COMPLIANCE WITH STANDARD PRECAUTIONS AND ASSOCIATED FACTORS AMONG HEALTHCARE WORKERS AT MWANANYAMALA REGIONAL REFERRAL HOSPITAL, DAR ES SALAAM

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By

Neema John

A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Public Health of

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CERTIFICATION

The undersigned certifies that he has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **"Compliance with Standard Precautions and associated factors among healthcare workers at Mwananyamala Regional Referral hospital, Dar es Salaam",** in (partial) fulfillment of the requirements for the degree of Master of Public Heath of Muhimbili University of Health and Allied Sciences.

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Dr. Stephen Kishinhi

(Supervisor)

_____

Date

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Mr. William Nelson

(Co-Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, **Neema John,** declare that this **dissertation** is my original work and that it has not been presented and will not be presented to any other university for a similar or any other degree ward.

Signature …… **Date** …….

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Lastly but not least I would like to thank all colleagues; with whom I shared ideas; for their moral support. Above all I thank God for providing me with protection and resilience throughout my studies.

DEDICATION

This work is dedicated to my loving husband Dennis Mkony and our wonderful daughter Leona. I can not express enough how grateful I am for all the support in completion of this dissertation.

ABSTRACT

Background: Compliance with infection prevention and control standard precautions is a significant challenge in many developing countries, including Tanzania, increasing the risk of healthcare-associated infections (HAIs) for both healthcare workers and patients. This study examined IPCSP compliance and its associated factors among HCWs at Mwananyamala Regional Referral Hospital, Dar es salaam.

Objective: The purpose of this study was to determine compliance with IPC Standard Precautions and its associated factors among health care workers at Mwananyamala Regional Referral Hospital.

Methodology: This was a hospital-based cross-sectional analytical study conducted at Mwananyamala Regional Referral Hospital. Data were collected from 160 randomly selected healthcare workers, including doctors, nurses, and health attendants, through a closed-ended structured questionnaire. Data were analyzed using SPSS version 27, employing T-tests for continuous variables and Chi-square tests for categorical variables. A linear regression model was used for Compliancy to IPC standard as the dependent variable

Results: In our study population the average age was 28 years (IQR 26-31), with 53.1% male and 46.9% female participants. Professionally, 26.3% were doctors, 49.4% nurses, and 24.4% attendants. Compliance with IPC standard precautions were low, with only 30.6% complying and 69.4% not complying with IPC standards. Compliance was significantly associated with profession (nurses more compliant than doctors and attendants, p value=0.009), work experience for more than five years, and prior blood/body fluid exposure (higher compliance among those exposed, p value=0.017). Provision of PPE and IPC training were also significantly associated with compliance (p value=0.003 and p value <0.001, respectively). Bivariate regression indicates that all behavioral factors showed strong positive associations with compliance, However, in multivariate regression, only PPE use remained a significant predictor (β=1.2, p value<0.001), while other factors were not significant predictors.

Conclusion: Only 30.6% of healthcare workers at Mwananyamala Regional Hospital complied with infection prevention and control (IPC) standards, with nurses being more compliant than doctors and attendants. Compliance was higher among those with over five years of experience and prior exposure to blood or body fluids. Key factors for higher compliance included the availability of personal protective equipment (PPE) and regular IPC training.

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ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome
CSPS	Compliance with Standard Precautions Scale
HAIs	Hospital Acquired Infections
HCWs	Health Care Workers
ICU	Intensive Care Unit
IPC	Infection prevention and control
IPCSPs	Infection Prevention and Control Standard Precautions
MOHSW	Ministry of Health and Social Welfare
NSSI	Needle Stick and Sharps Injuries
WHO	World Health Organization

DEFINITION OF KEY TERMS

Blood borne pathogens refers to microorganisms presents in the blood that has the potential to cause diseases in humans.

Compliance denotes to the degree to which a particular behavior aligns with established guidelines or recommendations.

HAIs are defined as infections acquired during treatment at the health facility, which were not present or in the incubation stage upon admission.

Standard Precautions are recommendations designed to safeguard healthcare workers and patients by minimizing risk of transmission of microorganisms from both known and unknown sources.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Infection prevention and control is crucial in provision of quality health care services yet it is not emphasized enough in health care settings, putting healthcare workers, patients and patient's relatives at risk of Health care Associated Infections (HCAIs) (1). Healthcare-associated infections (HCAIs) are a critical concern in healthcare settings worldwide due to their significant impact on patient health and healthcare systems. The World Health Organization (WHO) defines HAIs as infections that patients acquire while receiving treatment for other conditions within a healthcare setting. Common types of HCAIs include urinary tract infections, surgical site infections, pneumonia, and bloodstream infections. These infections can lead to severe health complications, extended hospital stays, increased healthcare costs, and elevated mortality rates. The prevention and control of HCAIs are vital for patient safety and overall public health (2).

Infection Prevention and Control (IPC) measures are essential strategies in preventing HCAIs. IPC standards include a range of practices designed to prevent the spread of infections in healthcare settings (3). These practices involve proper hand hygiene, sterilization of medical equipment, use of personal protective equipment (PPE), and adherence to isolation protocols for contagious patients. Compliance with these IPC standards is critical in mitigating the risk of HCAIs. Studies have shown that high (1,4) adherence to IPC protocols can significantly reduce the incidence of infections among patients and healthcare workers.

Despite the established importance of IPC measures, compliance rates vary widely across different healthcare settings, particularly in low-income countries. A previous systemic review analyzing data from more than 6 African countries (5) revealed that compliance with IPC standard precautions was relatively low, with only 24.8% of healthcare workers adhering to the recommended precautions.

Moreover, Tanzania faces high prevalence of infectious and life-threatening diseases such as HIV/AIDS, Tuberculosis and bloody diarrhea, proving the need for a focus on effective infection prevention practices (6). WHO 2022 global report revealed that approximately 23.6% of all hospital-treated sepsis are hospital-acquired, 48.7% of sepsis cases with organ dysfunction treated at ICU are hospital acquired infections. Infection prevention and control are cost effective solutions to ensure these burden is reduced (7).

The WHO report that globally, compliance with IPC standard precautions, including hand hygiene recommendations, remains suboptimal around the world, with high income countries at 64.5% and 9.1% in low income countries (7). In Sub-Saharan Africa (SSA), the burden of HCAIs is high, attributed to low IPC compliance. According to a recent WHO report, the proportion of HCAIs in SSA countries is reported to be 14.8%, leading to increased mobility and mortality (7) .

A recent study conducted at Lira university hospital in Uganda reported an overall compliance with IPC Standard Precautions of 28.5% (8). The study identified several factors associated with low compliance, including absence of IPC committee, lack of IPC team, inadequate IPC budget in hospital plans, insufficient IPC training and inadequate PPE supply (8). Despite the low compliance the burden of HCAIs remains underestimated and unknown due to limitations in surveillance activities, which requires both expertise and resources. The Prevalence of HCAIs in these countries is as high as 14.8%, as reported in a study conducted by Gosling and colleagues in a tertiary hospital in Tanzania (9). Compliance with IPC-SPs has remained a challenge in Tanzania. Hand hygiene compliance is as low as 6.9%, which is lower than the 9.1% hand hygiene compliance for low income countries reported by WHO (7), with the highest compliance reported being from the use of gloves (74.8%) (1). Generally, none of the scale items reached the recommended compliance of 80% by National Guidelines of IPC Standard Precautions (6).

The proposed study aims to determine proportion of compliance with IPC standard precautions and its associated factors at Mwananyamala Regional Referral hospital. The study will employ the self-administered standard WHO CSPS, which comprises of 20 items focusing on use of personal protective equipment, disposal of sharps and waste, hand

hygiene and decontamination of reusable equipment. Findings from this study will aid in providing interventions to increase compliance and reduce the burden of HCAIs.

1.2 Problem statement

Globally, about one out of every 15 people in developed countries and one out of every 7 people in low income countries acquires at least one HCAI throughout hospital stay. At least 10% of these HCAI patients will die (7).

Factors associated with HCAIs include being Immunocompromised, medical or surgical treatment, invasive medical devices and personnel exposure. Invasive medical devices accounts for at least 90% of HCAIs. These devices facilitate cross infection from patients to healthcare workers and from health care workers to another patient. Proper adherence to IPC Standard precautions by health care could decrease risk of patients developing HCAIs (9).

Tanzanian Ministry of Health has set IPC guidelines for hospitals to control HCAIs, but compliance is reportedly low as 22.5% in Songwe region (Bahegwa et al, 2022). Regardless the effort put forward by the MoH, there is a slightly increase in IPC Standard compliance score from 32.44 to 33.73 percent in 2010 and 2017 respectively among selected HFs of Tanzania (Hokororo et al, 2021) which is not sufficient.

There is limited research on factors associated with IPC compliance among HCWs which increases HCAIs risk for both workers and patients.

This study aims to investigate the factors influencing compliance to IPC Standard Precautions among healthcare workers in public health facilities.

Compliance with IPC standard precautions is still not sufficient among health care workers in Tanzania (1). However, there is limited information on factors affecting IPC Standard Precautions compliance. This exposes health care workers and patients to high risk of developing HCAIs even with the standard precautions in place(11). This study will investigate factors affecting compliance with IPCSPs among health care workers in public health facilities.

1.3 Conceptual framework

This section shows how independent factors like work years' experience, education level, Workload, provision of PPE, Occupational exposure, availability of WASH infrastructure and IPC supportive supervision are associated with Infection Prevention and Control compliance (Figure 1).

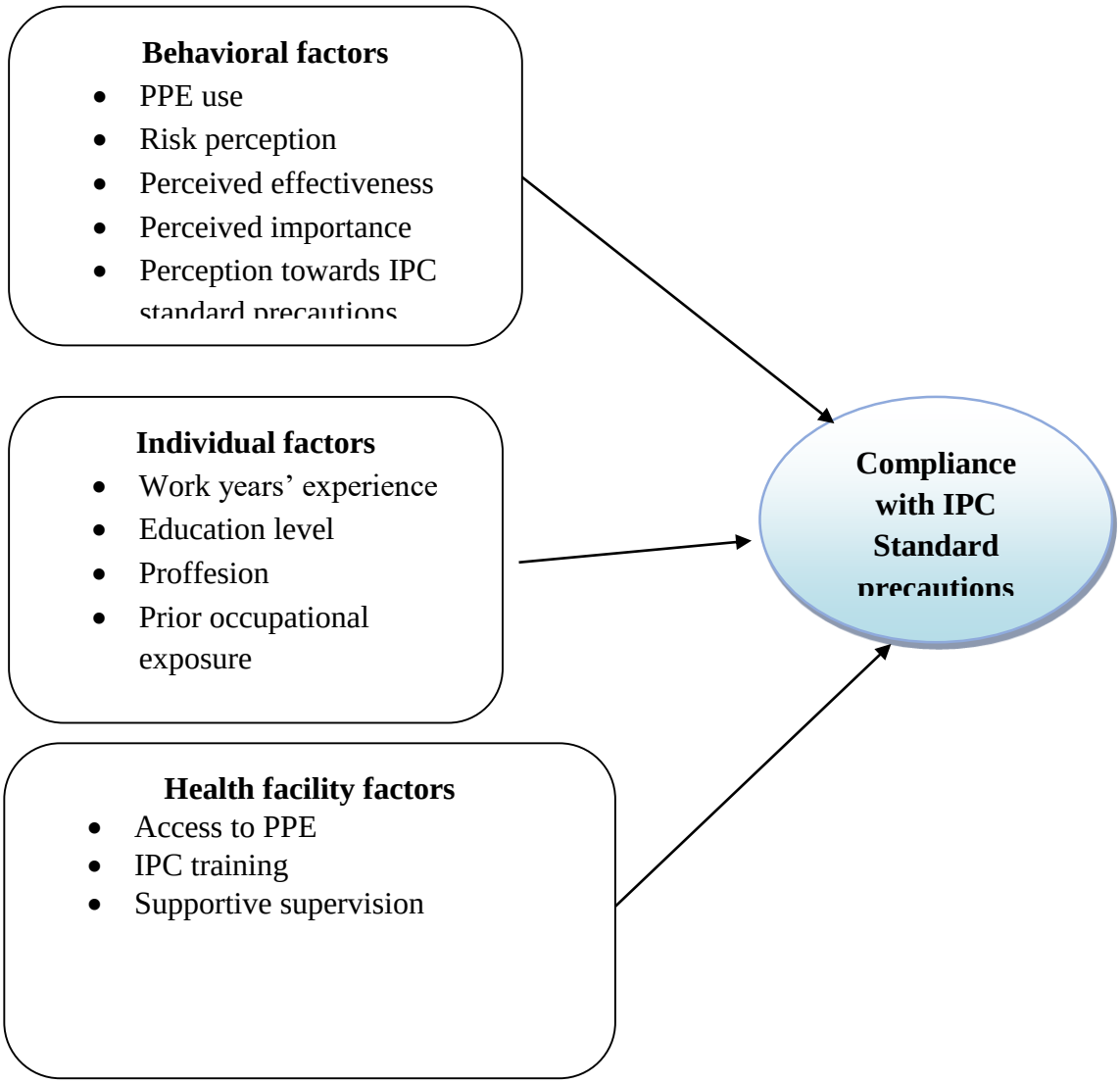


Figure 1: Conceptual framework

1.4 Rationale of the study

In Tanzania like most Sub-Saharan countries Infection prevention and control Standards compliance is still a challenge, Poor compliance exposes health care providers and patients to risk of HCAIs (12). Infection prevention and control Standards compliance is likely affected by factors like work years' experience, education level, IPC training, knowledge on IPC standard precautions (13). provision of PPE, availability of IPC SOPs, Previous occupational exposure, availability of WASH infrastructure and IPC supportive supervision.

IPCSPs compliance is the Conner stone for safe and high-quality health services delivery and exploring factors associated with IPCSs compliance will generate evidence and strategies that will help to motivate HCWs compliance with IPCSPs and help to relieve the burden of HAIs and future epidemics.

1.5 Research questions

1.5.1 Broad research question

What is the proportion of compliance with IPC Standard precautions and associated factors among health care workers at Mwananyamala referral hospital?

1.5.2 Specific research questions

1. What is the proportion of compliance with IPC Standard Precautions among health care workers at Mwananyamala regional referral hospital?
2. What are individual factors associated with IPC Standard Precautions compliance among health care workers at Mwananyamala regional referral hospital?
3. What are institutional factors associated with IPC Standard precautions compliance among health care workers at Mwananyamala regional referral hospital?
4. What are behavioral factors associated IPC Standard precautions Compliance among healthcare workers at Mwananyamala regional referral hospital?

1.6 Research objectives

1.6.1 Broad objective

To determine the proportion of compliance with IPC Standard precautions and associated factors among healthcare workers at Mwananyamala referral hospital.

1.6.2 Specific objectives

1. To determine the proportion of compliance with IPC Standard precautions among health care workers at Mwananyamala regional referral hospital.
2. To determine individual factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.
3. To determine health facility factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.
4. To determine behavioral factors associated with IPC standard precautions Compliance among healthcare workers at Mwananyamala regional referral hospital.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Compliance with IPC Standard precautions among healthcare workers

According to WHO compliance with IPC Standard Precautions is still a challenge especially in low- and middle-income countries. However there is a huge difference between compliance in high income countries and low in some countries (64.5 vs 9.1%) (14). A study report revealed the overall proportion of HCWs who were always compliant with SPs was found to be 12%, with nurses being the most compliant (3.4%) followed by intern doctors (2.5%) (15).

In Tanzania Compliance with IPC Standard Precautions has dropped from 53% in 2014 to 34% in 2017 (12). According to Bahegwa, year, on a study done in health facilities at Songwe region, highlighted that the IPC standard compliance proportional was 22.5%, while many workers required refreshment training and poor utilization of PPE was also highlighted (10). This observation highlights the importance of regular monitoring policies that will ensure adherence to the IPC standards as recommended in the National infection prevention and control guidelines (6).

2.2 Factors associated with compliance of IPC Standard Precautions

2.2.1 Individual factors associated with IPC Standard Precautions

Nurses assist patient with self-care needs such as bed baths, changing position, linen change which put them at higher risk of cross infection, increased risk perception in nurses make them more compliant with IPC Standard Precautions than doctors(16). A study report revealed that most compliant healthcare workers were nurses (3.4%) followed by intern doctors and general practitioners(2.5%) (15). A study report revealed Factors influencing health care workers to comply with IPC Standard Precautions include education, IPC training, work experience and professional category (being a nurse or a doctor) (13).

A study done in Public hospitals in Addis Ababa shows that Health care workers with at least 5 years of work experience 2.5 times likely to be compliant with IPC Standard

precaution (17). More working years could mean more awareness of the risk and more knowledge safety measures(18)

More than 90% of exposure to needle stick and sharp injuries occur in sub Saharan Africa having the highest prevalence of HIV infected patients , WHO reports that health care workers in Africa, Asia and western Mediterranean suffer at least 4 needle stick and sharp injuries in a year (14). Health care workers with experience of needle stick injury or blood splash exposure are more likely to be compliant than their counter part that have never experienced needle stick or blood splash exposure(19). On n a study done in health facilities at Songwe region Tanzania health care workers that previously experienced needle stick injuries were more likely to comply with IPC Standard Precautions (10).

2.2.2 Behavioral factors associated with IPC Standard Precautions

A health care worker behavior can influence compliance with standard precautions, healthcare worker's attitude towards use of PPE, hand hygiene and risk perception can greatly influence how they comply(20). if they perceive these guidelines worthy and lifesaving they will comply, on the hand if they do not believe in them and perceive them useless and time consuming they will not comply(21). Since the Standard precautions are practiced daily and at all times comfort of PPE(22) will also determine whether they are used properly and consistently (23). all these are personal behaviors that influence compliance with standard precaution. A study reported compliance to IPC Standard precautions were influenced by Risk perceptions, Attitude(24), Guidance, availability of appropriate PPE, perceived difficulty of protective behavior, perceived effectiveness, perceived importance, convenience, comfort of PPE and impact on patient care (4).

2.2.3 Health facility factors associated with IPC Standard Precautions

A health care facility needs water adequately and proper handwashing infrastructure(25). Hospitals are required provide these resources enabling healthcare workers resources to comply with standard precautions. A 2020 WASH global report revealed that 1.8 billion people were using health facilities that lacked basic water services and 800 million people attended health facilities with no toilets (7)In developing countries it was estimated 50% of health facilities did not have basic water services and 63% did not have access to sanitation

services, 26% did not have accessible to hand hygiene facilities and 60% did have proper waste management facilities (7).

A study conducted by WHO in 10 countries in Africa regions reported that only 20% of primary care facilities and 27% of hospitals had PPE needed by staff. Providing access to Personal Protective Equipment will influence Healthcare workers to use them(26). A study shows that access to PPE greatly influence compliance with standard precautions among healthcare workers (15). Another study done at Sao Paulo Brazil shows how availability of PPE also influences compliance with standard precautions(27)

Poor staff patient ratio and lack of human resources dedicated to IPC influences the compliance with standard precautions (14). Health care workers work burden affects how they comply with IPC Standard Precautions(28). A study report shows that knowledge and workload pressure were among the factors that influences compliance with IPC standards precautions (29).

Health facilities that allocate budgets for IPC training programs influences compliances with IPC Standard Precautions among health care workers (14). A study reported that compliance of nursing students towards standard precautions was significantly associated with a perceived safe workplace climate and training or seminars related to standard precautions in the last six months (30). According to Kassa access to IP guidelines, Training on standard precautions were among factors associated with standard precaution compliance (31).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

This was a hospital-based cross-sectional analytical study done at Mwananyamala Regional Referral Hospital. Data were collected through a closed-ended structured questionnaire. The data were collected by the principal investigator as well as other data collection assistants at Mwananyamala Regional Referral Hospital.

3.2 Study population

Health care workers at Mwananyamala regional referral hospital including doctors, nurses and health attendants available during the data collection period.

3.3 Study setting

Mwananyamala Regional Referral Hospital it's located in Kinondoni municipal council. Currently, it has the bed capacity of 254 with bed occupancy of 317. Mwananyamala Regional Referral hospital caters a population of more than 2.2 million.

3.4 Sample size estimation

The estimated target population of eligible healthcare workers across the stated categories at target population at Mwananyamala Regional Referral Hospital is 316, where 83 doctors, 157 nurses and 76 health attendants. The sample size for this study was determined in accordance to the finite sample size formula which was developed by Krejci and Morgan (32)

$$n = NZ2P(1-P)/d2(N-1) +Z2P(1-P)$$

Where;

n = Sample size,

N= Population size (316)

Z = Statistical correspondence to the level of significance (1.96),

P = Prevalence of 22.5% (10),

d = Precision or margin of error set at 0.05 (5%).

n = 316 * (1.96)2 * 0.225(1-0.225) / (0.05)2 * (316-1) + (1.96)2 * 0.225(1-0.225)

n = 145

Considering non response rate of 10%=145+15=160

Therefore, a minimum sample size of **160 participants** will be required.

3.5 Sampling technique

Stratified random sampling was used to give each subgroup a chance of being represented from the study population.

Sample size/population size x stratum size = proportional allocation

where sample size = 160

Population size= 316

The following table showed the distribution of sample in each stratum

Table 1: Sampling procedures for professional stratum

Cadre	**Population**	**Contribution ration**	**Sample**
Doctors	83	26.3%	42
Nurses	157	49.7%	79
Health attendants	76	24%	39
TOTAL	**316**	**100%**	**160**

Then participants from each discipline were chosen using simple random sampling.

3.6 Inclusion and Exclusion criteria

3.6.1 Inclusion criteria

Health care workers at Mwananyamala Regional Referral Hospital working in direct contact with patients.

3.6.2 Exclusion criteria

Staff on active duty like surgery

3.7 Variables

3.7.1 Dependent variable

Compliance with IPC Standard precautions

3.9.2 Independent variables

Factors affecting compliance with IPC Standard Precautions

Individual factors

- Education level
- Work years' experience
- Profession
- Prior occupational exposure

Health facility factors

- Provision of PPE
- IPC training
- Supportive supervision

Behavioral factors

- Risk perception
- Perceived effectiveness
- Perceived importance
- Perception towards IPC standard precautions

3.8 Data collection tool

Data were collected using self-administered questionnaire. The questionnaire with structured questions included participants' demographics, such as age, education level, gender, and marital status. Compliance with Standard Precautions Scale (CSPS) tool developed by WHO

was utilized. The scale items evaluate compliance with the use of PPE, disposal of sharps and waste, decontamination of equipment, and prevention of cross-contamination. It consists of 20 items with a four-point scale (never, seldom, sometimes, and always). A score of 1 was given to an “always” response in positively worded statements, and the “never” option was given a score of 1 in negatively worded statements, such as in items 2, 4, 6, and 15. Other responses were given a score of 0, resulting in a total possible score range of 0–20, with a higher score signifying better compliance with Standard Precautions. The average compliance was then stated in terms of a percentage. A compliance score of equal to or greater than 80% was considered high compliance, and less than 80% was considered low compliance. This criterion is based on Tanzania's national guidelines for recognizing the implementation status of quality improvement initiatives, where compliance of at least 80% is considered satisfactory. The individual factors such as profession, work years’ experience, experience with needle stick injuries and blood/body fluid exposure were self-reported by participants. Health facility factors such as supportive supervision, IPC training and provision of PPE was obtained by asking participant if they have ever received on job IPC training, receive PPE consistently and if they have received on job mentorship on Infection Prevention and Control. The behavioral assessment tool was adapted from the Standard Precaution Questionnaire (SPQ) by Michinov based on theory of planned behavior(TPB) (33). 5-point likert scale (0-strongly disagree to 4-strongly agree) was used in this study, the behavioral factors questions were positively stated. Scoring was done by calculating mean for each item and standard deviation, higher mean score for each item suggests a more positive behavior towards IPC standard precaution.

To ensure data quality, data collectors were trained and supervised closely. The questionnaires were pretested on a similar setting. The pretested questionnaire were not included in the study. Questionnaires collected daily were checked for completeness and clarity.

3.9 Data analysis

Data analysis was performed using SPSS version 27. Continuous variables, including Age, Compliance with Standard Precautions Score (CSPS), Work Experience (Years), Risk

Perception Score, Perception towards IPC Standard Precautions Score, Perceived Effectiveness Score, Perceived Importance Score, and PPE Use Score, were summarized using the T-test for mean and standard deviation. Categorical variables, such as Gender, Marital Status, Education Level, Profession, Blood or Body Fluid Exposure, Needle Stick Exposure, Provision of PPE, IPC Training, and Supportive Supervision, were summarized using the Chi-square test of independence. Descriptive statistics were carried out to illustrate means, standard deviations, and frequencies of the study variables. Bivariate and multivariate logistic regression analyses were performed to find out if there is significant association between independent variables and dependent variable. The strength of association between independent and dependent variables were assessed using odds ratio with 95% Confidence Interval. In this study variable with p-value of ≤ 0.2 were included in the multivariable logistic regression analysis. Variable with a p-value of ≤ 0.05 in multivariable logistic regression model were deemed significantly associated with the outcome.

3.10 Ethical Consideration

Ethical approval was sought from the Muhimbili University of Health and Allied Sciences' Institutional Review Board. Permission was requested from the respective directorate of Mwananyamala Regional Referral Hospital so as to be allowed to collect data from employees. The identity of the study individuals was not included in any data points being collected hence safeguarding their right to confidentiality.

3.11 Limitations of the study and mitigation

Due to limited time and resources this study was conducted in only one health facility and the results were considered the representatives of other hospitals on the same level as Mwananyamala. This is not the case since each hospital face different challenges.

CHAPTER FOUR

4.0 RESULTS

4.1 Demographic characteristics

In the study population the median age was 28 years (IQR 26-31), with a gender distribution of 53.1% male and 46.9% female. The marital status showed 61.9% single and 38.1% married. Education levels varied, with 9.4% having secondary education, 26.9% holding certificates, and 31.9% each possessing diplomas and degrees. Professionally, the participants were 26.3% doctors, 49.4% nurses, and 24.4% attendants. Compliance with standard precautions was low, with only 30.6% complying and 69.4% not complying (Table 1).

Table 1: Demographic characteristics of participants in the study population.

Variable	N	N = 160[1]
AGE	160	28.0 (26.0, 31.0)
Gender	160	
Male		85 (53.1%)
Female		75 (46.9%)
Marital status	160	
Single		99 (61.9%)
Married		61 (38.1%)
Education level	160	
Secondary		15 (9.4%)
Certificate		43 (26.9%)
Diploma		51 (31.9%)
Degree		51 (31.9%)
Profession	160	
Doctor		42 (26.3%)
Nurse		79 (49.4%)
Attendants		39 (24.4%)
Compliance status	160	
Not Complied		111 (69.4%)
Complied		49 (30.6%)

[1]Median (IQR); n (%)

4.2 Compliance with IPC Standard precautions among health care workers at Mwananyamala regional referral hospital.

Compliance with Standard Precautions average Score (CSPS) was 13.0 (IQR 10.0-16.0). Compliance status revealed that 69.4% of the participants did not comply with the standard precautions, while 30.6% were compliant.

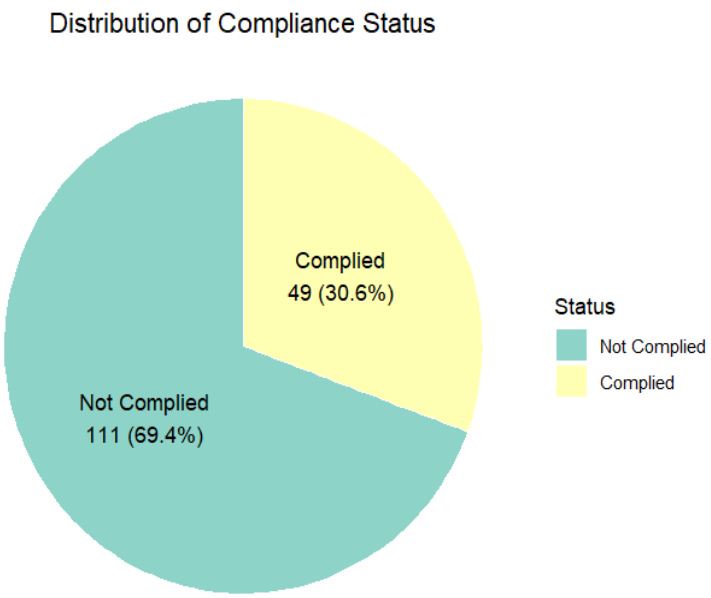


Figure 2: Proportion of IPC standard compliance in the study population

4.3 Summary of Compliance with Standard Precaution scores

Table 2: Compliance with Standard Precaution of HCW at Mwananyamala Regional Referral Hospital based on WHO CSPS tool

		Compliance	Percentage(%)
1	I wash my hands between patient contacts.	87	54.4%
2	I only use water for hand washing.*	25	15.6%
3	I use alcoholic hand rubs as an alternative if my hands are not visibly soiled.	73	45.6%
4	I recap used needles after giving an injection.*	27	16.9%
5	I put used sharp articles into sharp bo7xes.	129	80.6%
6	The sharps box is disposed only when its full.*	42	26.3
7	I remove personal protective equipment (PPE) in a designated area.	119	74.4%
8	I take a shower in case of an extensive splashing even after I have put on personal protective equipment (PPE).	142	88.8%
9	I cover my wound(s) or lesion(s) with water proof dressing before patient contact.	125	78.1%
10	I wear gloves when am exposed to body fluids, blood products and any excretions of patients.	142	88.8%
11	I change gloves between patient contacts.	138	86.3%
12	I decontaminate my hands immediately after removal of gloves.	127	79.4%
13	I wear surgical mask alone or in combination with goggles, face shield and apron whenever there is a possibility of a splash or splatter.	81	50.6%
14	My mouth and nose are covered when I wear a mask.	89	55.6%
15	I reuse a surgical mask or disposable personal protective equipment (PPE)*	60	37.5%
16	I wear gown or apron when exposed to blood, body fluids or any patient excretions.	87	54.4%
17	Waste contaminated with blood, body fluids, secretions and excretion are placed in red plastic bags regardless of patient's infection status.	124	77.5%
18	I decontaminate surfaces and equipment after use.	133	83.1%
19	I wear gloves to decontaminate used equipment with visible soils.	138	86.3%
20	I clean up spillage of blood or other body fluids immediately with disinfectants.	130	81.3%

*Negatively worded statement

4.4 Individual factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.

Compliance was not significantly associated with education level (P value= 0.3), though slightly higher in those with diplomas (38.8%) and certificates (26.5%). Profession showed a significant association (P value= 0.009), with nurses being more compliant (67.3%) compared to doctors (14.3%) and attendants (18.4%). Work experience also mattered (P value= 0.035), with those having less than 5 years of experience being less compliant (51.0%) than those with 5 or more years (49.0%). Blood or body fluid exposure significantly impacted compliance (P value= 0.017), with 91.8% of compliant workers reporting exposure compared to 75.7% of non-compliant ones. Needle stick exposure did not show a significant difference (P value= 0.080).

Table 2: Individual factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.

Variable	N	Complied, N = 49[1]	Not Complied, N = 111[1]	p-value[2]
Education level	160			0.3
Secondary		6 (12.2%)	9 (8.1%)	
Certificate		13 (26.5%)	30 (27.0%)	
Diploma		19 (38.8%)	32 (28.8%)	
Degree		11 (22.4%)	40 (36.0%)	
Profession	160			**0.009**
Doctor		7 (14.3%)	35 (31.5%)	
Nurse		33 (67.3%)	46 (41.4%)	
Attendants		9 (18.4%)	30 (27.0%)	
Work experience (Years)	160			**0.035**
less than 5 years		25 (51.0%)	76 (68.5%)	
5 and above years		24 (49.0%)	35 (31.5%)	
Prior blood or body fluid exposure	160			**0.017**
Yes		45 (91.8%)	84 (75.7%)	
No		4 (8.2%)	27 (24.3%)	
Prior niddle stick exposure	160			0.080
Yes		37 (75.5%)	68 (61.3%)	
No		12 (24.5%)	43 (38.7%)	

4.5 Logistic regression for Individual factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.

Bivariate analysis showed that doctors were significantly less likely to comply compared to nurses (OR 0.28, 95% CI 0.11-0.70, P value=0.005). Bivariate analysis showed that attendants were less likely to comply compared to nurses (OR 0.42, 95% CI 0.18-0.99, P value=0.046). Workers with 5 or more years of experience were also more likely to comply than those with less experience (OR 2.09, 95% CI 1.05-4.15, P value=0.037), though this was not significant in the multivariate analysis (OR 1.65, 95% CI 0.79-3.42, P value=0.18). Exposure to blood or body fluids was associated with more compliance in the bivariate model (OR 3.62, 95% CI 1.19-10.98, P value=0.023), this association was also significant in the multivariate model (OR 3.58, 95% CI 1.04-12.3, P value=0.043). Exposure to needle stick was observed to increase compliance in the bivariate model (OR 1.95, 95% CI 0.92-4.15, P value=0.083). However, this association did not reach the statistical significance.

Table 3: Logistic regression for Individual factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital.

	N=160		**OR (95% CI)**	**p-value**	**AOR (95% CI)**	**p-value**
Characteristic	Complied n=49	Not Complied n=111				
Profession						
Nurse	33 (67.3%)	46 (41.4%)	Ref			
Doctor	7 (14.3%)	35 (31.5%)	0.28 (0.11, 0.70)	0.005	0.5 (0.3, 0.819)	**0.006**
Attendants	9 (18.4%)	30 (27.0%)	0.42 (0.18, 0.99)	0.046	0.45(0.18, 1.12)	0.086
Work years' experience						
< 5 years	25 (51.0%)	76 (68.5%)	Ref			
≥5 years	24 (49.0%)	35 (31.5%)	2.09 (1.05, 4.15)	0.037	1.65 (0.79, 3.42)	0.18
Prior blood/fluid exposure						
No	4 (8.2%)	27 (24.3%)	Ref			
Yes	45 (91.8%)	84 (75.7%)	3.62 (1.19, 10.98)	0.023	3.58 (1.04, 12.3)	**0.043**
Prior needle stick exposure						
No	12 (24.5%)	43 (38.7%)	Ref			
Yes	37 (75.5%)	68 (61.3%)	1.95 (0.92, 4.15)	0.083	0.96 (0.39, 2.32)	0.92

4.6 Health facility factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital

Provision of personal protective equipment (PPE) was significantly associated with compliance (p value = 0.001), with compliant workers receiving PPE more frequently. Infection prevention and control (IPC) training was highly significant (p value < 0.004), with compliant workers having received training more frequently. Supportive supervision did not significantly impact compliance (p value > 0.9).

Table 4: Health facility factors associated with IPC standard precautions compliance among healthcare workers at Mwananyamala regional referral hospital

Variable	N	**Complied**, N = 49[1]	**Not Complied**, N = 111[1]	**p-value**[2]
Provision of PPE	160			**0.001**
Inconsistent		0 (0.0%)	20 (18.0%)	
Consistent		49 (100%)	91 (82.0%)	
IPC training	160			**<0.004**
No		0 (0.0%)	17 (15.3%)	
Yes		49 (100%)	94 (84.7%)	
Supportive supervision	160			> 0.9
No supervision		1 (2.0%)	4 (3.6%)	
Supervision		48 (98.0%)	107 (96.4%)	

4.7 The behavioral factors associated with IPC standard precautions Compliance among healthcare workers at Mwananyamala regional referral hospital.

In behavior assessment a 5-point likert scale (0-strongly disagree to 4-strongly agree) was used in this study, the behavioral factors questions were positively stated. Scoring was done by calculating mean for each item and standard deviation, higher mean score for each item suggests a more positive behavior towards IPC standard precaution.

Table 5: Summary of behavioral scores (N=160)

Variables	Mean score	SD
Risk perception	2.04	1.08
Perception towards IPC standard precautions	2.39	1.09
Perceived effectiveness	2.54	1.05
Perceived importance	3.21	1.15
PPE use	2.81	0.97

In the Bivariate linear regression, the risk perception score (β = 1.4, 95% CI 0.92-1.9, p value < 0.001), perception towards IPC standard precautions score (β = 1.6, 95% CI 1.1-2.1, p value < 0.001), perceived effectiveness score (β = 1.3, 95% CI 0.76-1.8, p value < 0.001), perceived importance score (β = 1.6, 95% CI 1.2-2.1, p value < 0.001), and PPE use score (β = 1.9, 95% CI 1.4-2.4, p value < 0.001) all showed strong positive relationships with compliance.

Table 6: Bivariate linear regression analysis of behavioral factors associated with IPC standard precautions Compliance among healthcare workers at Mwananyamala regional referral hospital.

Variables	Beta	95% CI[1]	p-value
Risk perception Score	1.4	0.92, 1.9	<0.001
Perception towards IPC standard precautions Score	1.6	1.1, 2.1	<0.001
Perceived effectiveness Score	1.3	0.76, 1.8	<0.001
Perceived importance Score	1.6	1.2, 2.1	<0.001
PPE use Score	1.9	1.4, 2.4	<0.001

[1]CI = Confidence Interval

In multivariate linear regression analysis, PPE use was the only statistically significant predictor of compliance (β = 1.2, 95% CI 0.70-1.8, p < 0.001), indicating a strong positive association with higher compliance scores.

Since Odds ratio=e^{β}

Odd ratio= $e^{1.2}$

Odds ratio= 3.3

This means that for each 1 unit increase on the predictor variable the odds of the outcome increase by a factor of about 3.3.

However, risk perception (β = 0.43, 95% CI -0.10-0.96, p = 0.11), perception towards IPC standard precautions (β = 0.43, 95% CI -0.26-1.1, p = 0.2), perceived effectiveness (β = 0.15, 95% CI -0.38-0.68, p = 0.6), and perceived importance (β = 0.62, 95% CI -0.08-1.3, p = 0.083) were not significant predictors, as their confidence intervals included zero and their p-values were greater than 0.05.

Table 7: Multivariate linear regression analysis of behavioral factors associated with IPC standard precautions Compliance among healthcare workers at Mwananyamala regional referral hospital.

Characteristic	**Beta**	**95% CI**[1]	**p-value**
Risk perception	0.43	-0.10, 0.96	0.11
Perception towards IPC standard precautions	0.43	-0.26, 1.1	0.2
Perceived effectiveness	0.15	-0.38, 0.68	0.6
Perceived importance	0.62	-0.08, 1.3	0.083
PPE use	1.2	0.70, 1.8	**<0.001**

[1]CI = Confidence Interval

CHAPTER FIVE

5.0 DISCUSSION

This study aimed to investigate the level of compliance with IPC standard precautions and the associated factors among healthcare workers at Mwananyamala Referral Hospital. Adherence to IPC protocols is crucial for reducing infection risk among both patients and healthcare providers, ensuring the sustainability of a healthy and safe environment in healthcare facilities, and preventing the spread of dangerous infections that can lead to severe complications.

We found that the compliance proportion in our study population was 30.6%, which is higher compared to previous studies that indicated levels below 20% (15). Moreover, our findings show a higher compliance proportion than the 9.1% generally suggested by WHO for most low-income countries. The proportion of compliance highlighted in our study may be attributed to increased awareness and regular training offered to healthcare workers in Tanzania, in line with the IPC standard policy currently being implemented. Despite the observed compliance to IPC standards, a recent study in Tanzania (10) highlighted a significant drop in IPC standard precaution adherence from 54% to 29.6%, marking underperformance with compliancy of the IPC standards. This observation when aligned with ours, we can raise and argument that there is underperformance with regard to IPC standard compliancy in our country and immediate attention is required before the underperformance prevail to lower statuses. Another study (10) which investigated the compliancy to IPC standards in more than six regions in Tanzania reported even lower compliance proportions ranging from 12.7% to 24.6%. Compliance with IPC standards is multifactorial, stemming from resources, human capital training, and management. The observed difference might be contributed by variation in sample sizes and inclusion methods, in which the previous studies, were multicentered and had much larger sample sizes.

We found out that, individually professionally there is a significant association with adherence to the IPC standards set. That is, being a nurse, doctor or attendant will significantly determine your adherence for IPC standards. For that matter, nurses were more likely to comply to IPC standards compared to doctors or attendants. This is quite similar

with results by Haile et al 2017, (15), who highlighted that nurse were more compliant to IPC standards compared to other categories of professions. In that study nurses were also more likely to be compliant compared to doctors and attendant. The same was observed by Alhumaid et al., 2021 (13) who highlighted the willingness and positive perception by nurses compared to other profession categories. Nurses usually have more direct and frequent contact with patients, making them more aware of infection risks and the need to follow safety guidelines. Their education and training often emphasize infection control more than the training for doctors and attendants. Nurses are also more involved in daily patient care tasks that require strict safety measures, like wound care and administering medications. Additionally, nurses may receive more support and supervision in their roles, encouraging them to follow IPC guidelines closely. Lastly, nurses might feel a higher personal risk of infection, motivating them to stick to safety standards to protect themselves and their patients. Work experience was a factor that was also another factor associated with the compliancy to IPC standards. Previous studies (10,17) have highlighted the role of IPC standard compliancy with reference working experience. For instance, Senbato et al., (17) highlighted that workers with more than 5 years of working experience are more likely to adhere to IPC compliancy compared to those with less years of working experience is a vivid factor that healthcare provider with more than 5 years are more likely to be trained well and have experience with IPC standards compared to other with less working experience.

Our study also investigated the facility factors that are associated with compliancy to IPC standards and found out that, provision of PPE and IPC training were significantly associated with the IPC standards complicit. The significant association between the provision of PPE and IPC training with IPC standards compliance can be explained by several key reasons. When healthcare workers have access to enough personal protective equipment (PPE), they are better prepared to protect themselves and their patients from infections, making it easier to follow safety guidelines. Adequate PPE supplies ensure that workers do not have to reuse equipment, which can lead to breaches in infection control practices. Regular IPC training ensures that healthcare workers are well-informed about the latest infection control methods and understand the importance of following these standards. Training sessions provide hands-on experience and reinforce the correct use of PPE and other safety measures, which

boosts overall compliance. Additionally, training can help address any misconceptions or gaps in knowledge, ensuring that all staff are on the same page regarding IPC protocols. Together, these factors create a safer work environment, reduce the risk of infections, and promote a culture of safety and accountability among healthcare workers. This combination of proper equipment and ongoing education is essential for maintaining high compliance with IPC standards. The same was observed in previous studies (13) who highlighted the importance of provision of PPE and regular standard training regarding IPC and how they are directly influence the compliancy. As recommended by WHO, (WHO 2022) that IPC standard training is a pillar for sustainable complicity systems for IPC in health working environment.

For behavior factors we found that, IPC standard compliance was associated with perceived importance, effectiveness, risk scores and perception towards IPC standard scores in bivariate analysis. Healthcare workers with a high-risk perception are more aware of the dangers of healthcare-acquired infections, motivating them to adhere strictly to IPC protocols. A positive perception of IPC measures and their effectiveness increases the likelihood of diligent compliance, as workers believe in their benefits. The same results were reported by Ayele and Kassa (30,31). Their studies highlighted the significant association between perception scores to importance, effectiveness and adherence and IPC standard compliancy. However, PPE use was the only factor that showed strong positive relationships with compliance in multivariate analysis. Access to and regular use of PPE facilitates adherence to IPC guidelines. Together, these factors highlight the importance of continuous education, adequate resources, and institutional support to maintain high compliance levels in healthcare settings.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Our study found out that, only 30.6% of healthcare workers at Mwananyamala Regional hospital involved in this study comply with IPC standard and adhering to the guidelines. Nurses were more compliant compared to doctors and attendants. Compliance was significantly higher among those with more than five years of work experience and those who had exposure to blood or body fluids. Provision of personal protective equipment (PPE) and regular IPC training were crucial factors associated with higher compliance rates. While various behavioral factors showed positive relationships with compliance in bivariate analysis, only PPE use remained a significant predictor in multivariate analysis. This indicates the importance of ensuring adequate PPE and ongoing training to improve IPC compliance among healthcare workers.

6.2 Recommendation

Based on results reported in this study, we recommend that facility administrators should ensure regular IPC training with a focus on enhancing compliance among doctors and attendants. Facility administrators should also prepare mentorship programs by experienced staff so as to boost compliance among new staff.

The MOH should implement regular audits and assessments of personal protective equipment (PPE) availability and usage across hospital. This practice can play a crucial role in maintaining ongoing adherence to IPC guidelines, thereby enhancing infection prevention efforts and promoting a safer healthcare environment for all stakeholders involved.

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APPENDICES

Appendix 1: Informed consent



SCHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES

INFORMED CONSNT FORM

Informed consent form for Health care workers at Mwananyamala Referral Regional Hospital.

Name of the group of individuals for whom this consent form is written …….

[Name of principal investigator] **Neema John**

[Name of organization] Muhimbili University of Health and Allied Sciences

[Name of proposal and version] **Compliance with Standard Precautions and the associated factors for prevention of Health Care Acquired Infections among healthcare workers at Mwananyamala hospital, Tanzania.**

This Informed Consent Form has two parts:

- Information Sheet (to share information about the research with you)
- Certificate of Consent (for signatures if you agree to take part)

You will be given a copy of the full Informed Consent Form

PART I: Information Sheet.

Greetings, I am Neema John, Pursuing Masters in Public Health at Muhimbili University of Health and Allied Sciences. I am working on a research project as a partial fulfillment of my master's degree in Public Health. I'm doing research on: Compliance with Standard Precautions and the associated factors for prevention of Health Care Acquired Infections among healthcare workers at Mwananyamala hospital, Tanzania, from May to June 2024. You are pleaded to answer questions that you will be given concerning Compliance with

Standard Precautions and the associated factors for prevention of Health Care Acquired Infections among healthcare workers. The information that you are going to share with me will be useful in giving suggestions to stake holders and policy makers in improving practice of Exclusive breast feeding among postpartum women.

I assure you that the information that you will decide to share with me will be confidential, only authorized individuals will have access to this information, we will not put your name or any identification tag that may link you to the information.

You are allowed to refuse taking part in this research or withdraw participation any time that you wish to stop taking part in this research.

Contacts: If you have any questions you may ask them now or later, even after the study has started. You may contact any of the following:

Name: Neema John Cell: 0716 699 668 E-mail: neemajohn188@gmail.com

PART II: Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Signature of Participant _____

Date _____

Day/month/year Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands that the following will be done:

1……

2……

3……

I confirm that the participant was given an opportunity to ask questions about the study, and all the questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

A copy of this Informed Consent has been provided to the participant.

Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____

Day/month/year

Appendix 2: Fomu ya makubaliano

Jina la utafiti: KIWANGO CHA KUZINGATIA KANUNI ZA KUZUIA NA KUDHIBITI MAAMBUKIZI NA MAMBO YANAYOCHANGIA UZINGATIAJI WA KANUNI HIZO.

Jina la muhusika:

Jina la mwandishi wa utafiti: Neema John

JINA LA CHUO ATOKACHO: Chuo cha Afya na Sayansi Shirikishi Muhimbili

Fomu hii inasehemu kuu mbili, kama ifuatavyo

- Sehemu ya taarifa kuhusu utafiti
- Fomuyamakubaliano (uhakiki na sahihi yakukubali kushiriki katika utafiti huu)

  Utapewa nakala ya fomu yakukubali kushiriki katika utafiti huu.

SEHEMUYA KWANZA: TAARIFA FUPI KUHUSU UTAFITI HUU

Utangulizi:

Habari! Jina langu naitwa Neema J Marwa, kutoka Chuo Kikuu cha sayansi ya tiba MUHIMBILI, nikichukua shahada yangu ya uzamivu ya afya ya umma. Nipokatika utafiti ambao utatumika katika kuhitimisha masomo yangu ya shahada ya pili. Ninafanya utafiti juu ya kiwango cha kuzingatia kanuni za kuzuia na kudhibiti maambukizi na mambo yanayochangia uzingatiaji wa kanuni hizo kwa wataalamu wa afya katika hospitali ya taifa ya Muhimbili kuanzia mwezi wa tano hadi mwezi wa sita 2024. Taarifa utakayotupatia itasaidia kutoa uelewa na kutoa mapendekezo hasa kwa watunga sera wa nchi pamoja na wadau mbalimbali katika kuimarisha uzingatiaji wa kanuni za kuzuia na kudhibiti maambukizi.

Nakuhakikishia kwamba taarifa zote zitakazo kusanywa kutoka kwako zitakua ni siri, watu wanaofanya kazi katika utafiti huu tu ndio wanaweza kuziona taarifa hizi. Hatutaweka jina lako wala taarifa yoyote ya utambulisho kwenye kumbukumbu ya taarifa utakazotupa.

Mawasiliano

Kama kutakuwa na swali lolote ,sasa na baada ya utafiti huu unaweza uliza au kutoa maoni yako kupitia:

Jina: Neema John

phoneno.**0716 699 688** **E-ma**il: neemajohn188@gmail.com

SEHEMU YA PILI: FOMU YA MAKUBALIANO

Nimesoma maelekezo ya awali ,nimeelewa, nmepewa nafasi ya kuulliza maswali nimejibiwa. Nimekubali kushiriki na kutoa ushirikiano wangu katika utafiti huu.

Jina la mshiriki:----------

Sahihi ya mshiriki:----------

Tarehe----------

Sahihi ya mtafiti:

Tarehe…….

Appendix 3: Questionnaire

TITLE: Compliance with Standard Precautions and the associated factors for prevention of Health Care Acquired Infections among healthcare workers at Mwananyamala hospital, Tanzania.

INSTRUCTIONS:

i. Encircle the correct answer
ii. Write your answer on indicated space.

PART ONE: SOCIO-DEMOGRAPHIC DATA

1. Age (in years)……..
2. Marital status
    1. Married
    2. Single
3. Sex
    1. Male
    2. Female
4. Level of education
    1. Secondary
    2. Certificate
    3. Diploma
    4. Degree
5. Profession
    1. Doctor
    2. Nurse
    3. Health attendant

PART TWO: COMPLIANCE WITH IPC STANDARD PRECAUTION

Compliance with Standard Precautions Scale (CSPS)

		Never	**Seldom**	**Sometimes**	**Always**
1	I wash my hands between patient contacts.				
2	I only use water for hand washing.				
3	I use alcoholic hand rubs as an alternative if my hands are not visibly soiled.				
4	I recap used needles after giving an injection.				
5	I put used sharp articles into sharp bo7xes.				
6	The sharps box is disposed only when its full.				
7	I remove personal protective equipment (PPE) in a designated area.				
8	I take a shower in case of an extensive splashing even after I have put on personal protective equipment (PPE).				
9	I cover my wound(s) or lesion(s) with water proof dressing before patient contact.				
10	I wear gloves when am exposed to body fluids, blood products and any excretions of patients.				
11	I change gloves between patient contacts.				

12	I decontaminate my hands immediately after removal of gloves.				
13	I wear surgical mask alone or in combination with goggles, face shield and apron whenever there is a possibility of a splash or splatter.				
14	My mouth and nose are covered when I wear a mask.				
15	I reuse a surgical mask or disposable personal protective equipment (PPE)				
16	I wear gown or apron when exposed to blood, body fluids or any patient excretions.				
17	Waste contaminated with blood, body fluids, secretions and excretion are placed in red plastic bags regardless of patient's infection status.				
18	I decontaminate surfaces and equipment after use.				
19	I wear gloves to decontaminate used equipment with visible soils.				
20	I clean up spillage of blood or other body fluids immediately with disinfectants.				

PART THREE: DETERMINING FACTORS ASSOCIATED WITH COMPLIANCE WITH IPC STANDARD PRECAUTIONS

INDIVIDUAL FACTORS

6. Work years' experience
    1. < 5 years
    2. >5years
7. Have you ever had a needle stick injury? or splash exposure?
    1. Yes
    2. No
8. Have you ever had blood splash exposure?
    1. Yes
    2. No

HEALTH FACILITY FACTORS

9. Have you received IPC training in the past year?
    1. Yes
    2. No
10. Do you have access to clean running water, sanitation and hygiene (WASH) at work?
    1. Yes
    2. No
11. Do you have access to a proper functioning toilet at work?
    1. Yes
    2. NO
12. Does your workplace provide Personal Protective Equipment (PPE) regularly?
    1. consistently
    2. inconsistently
13. Do you get supportive supervision in your workplace regarding IPC practices?
    1. Yes
    2. No

BEHAVIORAL FACTORS

How strongly do you agree or not agree with the following statements?

14. There is a high risk of healthcare workers contracting infectious diseases in healthcare facility due to the nature of work
    1. Strongly disagree
    2. disagree
    3. neutral
    4. agree
    5. strongly agree
15. IPC standard precautions are effective in preventing the spread of infections in healthcare settings
    1. Strongly disagree
    2. disagree
    3. neutral
    4. agree
    5. strongly agree
16. How strongly do you agree to the statement: "Adhering to IPC standard Precautions is essential to patient's safety"
    1. Strongly disagree
    2. disagree
    3. Neutral
    4. agree
    5. strongly agree
17. Following IPC standard precautions is extremely important to protect healthcare workers and patients**.**
    1. Strongly disagree
    2. disagree
    3. neutral
    4. agree
    5. strongly agree

18. Daily effective use of PPE is crucial in prevention of Healthcare Acquired Infection
    1. strongly
    2. disagree
    3. Neutral
    4. agree
    5. Strongly agree

Appendix 4: Dodoso

JINA LA UTAFITI: KIWANGO CHA KUZINGATIA KANUNI ZA KUZUIA NA KUDHIBITI MAAMBUKIZI NA SABABU ZINAZOCHANGIA UZINGATIAJI WA KANUNI HIZO.

MAELEKEZO

i. Zungushia duara jibu sahihi.

ii. Andika jibu lako kwenye nafasi iliyotolewa.

SEHEMU YA KWANZA: TAARIFA ZA KIJAMII NA KIDEMOGRAFIA

1. Umri (miaka)……
2. Hali ya ndoa
    1. Nimeoa/Nimeolewa
    2. Siko katika Ndoa
3. Jinsia
    1. Kiume
    2. Kike
4. Kiwango cha Elimu
    1. Elimu ya sekondari
    2. Stashahada
    3. Shahada
    4. Shahada ya za juu
5. Kada
    1. Daktari
    2. Muuguzi
    3. Mhudumu wa Afya

SEHEMU YA PILI: KIWANGO CHA KUZINGATIA KANUNI ZA KUZUIA NA KUDHIBITI MAAMBUKIZI

Kipimo cha kuzingatia kanuni za kuzuia na kudhibiti maambukizi

		Kamwe	**Mara chache sana**	**Mara chache**	**Mara zote**
1	Ninaosha mikono yangu kati ya kuwasiliana na wagonjwa				
2	Ninatumia maji tu kuosha mikono yangu.				
3	Ninatumia vitakasa mikono kusafisha mikono kama mbadala ikiwa mikono yangu haionekani kuwa imechafuka.				
4	Ninafunga tena sindano zilizotumika baada ya kutoa dawa kwa sindano.				
5	Natia vitu vyenye ncha kali vilivyotumika kwenye masanduku ya ncha kali.				
6	Sanduku la ncha kali hutupwa tu wakati limejaa.				
7	Ninavua vifaa vya kinga vya kibinafsi (PPE) mahali maalum.				
8	Ninajisafisha baada ya kumwagikiwa na maji ya mwilini kwa mgonjwa hata baada ya kuvaa vifaa kinga vya kibinafsi (PPE)..				
9	Ninavifunika vidonda vyangu au majeraha na kifuniko kisichopitisha maji kabla ya kuhudumia mgonjwa.				

10	Ninavaa glovu ninapokutana na majimaji ya mwili, bidhaa za damu na kinyesi cha wagonjwa.				
11	Ninabadilisha glovu kati ya kuwasiliana na mgonjwa mmoja na mwengine				
12	Ninasafisha mikono yangu mara moja baada ya kuondoa glovu.				
13	Ninavaa barakoa ya upasuaji pekee au pamoja na miwani, kivuli cha uso, na aproni wakati kuna uwezekano wa kunyunyizia au kuvujisha damu.				
14	Kinywa na pua yangu vinafunikwa ninapovaa barakoa.				
15	Ninatumia tena barakoa ya upasuaji au vifaa kinga vya kibinafsi (PPE) vinavyotumika mara moja.				
16	Ninavaa gauni au aproni ninapokutana na damu, majimaji ya mwili, au kinyesi cha mgonjwa.				
17	Taka zilizochafuliwa na damu, majimaji ya mwili, ute wa siri, na kinyesi hutolewa kwenye mifuko myekundu ya plastiki bila kujali hali ya maambukizi ya mgonjwa.				
18	Ninasafisha vifaa baada ya matumizi				
19	Ninavaa glovu kusafisha vifaa vilivyotumika na uchafu unaonekana.				
20	Ninasafisha mara moja! mabaki ya damu au majimaji mengine ya mwili na dawa za kuua viini.				

SEHEMU YA TATU: KUBAINI SABABU ZINAZOHUSIANA NA KUZINGATIA KANUNI ZA KUZUIA NA KUDHIBITI MAAMBUKIZI

SABABU BINAFSI

1. Uzoefu wa Miaka Kazini

    1. < Miaka 5
    2. Miaka 5

2. Je, umewahi kupata jeraha la sindano iliyotumika kwa mgonjwa? au kujichafua na majimaji yaliyotoka kwenye mwili wa mgonjwa?
    1. Ndio
    2. Hapana

    Ikiwa ndio mara ngapi_____

3. Je, umewahi kujichafua na damu?

    1. Ndio
    2. Hapana

SABABU ZA TAASISI YA AFYA

4. Ni mara ngapi umepata mafunzo ya IPC katika mwaka uliopita?
    1. Hakuna
    2. Mara moja
    3. Mara mbili na zaidi
5. Je, unaonaje ubora wa mafunzo ya IPC yaliyotolewa na taasisi yako?
    1. Nzuri sana
    2. Nzuri
    3. kawaida
    4. Duni
6. Je, kuna urahisi wa upatikanaji wa maji, usafi, na miundombinu ya usafi wa mikono (WASH) mahali pako pa kazi?
    1. Ndiyo

2. Hapana
3. Sijui

7. Je, ni rahisi kupata maji safi yanayotiririka kazini?
    1. Ndiyo
    2. Hapana
8. Je, kuna upatikanaji wa choo kinachofanya kazi vizuri kazini?
    1. Ndiyo
    2. Hapana
9. Je, mahali pako pa kazi hutoa Vifaa kinga binafsi (PPE) mara kwa mara?
    1. Mara zote
    2. Mara kwa Mara
    3. Mara chache sana
    4. Kamwe
10. Je ni mara ngapi unapata usimamizi wa karibu wa kusaidia kazini mwako kuhusiana na matumizi ya IPC?
    1. kamwe
    2. kila mwaka
    3. mara nne kwa mwaka
11. Unawahudumia wagonjwa wangapi kwa siku?
    1. 1-3
    2. 3-5
    3. 5 na zaidi

SABABU ZA KITABIA

12. Kuna hatari kubwa ya wafanyakazi wa afya kuambukizwa magonjwa ya kuambukiza katika vituo vya afya kutokana na asili ya kazi.
    1. Sikubaliani nayo kabisa
    2. Sikubaliani nayo
    3. Wastani

4. Nakubali
5. Nakubali kabisa

13. kuzingatia kanuni za kuzuia na kudhibiti maambukizi (IPC) ni hatua madhubuti katika kuzuia kuenea kwa maambukizo katika mazingira ya afya.
    1. Sikubali Kabisa
    2. Sikubali
    3. Wastani
    4. Nakubali
    5. Nakubali kabisa
14. Unaunga mkono kwa nguvu kauli: "Kuzingatia Hatua za Kuzuia IPC ni muhimu kwa usalama wa mgonjwa"?
    1. Sikubali kabisa
    2. sikubali
    3. Wastani
    4. Nakubali
    5. Nakubali kabisa
15. Kanuni za kuzuia na kudhibiti maambukizi zina ufanisi wa kutosha katika kuzuia kuenea kwa maambukizi katika mazingira ya huduma za afya.
    1. Sikubali kabisa
    2. sikubali
    3. Kawaida
    4. nakubali
    5. nakubali kabisa
16. Matumizi ya kila siku ya PPE yenye ufanisi ni muhimu katika kuzuia Maambukizo yanayopatikana katika Utunzaji wa Afya
    1. Sikubali kabisa
    2. Sikubali
    3. Wastani
    4. Nakubali
    5. Nakubali kabisa

Appendix 5: Approval for ethical clearance

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATIONS

Ref. No.DA.282/298/01.C/2289 Date: 31/05/2024

MUHAS-REC-05-2024-2289
NEEMA JOHN
SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: COMPLIANCE WITH STANDARD PRECAUTIONS AND THE ASSOCIATED FACTORS FOR PREVENTION OF HEALTH CARE ACQUIRED INFECTIONS AMONG HEALTHCARE WORKERS AT MWANANYAMALA HOSPITAL, TANZANIA.

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 31/05/2024
EXPIRATION DATE OF APPROVAL: 31/05/2025

STUDY DESCRIPTION:
Purpose:
The purpose of this hospital-based cross-sectional analytical study is to determine the level of Compliance with IPC Standard precautions and associated factors among healthcare workers at Mwananyamala regional referral hospital.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided: https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2015686.pdf and in the MUHAS archives.

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain Data Transfer Agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain Material Transfer Agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Apply for and obtain permission to publish the results from National Institute for Medical Research. The application should be before submitting to a publisher and not concurrently through the email publications@nimr.or.tz.
9. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

Dr. Nahya Salim Masoud,
Chairperson, MUHAS Research and Ethics Committee

Appendix 6: Introduction Letter

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

In reply quote;
Ref. No. HD/MUH/T.757/2022 03rd June, 2024

The Executive Director,
Mwananyamala Regional Referral Hospital,
P.O. Box 61665,
DAR ES SALAAM

Re: INTRODUCTION LETTER NEEMA JOHN

We would like to inform you that the bearer of this letter is **Neema John** with Reg. No. **HD/MUH/T.757/2022** is a student at Muhimbili University of Health and Allied Sciences (MUHAS) "pursuing **MPH-Executive Track.**

As part of her studies, she will be doing an elective research titled: "**Compliance with Standard Precautios and the Associated Factors for Preention of Health Care Acquired Infections Among healcare Workers at Mwananyamala Hospital, Tanzania.**"

The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES

c.c **Neema John**

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015; Direct Line:+255-22-2151378;Telefax:+255-22-2150465;E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix 7: Permission Letter

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH

Telephone Address:

Telephone: 022-2760500

Mwananyamala Regional
Referral Hospital,
P.O.Box 61665
Dar es Salaam.

RE: NO.: MA. 239/240/01/106

DATE: 07TH June,2024

Director,
Muhimbili University of Health and,
Allied Sciences,
Clinical Medicine,
P.O.BOX 65001,
DAR ES SALAAM.

RE: NEEMA JOHN- TO CONDUCTI HIS RESEARCH IN MWANANYAMALA REGIONAL REFERRAL HOSPITAL

The captioned subject refers

2. May you be informed that your request to research Titled "***Compliance with Standard Precautions and the Associated Factors for Prevention of Health Care Acquired Infections Among healthcare workers at Mwananyamala Hospital In Tanzania" Start*** **from 7TH June to 30th June, 2024**, is asserted.

3. The Institution charges **100,000/=**, as Research fee as per student spent. The payments a to be made upon reporting.

4. May she report to the Administration and HR department head for further instruction.

Thanks.

For: MEDICAL OFFICER INCHARGE
Mwananyamala Regional Referral Hospital
P. O. Box 61665
DAR-ES-SALAAM

Atugonza Kyaruzi
RESEARCH COORDINATOR
FOR: MEDICAL OFFICER INCHARGE
MWANANYAMALA REGIONAL REFERRAL HOSPITAL

COPY:
Head of Internal Medicine Department - **Mwananyamala Regional Referral Hospital**
Neema John -Report to the head of Internal Medicine Department