

KIBOGORA POLYTECHNIC

FACULTY OF HEALTH SCIENCE

DEPARTMENT OF BIOMEDICAL LABORATORY SCIENCES

PREVALENCE AND RISK FACTOR ASSOCIATED WITH NOSOCOMIAL INFECTION AMONG PEDIATRIC PATIENTS ATTENDING KIBOGORA LEVEL TWO TEACHING HOSPITAL

Case study: KIBOGORA LEVEL TWO TEACHING HOSPITAL

Period: 2022-2023

Undergraduate research thesis presented in partial fulfilment of the requirement for bachelor's degree in biomedical laboratory sciences with honours at kibogora polytechnic

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Kibogora august, 2023

DECLARATION

Declaration by the candidates

We, TUYAMBAZE Anitha and HAKIZIMANA celestina we hereby declare that this is our own original work and not a duplication of any similar academic work. It has therefore not been submitted to any other institution of higher learning. All materials cited in this paper which are not our own have been duly acknowledged.

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Declaration by the Supervisor

I declare that this work has been submitted for examination with my approval as KP supervisor

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ABSTRACT

This study was conducted to assess prevalence, types and risk factor on nosocomial infection among pediatric patients at kibogora level two teaching hospital. The study was guided with three objectives, firstly was to determine the prevalence of nosocomial infection among pediatric patients, To identify types of nosocomial infection that are prevalent among pediatric patients ,To determine the risk factors associated with the occurrence of nosocomial infection among pediatric patients. The study was based on quantitative approaches to collect data 368cases from the target population of using Fisher formula for sample size calculation. Data were collected using the data collection formant analysed using SPSS-20. Retrospective design were used where we look on relationship among variables and look on recorded information for patient. Questionnaire were used based on variables where dependent variable or disease caused by risk factor were nosocomial infection, risk factor or independent variables were poor hygiene, contaminated materials, level of knowledge, workers and visitors and intermediate or mediation variable were immunocompromized patients, hospitalized and chronic diseases. there is different ways we can use to prevent those infection firstly Steps involved in hand washing includes Wash hands with water, Take soap in hand, Rub hands palm to palm, Rub back of each hand with palm of other hand with finger interplaced, Rub palm to palm interplaced, Rub with back of finger to opposing palms with fingers interlocked, Rub each thumb clapsed in opposite hand using a rotational movement, Rub tip of the finger in opposite palm in circular motion, Rinse hand with water, Use proper towel to dry hands, Close the tap water with paper towel and Your hands are clean now. Secondly isolation method private room must be used, Keep equipment away from patients to avoid any contamination and Hospital personnel hygiene like wearing mask, gloves, gowns and other materials needed thirdly Sterilization of medical equipment

Medical or surgical instruments comes in contact with patients during operation or treatments, must be well sterilized or autoclaved in order to avoid diseases transmission in general result finding shows low level for preventing risk factor associated nosocomial infection where 55% does not wash hands before and after using toilet, 59.8% does not wash hands before and after touching on patients, 60.19% does not change gloves for each patients, 73.3% doesn't follow steps of hand hygiene, 13.8% shows positive for HIV or other chronic diseases, 5.4% shows patients with organ transplantation and 30.9% take multidrug. As conclusion; as we know nosocomial infection are those infection occur while patient receive treatment. In other words are infection or disease doesn't present at time of admission. In our study we have seen that those infection doesn't attack patients only also HCP, cleaners every one live or work in hospital without her/his care and protection can acquire it. we have to be a were for those risk factor which leads to nosocomial infection in order to prevent it . HCP, patient and cleaner must be aware for risk factor which can lead to nosocomial infection.

DEDICATION

This thesis is dedicated;

To Almighty God

Our beloved parents

Our sisters and brothers

Our friends

Anitha & Celestina

ACKNOWLEDGEMENTS

We are almost thankful to our almighty God for blessing us all days of our life, especially during our studies. It would be nothing without God's will.

We are also thankful to numerous individuals and institutions if they were not presenting our research would not be possible. We have obliged to extend our appreciation to the people and institutions below for their contribution to our educational career in general and this research in particular.

We take this opportunity to express our high gratitude to our supervisor for his efforts and limitless advice during this project, Mr. HITAYEZU Elysee it was great to work under his supervision.

We would like to thank also the faculty of Health sciences, biomedical laboratory sciences department at Kibogora Polytechnic, especially the lecturers and staff, for their close guidance, knowledge, and technical advice throughout our studies.

Special thanks to our parents, brothers and sisters for their encouragement during our studies and for providing all the requirements and supports.

Finally, our thanks go to our colleagues, classmates, friends, and our roommates whose moral and support was vital to the success of our studies at Kibogora Polytechnic.

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LISTE OF ABBELIVIATION AND ACCRONYMS

NIS: nosocomial infections

HAI: healthcare association infection

CLABSI: Central line-associated bloodstream infections

CAUTI: Catheter-associated urinary tract infections

SSI: Surgical site infections

VAP: Ventilator-associated pneumonia

UTI: urinary tract infection

LRI: lower respiratory infection

BSI: blood stream infection.

HCP: health care provider

WHO: world health organization.

CHAPTER ONE: GENERAL INTRODUCTION

1.0 INTRODUCTION

This first chapter describes the background of the study, problem statement, purpose of the study, objective of the study, research question, significance of the study, limitation of the study and scope of the study about prevalence of nosocomial infection among pediatric patients.

1.1 BACKGROUND OF THE STUDY

Global prevalence of nosocomial infection According to a report of the World Health Organization (WHO) on 55 hospitals in 14 countries, 8.7% of global hospitalized patients had HAIs, which were more prevalent in the Eastern Mediterranean Region and less prevalent in the West of the Pacific. The top five continents with high number of nosocomial infection were the prevalence rate of these infections was reported to be 5% in the North of America and some parts of Europe, and was about 40% in some Asian, Latin American and African countries. According to the findings of a study conducted in Europe, the prevalence of HAIs was nearly 2.9%. Risk factors which associate with those nosocomial infections include medical interventions, poor health standards of the hospital environment, and poor personal hygiene of hospital staff and patients' poor practice of personal hygiene among hospital staff and patients can cause HAIs (Samira Raofi, 2023)

Prevalence of nosocomial infection in Africa, in Germany 3.6%, France 4.4%, Slovenia 4.6%, Norway 5.1%, Italy 6.7%, Belgium 6.9%, Netherlands 7.2%, Greece 7.9%, Spain 8.1%, Switzerland 8.8%, United Kingdom 9%, Finland 9.1%, Canada 11.6% and New Zealand 12%. Mongolia 5.4%, Latvia 5.7%, Thailand 6.5%, Lebanon 6.8%, Indonesia 7.1%, Cuba 7.3%, Islamic Republic of Iran 8.8%, Lithuania 9.2%, Tunisia 9.4% Turkey 12.5%, Brazil 14%, Malaysia 14% Algeria 16.2%, Serbia 17.4%, Morocco 17.8%, Tunisia 17.9% and Albania 19.1%. Also in Nigeria and Ethiopia, they show that the total occurrence in surgical wards is varying between 5.7%-45.8%. The study conducted by British microbiology research journal (Mbim1, 2016)

In Rwanda prevalence of nosocomial infection according to survey conducted by Butare university teaching hospital (CHUB), the study was based on UTI, BSI and LRI. Four hundred seventy-six

children were admitted in pediatric department of butare university teaching hospital, among these patients, 12.10% had hospital acquired infection during their stay in hospital. The prevalence of HAI per months from June to November were June 13.4%, July 20%, August 6.17%, September 8.41%, October 11.11%, and November 15.78%. The percentage based on types of infection are 46.55 were low respiratory infection, 36.2 were blood stream infection and 17.24 were urinary tract infection. The most common bacteria cause those infection is Pneumonia followed by E. coli and S. aureus. (Bayingana, 2019). Baseline measurements conducted at kibogora level two teaching hospital showed the overall hand hygiene compliance of 26% (Ngarukiye, 2017). There were no study talks about prevalence of nosocomial infection at kibogora level two teaching hospital.

1.2 PROBLEM STATEMENT

Nosocomial infections are one of the significant causes of mortality and morbidity in hospitals. In immunocompromised patients, patients with multiple organ failure, burn victims, the mortality rate is high. Medical devices are associated with the spread of nosocomial infections. (Mahavir.J, 2019).

According to estimate reported of WHO, approximately 15% of all hospitalized patients suffer from these infections. These infections are responsible for 4%–56% of all death causes in neonates, with incidence rate of 75% in South-East Asia and Sub-Saharan Africa. The incidence is high enough in high income countries between 3.5% and 12% whereas it varies between 5.7% and 19.1% in middle- and low-income countries. (hassan, 2017) Study conducted at CHUK for assessing hand hygiene compliance shows that over all compliance found are 42.94% for 2 months (donatien, 2021) there was low level of hygiene compliance in pediatric patients at kibogora level two teaching hospital. Baseline measurements conducted at kibogora level two teaching hospital showed the overall hand hygiene compliance of 26%. (Ngarukiye, 2017)

Several point-prevalence studies conducted in healthcare facilities across Africa have been published. The primary objective of this study is to estimate the pooled point-prevalence and types of HAIs among hospitalized patients in Africa. The secondary objectives are to evaluate the risk factors associated with HAIs and to describe the microorganisms isolated from patients with HAIs in African studies. There was low level of evaluating risk factors and types of HAIs at Kibogora level two teaching hospital. (Usman Abubakar, 2022)

1.3 PURPOSE OF THE STUDY

Aims of this study is to assess prevalence, risk factor and types on nosocomial infection among pediatric patients since 2022-2023 at kibogora level two teaching hospital.

1.3.1 General objective

To assess prevalence, risk factor and types of nosocomial infection among pediatric patient since 2022-2023 at kibogora level two teaching hospital

1.3.2 Specific objective

1. To determine the prevalence of nosocomial infection among pediatric patients at kibogora level two teaching hospital.
2. To determine the risk factors associated with the occurrence of nosocomial infection among pediatric patients at kibogora level two teaching hospital.
3. To identify types of nosocomial infection that are prevalent among pediatric patients at kibogora level two teaching hospital

1.4 RESEARCH QUESTION

1. What is prevalence of nosocomial infection among pediatric patients at kibogora level two teaching hospital?
2. What is risk factors associated with the occurrence of nosocomial infection among pediatric patients at kibogora level two teaching hospital?
3. What is types of nosocomial infection that are prevalent among pediatric patients at kibogora level two teaching hospital?

1.5 SIGNIFICANCE OF THE STUDY

This study were important to;

1.5.1 To the researchers

This study were provide knowledge to the researcher on the prevalence, types and risk factors of nosocomial infection on patients attended this hospital.

1.5.2 To kibogora level two teaching hospital

Administration of kibogora level two teaching hospital and workers were able to set rules and regulation to follow in order for enabling them to provide effective healthcare services to those patients. Not only that, also patients were benefits from this research where there is an

improvement of care, treatment to the patient. Also rules and regulation were set to the patients for preventing prevalence of that infection.

1.5.3 To nyamasheke district

According to the information about the prevalence of nosocomial infection among pediatric patients attended this hospital, it gave a shape of this infection in whole district, and then it was easy for them to take mitigations of eradicating and controlling the spread of these infections in their citizens

1.6 SCOPE OF THE STUDY

1.6.1. Geographical scope

The study were conducted in NYAMASHEKE district, kanjongo sector located in western province. The sample was taken at kibogora level two teaching hospital.

1.6.2. Content scope

This study were describing the current views on the prevalence of nosocomial infection among pediatric patients in NYAMASHEKE district.

1.6.3. Time scope

The research was done in the period of 5 months, from April up to august, 2023.

1.7 LIMITATION OF THE STUDY

During conducting our research it was complicated to collect data or information from the patients (consent) due to fearing for their security and lack of knowledge about research, hence we have been limited to gather information.

CHAPTER TWO: LITERATURE REVIEW

2.0. INTRODUCTION

This chapter deal with the analysis of existing literature on prevalence and risk factor associated nosocomial infection among pediatric patients.

2.1. DEFINITION KEY CONCEPT

2.1.1 Nosocomial infection

Nosocomial infections are those that manifest in a patient when they are being treated at a hospital or another sort of clinical facility and weren't present when they were first admitted. Include the infections that a medical professional picked up while working in a hospital or healthcare centre.(w.berekete, 2012)

2.1.2 Infection

Infection is transmitted to the susceptible patient in a variety of ways. Infections can be spread by healthcare workers in addition to contaminated tools, bed sheets, and airborne particles. The outside environment, another infected patient, potentially contaminated staff members, or in some circumstances, the source of the infection cannot be identified (Kiss, 2017)

2.1.3 Healthcare associated infection (HAIs):

Appear in a patient under medical care in the hospital or other health care facility which was absent at the time of admission. (hassan, 2017)

2.2.4. Prevalence

Prevalence refers to the total number of individuals in a population who have a disease or health condition at a specific period of time, usually expressed as a percentage of the population. (international government agencies, 2020)

2.2. Prevalence of nosocomial infection among pediatric patient

Nosocomial infections (NI) are a major complication of hospital care in adults and children. These infections can be caused by bacteria, fungi, and viruses and can occur in the bloodstream, urinary, respiratory, digestive tracts and soft tissues. The recent medical developments, including the increased use of broad spectrum antibiotics, urinary and central venous catheterizations as well as endotracheal incubations put patients at an increased risk of contracting NI undergo longer hospital stays and treatment costs in Iran nosocomial infection found are 3.34 per 100 patients where RTI are 36%, GIT are 32%. (b.pourakbari, 2012)

In the United State, approximately 2 million HAIs are reported annually with about 90,000 deaths. In Asia, HAIs prolonged hospital stay by 5–21 days and HAIs are associated with mortality

ranging from 7% to 46%. In Africa, a higher rate of mortality among inpatients who suffer HAIs has been reported (22.0%). HAI is higher in low and middle-income countries compared to developed countries. Surgical site infections were the most common HAIs in Africa and accounted for 41.6% of all HAI, followed by bloodstream infection which represented 17.07% and respiratory tract infections/pneumonia with 17.04%. (Usman Abubakar, 2022)

In Rwanda the few study on point-prevalence of HAI were only done in teaching hospitals. From 40 district hospitals were 0.8%; 0.4% and 0.2% for 2010, 2011 and 2013 respectively. (Twizerimana Jean Pierre¹, 2021).only CHUB provide information about prevalence of nosocomial infection among pediatric patient where we found it vary 12.1% of HAIs in pediatric patients. (Bayingana, 2019)

2.3. Risk factor that influence nosocomial infection among pediatric patients

Patient susceptibility: factors that influence the acquisition of infection include age, immune system, underlying disease, and diagnostic and treatment procedures. Patients with chronic diseases such as malignancies, leukemia, diabetes, renal failure, or acquired immunodeficiency syndrome (AIDS) are more susceptible to infections caused by opportunistic pathogens.

Immunosuppressive drugs or radiation can weaken the resistance to infections. Damage to the skin or mucous membranes overcomes the natural defense mechanisms. Malnutrition and immunodeficiency are also a risk. Therapeutic procedures such as biopsies, endoscopic examinations, catheterization, incubation/ventilation and sectioning, and surgical procedures. (g.ducel, 2002). gender, the reason for the admission, the severity of underlying illnesses and organ dysfunction at the time of the admission as determined by the Acute Physiology and Chronic Health Evaluation (APACHE) II, the presence of ischemic heart disease, chronic obstructive pulmonary disease, diabetes mellitus, chronic renal or hepatic failure, intoxication, foreign bodies and prostheses, underlying malignancy, generalized body trauma, recent use of immunosuppressive therapy. (Burcin Ozer, 2011)

Microbial agent and bacteria resistance: Hospital infections can be caused by a wide variety of microbes, and any bacterium has the potential or ability to infect hospitalized individuals. Bacterial agents are responsible for 90% of NIs, while mycobacterial, viral, fungal, or protozoa agents are less frequently involved (w.berekete, 2012). During hospital treatment, the patient comes into contact with various microorganisms. Many different bacteria, viruses, fungi and parasites can

cause hospital-acquired infections. Infections can be caused by a microorganism acquired by another person in the hospital (cross-infection) or by the patient's own flora. Can be acquired from an inanimate object, most nosocomial infections are caused by external pathogens (foodborne and airborne diseases, gas necrosis, tetanus). (g.ducel, 2002) Many patients receive antimicrobial drugs. By selecting and replacing genetic resistance elements, antibiotics promote the development of multidrug-resistant bacterial strains; microorganisms of normal human flora that are sensitive to this drug. (g.ducel, 2002)

Environmental factor: Hospitalized patients with infectious or pathogenic microorganisms are potential sources of infection for patients and staff. Hospital-infected patients are an additional source of infection (donatien, 2021). Overcrowded hospital conditions, frequent transfer of patients from one to another, and concentration of patients highly susceptible to infection in one area (eg, neonatal, burn and intensive care) contribute to the development of hospital-acquired infections. (g.ducel, 2002) The microbial pathogens that cause HAI have two special properties: first, they are recognized as hospital pathogens; second, they have an innate ability to survive on surfaces in the hospital environment for long periods of time. (Dancer, 2009)

Unawareness

Use of the wrong injection technique, poor knowledge of infection control measures, inappropriate use of invasive devices (catheters) and lack of control policies in low-income countries, these risk factors are related to poverty, lack of financial support, lack of health workers. And inadequate equipment (hassan, 2017) Hospital patients are at an unusually high risk of infection. Common predisposing factors that predispose patients to hospital-acquired infections include concurrent infections, prostheses, surgery, immunosuppressive agents, administration of broad-spectrum antibiotics, and the development of multidrug-resistant pathogens. Other risk factors include the age of the patient, length of hospital stay, underlying diseases such as diabetes, tumors or overcrowding in hospital wards, high-risk medical procedures such as surgical operations and the use of invasive devices. Invasive of device like mechanical ventilation catheter, central venous catheter, urinary tract catheter, nasogastric tube. Neurological failure, respiratory failure can lead to nosocomial infection. (emmanuelle girou, 1997)

2.4 Types of nosocomial infection among pediatric patients

The most frequent types of infections include central line associated bloodstream infections, catheter-associated urinary tract infections, surgical site infections and ventilator-associated pneumonia., (hassan, 2017)

2.4.1 Central line-associated bloodstream infections (CLABSI)

CLABSIs is the infection occurs when the bacteria (bacteria or viruses) enter the blood through the central line. There are the dead hospital infections with an incidence of 12-25% of deaths. The catheters are placed on the midline of fluid and drugs, but long-term use can cause severe circulatory infections, which result in health and medical costs. . (hassan, 2017)

2.4.2 Catheter associated urinary tract infections (CAUTI)

CAUTI is infection occurs when bacteria get in the way during catheter placement. The most common type of nosocomial infection worldwide. In 2011, urinary tract infections accounted for more than 12 percent of reported infections, according to acute care hospital statistics. CAUTIs are caused by the endogenous native microflora of patients. Indwelling catheters act as a channel of entry for bacteria, while if the catheter is not completely removed, some urine remains in the bladder, ensuring the stability of the bacteria. CAUTI can progress to complications such as orchitis, epididymitis and prostatitis in men, and pyelonephritis, cystitis and meningitis in all patients (hassan, 2017)

2.4.3 Surgical site infections (SSI)

SSIs are infections occur after surgery, where the surgery is performed. Nosocomial infections are reduced by 2-5 percent in patients who have undergone surgery. They are the second most common type of hospital-acquired infection, mostly caused by *Staphylococcus aureus*, leading to prolonged hospital stay and death. Pathogens that cause SSI arise from the patient's endogenous microflora. The frequency of occurrence can be up to 20, depending on the procedures and control criteria used. (hassan, 2017)

2.4.4 Ventilator associated pneumonia (VAP)

VAP is lungs infection develops when person are on ventilator. Nosocomial pneumonia found in 9–27% of patients on mechanically assisted ventilator. It usually occurs within 48 h after tracheal incubation. 86% of nosocomial pneumonia is associated with ventilation. Fever, leucopenia, and bronchial sounds are common symptoms of VAP. (hassan, 2017)

2.5. Nosocomial infection pathogens

Most Pathogens which are responsible for nosocomial infections are bacteria, viruses and fungal parasites. These microorganisms vary depending upon different patient populations, medical facilities and even difference in the environment in which the care is given. (hassan, 2017)

2.5.1 Bacteria

Bacteria are the most common pathogens responsible for HAIs. Some are natural or normal flora and can cause infection only when the immune system of the patient is compromised. (hassan, 2017)

2.5.2 Viruses

Viruses are also an important cause of HAIs. It was reported that 5% of all HAIs are because of viruses. They can be transmitted through hand-mouth, respiratory route and faecal-oral route. (hassan, 2017)

2.5.3 Fungal parasites

Fungal parasites are opportunistic pathogens that cause HAIs in immune-compromised patients. *Aspergillus* spp. can cause infections through environmental contamination. *Candida albicans*, *Cryptococcus neoformans* are responsible for infection during hospital stay. (hassan, 2017)

2.6. Transmission mode of Healthcare-associated Infections

Mode of transfer of hospital-acquired infection can be either by direct or by indirect contact. Vectors involve the organisms that act as a carrier for the spread of disease by dispersion of causative pathogens. Cockroaches, ants, and flies come in direct contact with faces of the patient, and contaminated objects can cause disease by cross-contamination of other objects which can lead to infection. (Mahavir.J, 2019)

2.7. Prevention of nosocomial infection

Nosocomial infection can be prevented by minimizing the spread of causative agents, isolation for the patient suffering from infectious disease and maintaining well sanitary conditions in hospitals (Mahavir.J, 2019)

Pharmaceutical Sciences and Research select areas where we can put efforts to avoid nosocomial infection. Which are: Maintenance of hygiene, An isolation unit for a patient infected by an infectious disease, Sterilization of medical equipment and Validation and cleaning of hospitals environment. (Mahavir.J, 2019)

A) Maintenance of hand hygiene: is the most routes of transmission of diseases. Improper hand wash does not lead to complete eradication of germs and can be a reason for infection. (Mahavir.J, 2019)

2.7.1 Steps involved in hand washing

Those steps are the following; Wash hands with water, Take soap in hand, Rub hands palm to palm, Rub back of each hand with palm of other hand with finger interplaced, Rub palm to palm interplaced, Rub with back of finger to opposing palms with fingers interlocked, Rub each thumb clasped in opposite hand using a rational movement, Rub tip of the finger in opposite palm in circular motion, Rinse hand with water, Use proper towel to dry hands, Close the tap water with paper towel and Your hands are clean now. (Mahavir.J, 2019)

2.7.2 Isolation unit for patients infected by an infectious disease

Private room must be used, Keep equipment away from patients to avoid any contamination and Hospital personnel hygiene like wearing mask, gloves, gowns and other materials needed. (Mahavir.J, 2019)

2.7.3 Sterilization of medical equipment

Medical or surgical instruments comes in contact with patients during operation or treatments, must be well sterilized or autoclaved in order to avoid diseases transmission. (Mahavir.J, 2019)

The World Health Organization has identified five moments in which hand hygiene should always be practiced:

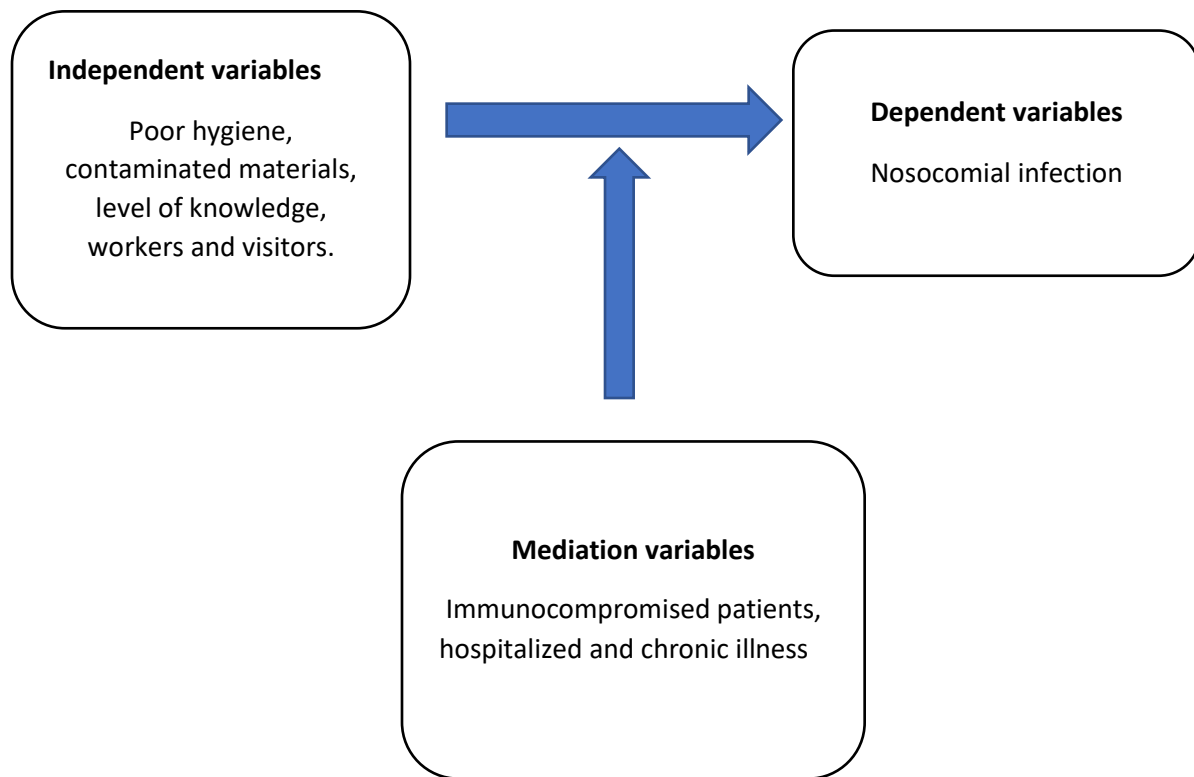
we can practiced Before touching a patient, before any clean or aseptic procedure, after exposure to body fluid, after touching a patient and after touching patient surroundings. Alcohol-based hand sanitizers are preferred over soap and water washing except when hands are visibly soiled. (Mahavir.J, 2019)

2.8. Conceptual framework

In conceptual framework we have three variables which include, dependent variables, independent variables and intermediate or mediation variables.

Dependent variable we found nosocomial infection, independent variables we found poor hygiene, contaminated materials, level of knowledge, workers and visitors while in intermediate or mediation we found immunocompromised patients, hospitalized and chronic diseases.

Figure 1 conceptual framework



2.9 Research gap

Lack of large scale studies: there is a shortage of large scales studies that examine the prevalence of nosocomial infection and risk factor among pediatric patients in different population. This can result in incomplete understanding of diseases burden and its associated risk factor. Limited data on associated between nosocomial infection and pediatric: despite the well-known association between nosocomial infection and pediatric patients. As a result further research is needed to determine the precise link between the two condition and how they interact with each other.

Insufficient focus on risk factor, there are other factor may contribute to the development of diseases in pediatric patients. Further research is needed to identify and quantify the role of these factor in development of nosocomial infection in pediatric patients.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 INTRODUCTION

Research methodology is specific procedure or techniques used to identify, select, and analyze information about topics. This chapter describes research approach design, sample of size, target population, instruments used in data collection, and data analysis.

3.1 RESEARCH DESIGN AND APPROACH

This study was used quantitative research approach which comes from retrospective study design at kibogora district hospital from May to July 2023 to assess nosocomial infection among pediatric patients.

3.1.1 RESEARCH APPROACH

3.1.1.1 Quantitative research

This study was quantitative approach which was used causal comparative research, where we were looked on relationship among variables.

3.1.2 RESEARCH DESIGN

3.1.2.1 Retrospective

This study was retrospective, use historical data to identify member of population who have been exposed or not exposed to diseases. Researcher were looked on historical data recorded in books or other materials used for keeping patients data safe. In our research we were looked or considered to the information from recorded book, how many patients exposed or not exposed to nosocomial infection since 2022 to 2023.

3.2 TARGET POPULATION

The target group for the study was comprise of all pediatric patients who acquire nosocomial infection while receiving treatment at Kibogora level two teaching Hospital. In our study 368 were sample size of pediatric patients which are hospitalized.

3.2.1 Inclusion population

In our study inclusion population were all patients who are hospitalized in kibogora level two teaching hospital.

3.2.2 Exclusion population

In our study exclusion population were all patient who live external or which are opd at kibogora level two teaching hospital.

3.3 SAMPLE SIZE

This study utilized a model to determine the sample size of patients diagnosed with nosocomial infection at Kibogora level two teaching Hospital. The single population proportion formula was utilized to determine the sample size a marginal error of 0.02%, and a confidence interval of 95%.

The sample size was calculated using the following formula: fisher formula

$$n = (Z^2 * p * q) / e^2$$

n: sample size

z: is the z value or statistical parameter

p: is estimated proportion of population

q: is 1-p

e: standard error (0.05)

$$z=1.96$$

$$p=4\% \text{ which is equal to } 0.04$$

$$q=1-p$$

$$q=1-0.04,$$

$$q=0.96$$

$$e=0.05$$

$$n = (Z^2 * p * q) / e^2$$

$$n = (1.96^2 * 0.04 * 0.96) / 0.02^2$$

$$n = (3.8416 * 0.04 * 0.96) / 0.0004$$

$$n = 0.14751744 / 0.0004$$

$$n = 368.$$

The sample size were 368

3.4 DATA COLLECTION INSTRUMENTS.

-Observation and questionnaire checklist are the main instruments we were used in our study.

Observation is quick and easy method used by researcher where watching behaviors and

characteristics and how things are done and also recording included. On questionnaire we can use written documents or asking questions.

-paper, pens, laptop also was used.

3.5 VALIDITY AND RELIABILITY OF INSTRUMENT

The process of gathering information was taken place over a span of five months, specifically from April to August 2023. An inquiry document was utilized to assess level of hygiene among pediatric patients.

3.6 DATA ANALYSIS

After data collection, a statistical analysis was used for quantitative data and analyzed using statistical package for social science (spss) version 20.

3.7 ETHICAL CONSIDERATION

Ethical consideration is like avoiding any thing which is harm to patients, workers and all administration in general. That's why firstly we need to follow different rules which facilitates us to reach to what we wish includes: permission from kibogora polytechnic which must be submitted to kibogora level two teaching hospital for allowing us to collect data, also we need to be honest in our research in order to avoid any harassment to kibogora level two teaching hospital, also confidentiality must be our firstly ethics because even in our daily life confidentiality to other are necessary thing. For patients, we need to keep what we have seek as our culture we can't say it's our last ethics because there are many but to avoid any thing which can harm anyone in our study is our wish.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.0 INTRODUCTION

This chapter analyses data collected, interpret it and present various finding from our research depending on different study objectives and questionnaires. Result were presented using table

4.1 PRESENTSTION OF FINDING AND INTERPRETATION

4.1.1 Prevalence and types of nosocomial infection

Table 1: prevalence and types of nosocomial infection.

		available types of nosocomial infection				
		Simple pneumonia	Severe pneumonia	Sepsis	UTI	None
		Table N %	Table N %	Table N %	Table N %	Table N %
age of patients	1-15	4.2%	4.2%	1.8%	2.4%	32.7%
	16-30	0.3%	2.4%	0.0%	0.3%	51.7%
HCP	31-45	0.0%	0.0%	0.0%	0.0%	0.0%
	46-65	0.0%	0.0%	0.0%	0.0%	0.0%
Gender	Male	2.7%	3.6%	0.6%	1.2%	7.8%
	Female	1.8%	3.0%	1.2%	1.5%	76.6%

Table 1 shows prevalence and types of nosocomial infection where from 1-15 years have 5.4% simple pneumonia, 4.2% severe pneumonia, 1.8% sepsis, 2.4% UTI and 32.7% none. From 16-30 years 0.3% simple pneumonia, 2.4% severe pneumonia, 0.0% sepsis, 0.3% UTI and 51.7% none. From 31-45 years and 46-65 years were 0.0% on simple pneumonia, severe pneumonia, sepsis, UTI and none. Prevalence of male were 2.7% were simple pneumonia, 3.6% severe pneumonia, 0.6% sepsis, 1.2% UTI and 7.8% none. Where female account 1.8% simple pneumonia, 3.0% severe pneumonia, 1.2% sepsis, 1.5% UTI and 76.6% none.

4.1.2 Risk factor associated with nosocomial infection

Table 2: risk factor associated nosocomial infection by t-test (spss)

		available types of nosocomial infection				
		Simple pneumonia	Severel pneumonia	Sepsis	UTI	None
		Table N %	Table N %	Table N %	Table N %	Table N %
1.washing hands before and after using toilet	Yes	0.3%	1.8%	0.0%	0.6%	42.3%
	No	4.2%	4.8%	1.8%	2.1%	42.0%
2.Hand wash of HPC before and after touch to patient	Yes	1.2%	0.9%	0.6%	0.6%	36.9%
	No	3.3%	5.7%	1.2%	2.1%	47.4%
3.times in which patient room is cleaned	once	2.4%	4.2%	1.2%	1.8%	72.7%
	twice	2.3%	2.4%	0.6%	1.9%	10.5%
	none	0.0%	0.0%	0.0%	0.0%	0.0%
4.changing gloves to every patients	Yes	1.8%	3.0%	0.9%	1.8%	2.1%
	No	2.7%	3.6%	0.9%	0.9%	82.3%
5.follow hand hygiene procedures	Yes	2.7%	4.2%	1.2%	2.4%	16.2%
	No	1.8%	2.4%	0.6%	0.3%	68.2%
6.patients with HIV or other chronic disease	Yes	1.2%	2.1%	0.3%	0.6%	9.6%
	No	3.3%	4.5%	1.5%	2.1%	74.7%
7.organ transplantation	Yes	1.2%	1.8%	0.3%	0.6%	1.5%
	No	3.3%	4.8%	1.5%	2.1%	82.9%
8.multi drug using	Yes	2.1%	4.5%	0.6%	1.5%	22.2%
	No	2.4%	2.1%	1.2%	1.2%	62.2%
	non	0.3%	0.9%	0.0%	0.0%	5.4%
9.level of education	Primary	1.8%	1.5%	1.2%	0.6%	33.0%
	Secondary	0.9%	0.9%	0.6%	0.6%	15.3%
	A1	0.6%	2.4%	0.0%	0.3%	15.9%
	A0	0.9%	0.9%	0.0%	1.2%	14.7%

Table 2 shows risk factor which associate nosocomial infection where on washing hands before and after using toilets shows 0.3% simple pneumonia, 1.8% severe pneumonia, 0.0% sepsis, 0.6% UTI, and 42.3% none. 4.2% simple pneumonia, 4.8% severe pneumonia, 1.8% sepsis, 2.1% UTI and 42.0% doesn't wash their hands before and after using toilet. washing hands of HCP before and after touching on patients shows 1.2% simple pneumonia, 0.9% severe pneumonia, 0.6% sepsis, 0.6% UTI and 36.9% none while 3.3% simple pneumonia, 5.7% severe pneumonia, 1.2% sepsis, 2.1% UTI and 47.4% none doesn't wash their hands before and after touching on patients.

Time patient room are cleaned daily 2.4% simple pneumonia, 4.2% severe pneumonia, 1.2% sepsis, 1.8% UTI and 72.7% none shows once time daily room cleaned. 2.3% simple pneumonia, 2.4% severe pneumonia, 0.6% sepsis, 1.9% UTI and 11.7% none shows twice room cleaned. Simple pneumonia, severe pneumonia, sepsis, UTI and none shows 0.0% means there is no day left without cleaning room. On changing gloves for each patients 1.8% simple pneumonia, 3.0% severe pneumonia, 0.9% sepsis, 1.8% UTI and 2.1% none they change gloves for each patients while 2.7% simple pneumonia, 3.6% severe pneumonia, 0.9% sepsis, 0.9% UTI and 82.3% none they doesn't change gloves for each patients. On following hand hygiene steps shows 2.7% simple pneumonia, 4.2% severe pneumonia, 1.2% sepsis, 2.4% UTI and 16.2% none follow hand hygiene steps while 1.8% simple pneumonia, 2.4% severe pneumonia, 0.6% sepsis, 0.3% UTI and 68.2% doesn't follow steps.

HIV or other chronic diseases shows 1.2% simple pneumonia, 2.1% severe pneumonia, 0.3% sepsis, 0.6% UTI and 9.6% none while 3.3% simple pneumonia, 4.5% severe pneumonia, 1.5% sepsis, 2.1% UTI and 74.7% doesn't have HIV or other chronic diseases. patient with organ transplantation shows 1.2% simple pneumonia, 1.8% severe pneumonia, 0.3% sepsis, 0.6% UTI and 1.5% none while 3.3% on simple pneumonia, 4.8% severe pneumonia, 1.5% sepsis, 2.1% UTI and 82.9% none. Patients using multidrug shows 2.1% simple pneumonia, 4.5% severe pneumonia, 0.6% sepsis, 1.5% UTI and 22.2% none while 2.4% simple pneumonia, 2.1% severe pneumonia, 1.2% sepsis, 1.2% UTI and 62.2% none doesn't use multidrug. On level of education shows 1.8% simple pneumonia, 1.5% severe pneumonia, 1.2% sepsis, 0.6% UTI and 33.1% none

were primary level. 0.9% simple pneumonia, 0.9% severe pneumonia, 0.6% sepsis, 0.6% UTI and 15.3% none where secondary level. 0.6% simple pneumonia, 2.4% severe pneumonia, 0.0% sepsis, 0.3% UTI and 15.9% none were A1 level. 0.9% simple pneumonia, 0.9% severe pneumonia, 0.0% sepsis, 1.2% UTI and 14.7 none were A0 level. 0.3% simple pneumonia, 0.9% severe pneumonia, 0.0% sepsis, 0.0 UTI and 5.4% none were non educated level.

Table 3: Risk factor and their p.value

Risk factor and their p value	Sig.
1.washing hands before and after using toilet	.039
2.hand wash of HPC before and after touch to patient	.018
3.times in which patient room is cleaned	.024
4.changing gloves to every patients to every patients	.000
5.follow hand hygiene procedures	.018
6.patients with HIV or other chronic disease	.128
7.organ transplantation	.104
8.multi drug using	.653
9.level of education	.800

Table 3 shows p value of our risk factor where washing hand before and after using toilet, washing hands by HCP before and after touching on patient, daily patients room cleaned, change gloves for each patients and follow hand hygiene are associated means high percentage of those risk factor where they weren't followed cause diseases while HIV or other chronic diseases, organ transplantation, multidrug and level of education are not associated some time it can read to nosocomial infection but another time does not.

Table 4: Observation question

Risk factor	Materials	Percentage
Change gloves for each patients		70%
Materials used	Gloves Waste management Hand sanitizer Soap water	80%
Washing hands by HCP before and after touching on patients		65%
Level of hygiene		70%

Table 4 shows observation question (check list) where we observe then we gave them makes or percentage based on what we sow. we looked how they change gloves between patient according to our observation they got 70%, observation on materials used where they store materials, how they wash hands if they used soap and water or hand sanitizer also how waste are managed they got 80%, washing hands before and after touching on patient they got 65% and on level of hygiene we found on patients room, patients, HCP, cleaners, hygiene in general account 70%.

4.2 DISCUSSION OF FINDINGS

Aims of our study is to assess prevalence, types and risk factor associated nosocomial infection among pediatric patient at kibogora level two teaching hospital. The prevalence and types we found were UTI (urinary tract infection), VAP (ventilator associated pneumonia), and SSI (surgical site infection). On VAP we have simple pneumonia and severe pneumonia, where we found 4.5% simple pneumonia and 6.6% were severe pneumonia. SSI found were 1.8% which are

sepsis. UTI found were 2.7%. And 84.4% there is no infection had. Female were 84.1% in all of those infection while male were 15.9%. This differ from finding of study conducted in a university hospital 2013 shows 117(11.2%) had a total 124 nosocomial infection. The most common nosocomial infection were SSI 29%, gastrointestinal tract were 26%, respiratory tract were 19%, UTI were 16.4% and primary sepsis were 4%. (Ella Ott, 2013)

On risk factor which are associated to nosocomial infection, washing hands before and after using toilet account 45% while 55% does not wash hands totally they forgot it, washing hands by HCP before and after touching on patients account 40.2 % wash their hands while 59.8% does not wash hands before and after touching on patients. 63.1% shows once times patients room were cleaned, 36.9% shows twice time patient room are cleaned. 39.81% shows changing gloves for each patient while 60.19% does not change gloves for each patients. 26.7% follow steps of hand hygiene while 73.3% doesn't follow those steps. 13.8% shows positive for HIV or other chronic diseases while 86.2% doesn't have HIV or other chronic diseases. 5.4% shows patients with organ plantation while 94.6% doesn't have organ transplantation. 30.9% take multidrug while 69.1% doesn't take it. On level of education 6.6% were non educated, 38.1 were primary level, 18.3% were secondary level, 20.2% were A1 level and 17.7% were A0 level. Differ from study done in 2020 shows that risk factor associated nosocomial infection were those who have chronic diseases like diabetes, hepatitis b, hepatitis c, low hemoglobin concentration, low white blood cell count, and longer duration of catheterization also poor patient hygiene read to nosocomial infection. (Saad Hanif Abbasi, 2020)

4.3 SUMMARY OF FINDINGS

In our study 368 were participant were highest number were female 84.1% while male were 15.9% based on our objectives which were to determine the prevalence of nosocomial infection among pediatric patients at kibogora level two teaching hospital, To identify types of nosocomial infection that are prevalent among pediatric patients at kibogora level two teaching hospital and To determine the risk factors associated with the occurrence of nosocomial infection among pediatric patients at kibogora level two teaching hospital. Highest percentage of diseases account 6.6% which are severe pneumonia followed by simple pneumonia account 4.5% followed by UTI 2.7% and the last account 1.8% SSI or sepsis. Based on risk factor 55% does not wash hands before and after using toilet, 59.8% does not wash hands before and after touching on patients, 60.19% does not change gloves for each patients, 73.3% doesn't follow steps of hand hygiene, 13.8% shows

positive for HIV or other chronic diseases, 5.4% shows patients with organ transplantation and 30.9% take multidrug.

CHAPTER FIVE: CONCLUSION AND RECOMMENDATION

5.0 INTRODUCTION

This chapter will summarize study finding, conclusion and recommendation based on our objective which stat that's: To determine the prevalence of nosocomial infection among pediatric patients at kibogora level two teaching hospital, To identify types of nosocomial infection that are prevalent among pediatric patients at kibogora level two teaching hospital and To determine the risk factors associated with the occurrence of nosocomial infection among pediatric patients at kibogora level two teaching hospital.

5.1 CONCLUSION

In our study 368 participate in our study where high number of participant were female. Categories of our participant were pediatric patients, their mothers, and health care provider. Based on our objective as we said it above we have some percentages which indicates how nosocomial infection are prevalent and their risk factor which are associated to it.

We conclude that; as we know nosocomial infection are those infection occur while patient receive treatment. In other words are infection or disease doesn't present at time of admission. in our study we have seen that those infection doesn't attack patients only also HCP, cleaners every one live or work in hospital without her/his care and protection can acquire it.

5.2 RECOMENDATION

To kibogora level two teaching hospital

- Retrain HCP about nosocomial infection and how they can prevent their risk factor not only HCP also patients, cleaners must be trained about it in order to prevent those diseases.
- make their own checking as staff to be surely that what they trains are followed by both.
- setting rules to be followed by patient, cleaner and HCP to prevent nosocomial infection.
- working together in order to achieve those goal and rules.

To nurses and laboratory student

We are now leaners time will came we will became HCP while we are reaching there don't forgot to be a wear on nosocomial infection and how we can prevent it, even now don't forgot it.

To ministry of health

We offer you where we are now, but we ask you to put again effort on different area to retain and encouraging HCP and population in general to be a wear on risk factor which can read to nosocomial infection while they reach in hospital.

5.3. SUGRESSION FURTHER THE STUDY.

A similar study can be conducted in other health facilities of the country to compare the findings and compare similarities of nosocomial infection.

A similar study can be conducted on prevention of nosocomial infection among pediatric patients.

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APPENDICES

Appendix 1: DEMOGRAPHIC CHARACTERISTICS.

Prevalence and types of nosocomial infection

1. Gender:

Male

Female

2. Age:

1-15

16-30

31-45

46-65

3. Diseases

Pneumonia

Sepsis

UTI

None

Appendix 2: QUESTIONNAIRE FOR PARTICIPANTS

Question regarding to risk factor that are associated to patients and HCP.

1. How many times per day patient's room are cleaned?

One:

Two:

2. Is healthcare provider change gloves for each patients?

Yes:

No:

3. is healthcare provider clean hand before and after touching on patient?

Yes:

No:

4. Is healthcare provider wash hands before and after using toilet?

Yes:

No:

5. Is healthcare provider follow properly principle of hand hygiene steps?

Yes:

No:

6. Do you have HIV or other chronic diseases

Yes:

No:

7. Do you have organ transplantation

Yes:

No:

8. Do you get multidrug?

Yes:

No:

9. Education level

None

Primary

Secondary

A1

A0

Appendix 3: check list

OBSERVATION QUESTION

Risk factor	materials	Percentage
Change gloves for each patients		
Materials used	Gloves Waste management Hand sanitizer Soap water	
Washing hands by HCP before and after touching on patients		
Len		

Appendix 4: research letter.



KIBOGORA POLYTECHNIC



Kibogora, July 06th 2023

To the DG of Kibogora Level Two Teaching Hospital

RE: Request of conducting Research



Dear sir,

We write this letter to humbly request to allow **Mrs. TUYAMBAZE Anitha** and **Mr. HAKIZIMANA Celestina** to conduct research in your institution.

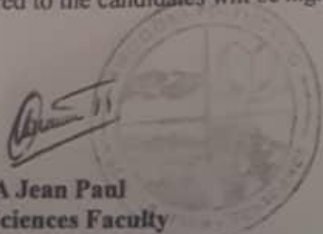
The above mentioned are bonafide students of Kibogora Polytechnic pursuing Bachelor's degree in Biomedical Laboratory sciences.

These students are currently conducting a research topic **"PREVALENCE AND RISK FACTORS ASSOCIATED WITH NOSOCOMIAL INFECTIONS AMONG PEDIATRIC PARIENTS ATTENDING KIBOGORA LEVEL TWO TEACHING HOSPITAL"**

We are convinced that your institution will constitute a valuable source of information pertaining to their research, the purpose of this letter is to humbly request you to avail them the pertinent information they may need. we pledge to ensure that all provided information will be confidential and used in the strict academic purpose.

Any assistance rendered to the candidates will be highly appreciated.

Yours sincerely,



Mr. NSENGIYUMVA Jean Paul
Ag. Dean of Health Sciences Faculty
Kibogora Polytechnic