridhaa ni kwamba umefahamu na umekubali kushiriki katika utafiti.
Nimekubali kushiriki katika utafiti huu.
Sahihi…….. Tarehe……./…/…….

Appendix iv: Ethical clearance

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR OF POSTGRADUATE STUDIES

P.O. Box 65001
DAR ES SALAAM
TANZANIA
Web: www.muhas.ac.tz

Tel G/Line: +255-22-2150302/6 Ext. 1015
Direct Line: +255-22-2151378
Telefax: +255-22-2150465
E-mail: dpgs@muhas.ac.tz

Ref. No. DA.287/298/01A/

2nd April, 2019

Ms. Rehema Danford Mlay
MSc. Critical Care and Trauma Nursing
MUHAS.

RE: APPROVAL OF ETHICAL CLEARANCE FOR A STUDY TITLED: "ASSESSMENT OF PERFORMANCE ON CARING FOR TRAUMATIC BRAIN INJURY PATIENTS AMONG NURSES IN TERTIARY FACILITIES IN TANZANIA"

Reference is made to the above heading.

I am pleased to inform you that, the Chairman has, on behalf of the Senate, approved ethical clearance for the above-mentioned study. Hence you may proceed with the planned study.

The ethical clearance is valid for one year only, from **1st April, 2019 to 30th April, 2020.** In case you do not complete data analysis and dissertation report writing by **30th April, 2020,** you will have to apply for renewal of ethical clearance prior to the expiry date.

Dr. Emmanuel Balandya
ACTING: DIRECTOR OF POSTGRADUATE STUDIES

cc: Director of Research and Publications
cc: Dean, School of Nursing, MUHAS

Appendix v: Request to conduct a research

MUHIMBILI ORTHOPAEDIC INSTITUTE

P.O. Box 65474; DAR ES SALAAM, TANZANIA, MUHIMBILI COMPLEX
Executive Director: +255-022-2153359
General lines: +255-022-2151298/2152937/2152938
FAX: +255-022-2151744
E-Mail: info@moi.ac.tz
Website: www.moi.ac.tz
OFFERING SERVICES IN ORTHOPAEDICS, NEUROSURGERY AND TRAUMATOLOGY

MOI/PF.494/107

9TH April, 2019

Director, Postgraduate studies
MUHAS
P.O.BOX 65001
DAR ES SALAAM

RE: REQUEST TO CONDUCT A RESEARCH

Reference is made to your letter dated 3rd April, 2019 with reference No: HD/MUH/T.302/2017 regarding the above subject matter.

On behalf of the Management of the Institute I would like to official inform you that your request for Ms.Rehema Danford Mlay to conduct a research heading **'Assessment of performance on caring for traumatic brain injury patients among nurses in tertiary facilities in Tanzania'** at **MOI** has been approved. Therefore very kindly you're requested to inform the student that she can start to collect data as requested.

On the arrival you should come and see the undersigned person for more information.

It's my hope that you will extend enough cooperation regarding this matter.

With regards,

Abdallah Mbuguni
For: Executive Director

TRAINING OFFICER
MUHIMBILI ORTHOPAEDIC INSTITUTE
P. O. Box 65474
DAR-ES-SALAAM

Cc: Medical Director –MOI
Cc: Rehema Danford Mlay-MOI

All correspondences to be addressed to the Executive Director

Appendix vi: Researcher's Permission for Data Collection

MUHIMBILI NATIONAL HOSPITAL

Cables: "MUHIMBILI"
Telephones: +255-22-2151367-9
FAX: +255-22-2150534
Web: www.mnh.or.tz Tanzania

Postal Address:
P.O. Box 65000
DAR ES SALAAM

MLOGANZILA

In reply please quote:
MNH- MLG /TRCU/Permission/2019/002 **09/04/ 2019**

Head,
Emergency Medicine Department
MNH-Mloganzila

RE: PERMISSION TO COLLECT DATA AT MNH - MLOGANZILA

Name of Student	REHEMA DANFORD MLAY
Title	"ASSESSMENT OF PERFORMANCE ON CARING FOR TRAUMATIC BRAIN INJURY PATIENTS AMONG NURSES IN TERTIARY FACILITIES IN TANZANIA"
Institution	Muhimbili University of Health and Allied Sciences
Supervisors	Dr. Edith Tarimo
Period	01/04/2019 to 30/04/2019 (4 weeks)

Permission has been granted to **REHEMA DANFORDMLAY** to collect data for the above study.
Please ensure that the researcher abide to the ethical principle and other condition.

Sincerely,

Dr. FarajaS. Chiwanga
Head of Teaching, Research and Consultancy Unit

c.c. DMS
c.c. Rehema Danford Mlay