YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF APPLIED ECONOMICS
MASTER OF PUBLIC ADMINISTRATION PROGRAMME

AWARENESS TOWARDS INFECTION PREVENTION AND CONTROL AMONG HEALTHCARE WORKERS AT NEW YANGON GENERAL HOSPITAL

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EMPA - 45 (19th BATCH)

JULY, 2024

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AWARENESS TOWARDS INFECTION PREVENTION AND CONTROL AMONG HEALTHCARE WORKERS AT NEW YANGON GENERAL HOSPITAL

A thesis submitted as a partial fulfillment towards the requirements for the degree of Master of Public Administration (MPA)

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This is to certify that this thesis entitled "**Awareness Towards Infection Prevention and Control among Healthcare Workers at New Yangon General Hospital**" submitted as partial fulfillment towards the requirements for the degree of Master of Public Administration has been accepted by the Board of Examiners.

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ABSTRACT

This study aims to assess knowledge, attitudes and practices of infection prevention and control among the healthcare workers at New Yangon General Hospital. Total 165 respondents participate in the study to depict the picture of the whole study in the hospital. The majority of staffs are nurses (43.1%) and doctors (30.3%). Most of the respondents are female and mean age of participants is 31 years. Of the respondents, 89.09% of respondents have good level of knowledge, 99.39% of respondents have good attitudes towards infection prevention and control and 88.48% of respondents have good practices of infection prevention and control. The practice level of females is higher than that of males. The respondents with the longest service (31-40 years) obtain the perfect practice scores. There is a significant association between the level of knowledge and the practices toward infection prevention and control of healthcare workers. Overall, this study reveals that the majority of healthcare professionals possess good knowledge and practices, and almost all of them have positive attitudes.

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LIST OF ABBREVIATIONS

AMR	Antimicrobial Resistance
COVID-19	Coronavirus disease 2019
CT	Computed Tomography
DOTS	Direct Observed Treatment, Short-course
DHIS	Digital Health Information System
ED	Emergency Department
HAIs	Hospital- Associated Infections
HCWs	Healthcare Workers
IPC	Infection Prevention and Control
ICUs	Intensive Care Units
IT	Information Technology
KAP	Knowledge, Attitudes, Practices
LMICs	Low-and Middle- Income Countries
MRI	Magnetic Resonance Imaging
MOH	Ministry of Health
NYGH	New Yangon General Hospital
N95	Non-Oil mask having 95 percent effciency
OPD	Outpatient Department
PPE	Personal Protective Equipment.
SDGs	Sustainable Development Goals
STATA	Statistics and Data
SD	Standard Deviation
SOPD	Specialist Outpatient Department
TB	Tuberculosis
USD	US Dollar
UN	United Nations
USA	United States of America
Uro	Urological
WHO	World Health Organization
Xray	X Radiation
YGH	Yangon General Hospital
YSH	Yangon Specialist Hospital
μm	Micrometer

CHAPTER I
INTRODUCTION

1.1 Rationale for the Study

Infection acquired in health care facilities is increasing challenges all over the world. The COVID-19 pandemic and other recent large disease outbreaks have highlighted that the health care setting is the source of transmission of diseases if infection control is inappropriate.

An infection that was not present or incubating at the time of admission but that the patient contracted during the course of care (including preventive, diagnostic, and treatment services) in a hospital or other healthcare facility is known as a healthcare-associated infections (HAIs). HAIs can also manifest after the patient is discharged. Visitors and healthcare providers both have the potential to contract HAIs (Eggers et al., 2022).

Currently, out of every 100 patients in acute-care hospitals, seven patients in high-income countries and fifteen patients in low- and middle-income countries (LMICs) will get at least one healthcare-associated infections (HAIs) during their hospital stay. One in ten patients who are impacted will, on average, pass away from their HAIs (WHO, 2022).

Newborns and those receiving acute care are especially vulnerable. Additionally, the data shows that about half of all instances of sepsis with organ failure treated in adult intensive-care units and around one in four cases of sepsis treated in hospitals are related to health care (WHO, 2022).

Longer hospital stays, a spike in morbidity and death, an increase in antibiotic resistance, and significant economic and productivity losses are all brought on by HAIs. Health systems are also heavily burdened by HAIs, which result in higher expenses and workloads.

HAIs additional fees range from $1,000 to $12,000 USD, depending on the nation [Eggers et al., 2022). HAIs primarily affect low- and middle-income countries (LMICs), but they also affect high-income nations. The financial burden of healthcare-

associated infections (HAIs) in high-income nations results in an additional €13–24 billion in costs annually in Europe, as well as 16 million more inpatient days. On the other hand, the damage in the United States is expected to be between US$28 billion and 45 billion (as cited in Mothibi, 2021).

Compared to high-income countries, morbidity and death from HAIs are two to twenty times greater in low- and middle-income nations. On the other hand, a significant portion of HAIs can be avoided by using efficient infection prevention and control (IPC) strategies. A sufficient understanding and application of IPC can effectively lower the cost of HAIs. Improving hand hygiene compliance can minimize 50% of HAIs, while the implementation of IPC programs and interventions can reduce HAIs by 35% to 70% (Eggers et al., 2022). Myanmar, one of the LMICs, also has the massive problems of HAIs in health care settings. Its control depends on the availability of resources, adequacy of training and infection prevention and control compliance.

New Yangon General Hospital (NYGH) serves as a central teaching and general hospital in Myanmar and played a pivotal role as a primary COVID-19 treatment center during the pandemic. Ensuring the prevention of hospital-acquired infections (HAIs) is a critical responsibility for all healthcare workers at this facility, necessitating a collaborative effort to minimize infection rates among patients and staff. This study aims to evaluate the knowledge, attitudes, and practices of healthcare workers at NYGH. The insights gained from this research are expected to highlight areas for enhancing infection prevention and control measures in both public and private healthcare settings.

1.2 Objective of the Study

This study aims to determine knowledge, attitudes and practices of infection prevention and control and assess relationship between knowledge level and safety practices among healthcare workers at New Yangon General Hospital.

1.3 Method of Study

The study was a cross-sectional analysis conducted within New Yangon General Hospital. The study was intended to evaluate the knowledge, attitudes and practices of healthcare workers towards infection prevention and control. The sample included 165 respondents from NYGH.

Data collection carried out by delivering structured questionnaire in English. Questionnaires included questions of knowledge, attitudes and practices towards infection control and general characteristics of respondents. Informed consent was also asked to the respondents before enrolment in the survey. The questionnaire was tested to 10 healthcare workers as pilot survey at Yangon General Hospital (YGH) and corrective measures were done as necessary.

1.4 Scope and Limitations of the Study

The study aimed to evaluate the healthcare workers' understanding of IPC measures, investigate the healthcare workers' perceptions and attitudes towards IPC practices and examine the actual practices of healthcare workers in implementing IPC measures during their routine activities in the hospital.

The study involved all healthcare workers from medical, surgical, emergency and outpatient, operation theatre, isolation, radiology, laboratory and medical store departments at NYGH. It focused to provide a comprehensive overview of IPC adherence within the hospital, suggest actionable recommendations to enhance IPC measures, ultimately aiming to reduce the incidence of HAIs.

There were some limitations in this research. The categories of HCWs involved doctors, nurses, pharmacists, technicians and nurse aid and not involve other types of healthcare workers. The respondents were only from main departments and other departments like administrative department, rehabilitation department, medico-social department, reception, medical record department were not included.

1.5 Organization of the Study

Rationale and method of study is presented in Chapter I. Chapter II, has the detailed information concerning with health care associated infections and infection control to mitigate them. Chapter III presents the profile and infection prevention and control programme of New Yangon General Hospital. Chapter IV includes survey analysis. Chapter V provides findings and suggestions.

CHAPTER II
LITERATURE REVIEW

Infections obtained in a medical facility are referred to as nosocomial infections, sometimes known as healthcare-associated or hospital-acquired infections. The infection must manifest at least 48 hours following admission in order to qualify as nosocomial. It cannot exist at the time of admission. These infections can lead to serious problems like sepsis and even death (Cheung et al., 2023).

One of the most frequent adverse events in healthcare delivery is healthcare associated infections (HAIs), and both the endemic burden and the development of epidemics pose serious threats to public health. HAIs pose a financial burden on society and have a substantial effect on morbidity, mortality, and quality of life. But many HAIs cases can be avoided, and there is mounting data to support the idea that these illnesses cause a significant amount of suffering worldwide and that prevention measures can help minimize their spread (WHO, 2016).

It is a fundamental human right for patients and healthcare professionals to have access to health care services that are planned and operated to reduce the risks of preventable HAIs. A major factor in achieving the SDGs of the UN connected to health is the prevention and control of HAIs. In order to achieve people-centered, integrated universal health coverage, effective IPC is a critical factor in determining the quality of health service delivery (WHO, 2016).

2.1 Healthcare Associated Infection

2.1.1 Burden of Healthcare Associated Infection

In the United States, it is estimated that around 1.7 million patients annually suffer from hospital-acquired infections (HAIs), which corresponds to a prevalence rate of 4.5% and results in approximately 99,000 deaths. In Europe, estimates indicate that over 4 million patients experience roughly 4.5 million episodes of HAIs each year, leading to 37,000 deaths (WHO, 2016).

Although there is a limitation of information from LMICs, the prevalence of HAIs is thought to be between 5.7% and 19.1%. With a several-fold higher prevalence of healthcare-associated infections (HAIs) in low- and middle-income countries (LMICs) than in high-income nations, the increasing burden of HAIs mostly affects high-risk populations, such as newborns and patients admitted to intensive care units (ICUs). For instance, in low- and middle-income countries (LMICs), up to one in three patients may have an infection that they contracted while in the intensive care unit. In developing nations, an extended hospital stay linked to healthcare-associated infections (HAIs) ranges between 5 to 29.5 days (WHO.2016).

At the patient and population level, HAIs unquestionably has a major (and mostly preventable) financial burden. This comprises significant additional expenses for health services because of the lengthier hospital stays and the overall effect on the facility; it also includes needless testing and treatment as well as longer times spent providing patient care. Lost output as a result of illness and death is one of the societal costs (WHO, 2016).

The acknowledged reporting deficiencies in the current monitoring methods, when combined, lead to a significant underestimation of the burden of HAIs. Despite gaps in the research base, HAIs is clearly a problem that both developed and developing nations face. In many regions of the world, significant progress has been achieved toward reducing or eliminating HAIs. But no nation has managed to totally eliminate the risk of acquisition (WHO, 2016).

2.1.2 Sources of Healthcare Associated Infection

Both in the community and in the hospital, bacteria and viruses are common environmental occupants. Most of these organisms are not harmful and might even be useful to the human body. The natural environment's organisms could serve as a reservoir from which illnesses could spread to further patients. There are other reservoirs, but; the source is typically referred to as the one from which illnesses originate. To stop the spread of infections from this source, the right source must be identified (WHO, 2002).

Patients receiving medical care in hospitals may acquire infections. These infections can originate from a wide range of sources and are typically linked to invasive treatments performed in radiology departments, clinics, operating rooms, and wards.

The organisms can originate from a variety of sources, such as:

1. The patients' own resident flora, which can be found in the mouth, gastrointestinal tract, vagina, or skin;
2. The microbial flora of healthcare personnel and other patients on the ward;
3. Transient bacteria carried on the hands of healthcare workers from one patient to another;
4. Contaminated instruments, dressings, needles, etc. used for invasive procedures,
5. Infusions.

In order to protect all patients, general hospital practice standards must address the vast range of potential for hospital pathogen acquisition. Simultaneously, every risk category or process might need particular actions to eliminate particular sources of infection (WHO, 2002).

2.1.3 Solutions to the Problem of Healthcare Associated Infections

Assessing the primary factors that influence healthcare-associated infections (HAIs) is a multifaceted process, but it is a necessary first step in developing strategies and corrective actions. In high-income nations with advanced settings, healthcare-associated infections (HAIs) might arise as a predictable side effect of advanced medical treatments and care procedures. It is also clear that this is often an indication of a breakdown in the health-care delivery system. Although resources are more widely available in these settings, awareness and knowledge of healthcare-associated infections (HAI) are frequently low, and well-known, empirically supported infection prevention and control techniques may be more strictly enforced and successfully put into practice. (WHO, 2011)

While general determinants in high-income countries also play a significant influence in raising the risk of healthcare-associated infections (HAIs), the nature of this problem differs somewhat in developing nations. These include issues with poor hygiene and sanitation, a lack of basic equipment, inadequate infrastructure, an unfavorable social background, and a population that is primarily afflicted with malnutrition and various infections and/or diseases. (WHO, 2011)

Strong evidence from the severe HAI burden indicates that in order to make any meaningful progress in the future, these factors and surveillance-related concerns need

to be carefully considered and addressed at all level. The following have been recognized as the primary solutions and areas for development:

1. Determining the factors that influence the HAIs load locally.
2. Enhancing national reporting and surveillance mechanisms.
3. Ensuring that there are minimum requirements in terms of facilities and resources available for HAIs
4. Institutional monitoring, encompassing the capability of microbiology labs.
5. Ensuring the national and healthcare setting levels have the core components for infection control in place.
6. Putting routine safety measures into effect, such as using the best hand hygiene techniques at the bedside.
7. Increasing staff accountability and education.
8. Adapting and validating surveillance systems to the realities of developing countries through research.
9. Carrying out studies on how patients and their families might be included in HAIs reporting and control (WHO, 2010).

2.2 Infection Control Programme

Every healthcare facility needs to create an infection control program to safeguard the health of its patients and employees. In addition, it needs to construct a yearly work plan that assesses and encourages staff development, epidemiological surveillance, adequate isolation, sterilization, and other measures. Moreover, it also needs to allocate enough funding to support the infection control program.

2.2.1 Important components of the infection control programme

Healthcare facilities should prioritize their infection control needs and create programs that meet those needs in addition to putting basic infection control measures into place. Important components of the infection control programme are-

1. Basic infection control measures, such as standard and additional precautions;
2. Healthcare workers' education and training;
3. Healthcare workers' protection, such as vaccinations;
4. Hazards identification and risk reduction;
5. Routine procedures necessary for infection control, including the use of single-use devices, aseptic techniques, reprocessing of instruments and equipment, the

use of antibiotics, controlling the exposure of blood and bodily fluids, handling and using blood and blood products, and responsible disposal of medical waste;

6. Effective work practices and protocols, include the utilization of therapeutic devices, support services (like food and linen), environmental management techniques, and hospital/clinical waste management;
7. Surveillance;
8. Incident tracking;
9. Outbreak analysis;
10. Targeted infection control;
11. Conducting research (WHO, 2004).

2.2.2 Infection Control Committee

A multidisciplinary platform for collaboration and information exchange is offered by an infection control committee. The committee should have representation of key departments, such as clinical microbiology, pharmacy, administration, housekeeping, engineering and training services. To increase the visibility and efficacy of the program, the committee needs to report directly to the medical staff or the administration. The committee needs to be able to get together quickly in case of an emergency (like an outbreak). The committee is in charge of creating guidelines for infection prevention and control as well as managing the program's execution. It should:

1. Include representatives from various hospital units such as medical, nursing, engineering, housekeeping, administrative, pharmacy, sterilizing services, and microbiology departments.
2. Select one committee member to serve as chairperson, ensuring they have direct access to the hospital administration's head.
3. Designate an infection control practitioner (a healthcare worker trained in infection control principles and practices, such as a physician, microbiologist, or registered nurse) to act as secretary.
4. Hold regular meetings, ideally monthly, but at least three times a year.
5. Develop and maintain an infection control manual or manuals.
6. Continuously monitor and evaluate the infection control program's performance (WHO, 2004).

2.2.3 Infection Control Team

The daily operations of the infection control program are managed by the infection control team. These team or individuals play a role in providing scientific and technical support, such as through research and surveillance, policy development and assessment, practical supervision, material and product evaluation, monitoring sterilization and disinfection, making sure medical waste is managed responsibly, and putting training plans into action. They are also encouraged to contribute to and engage in research and evaluation initiatives on both national and international scales. The infection control team should:

1. Involve a minimum of one infection control professional who has received the necessary training;
2. Carry out the surveillance programme;
3. Develop and disseminate infection control policies;
4. Monitor and manage critical incidents;
5. Coordinate and conduct training activities (WHO, 2004).

2.3 Standard Precautions and Additional Precautions

2.3.1 Standard Precautions

Providing a high degree of protection for patients, healthcare professionals, and visitors necessitates implementing work practices that involve treating every patient in the institution with the same basic level of "standard" precautions. These include the following:

1. Immediately wash hands after handling anything infectious.
2. Whenever possible, employ the no-touch method.
3. Put on gloves whenever come into contact with bodily fluids, mucous membranes, secretions, excretions, or blood.
4. Wash hands right after taking off gloves.
5. Handle all sharps with highest caution.
6. Promptly clean up any spills of infectious materials.
7. Make sure that contaminated patient-care items, linens, and equipment are either disposed of, sterilized, or cleaned after each use.
8. Ensure proper handling of waste.
9. If a washing machine is unavailable for linens soiled with infectious material, boil the linens as an alternative (WHO/CDS/CSR/EPH/2002.12, 2002).

2.3.2 Airborne Precautions and Droplet Precautions

Airborne infections typically occur through the respiratory route, with the infectious agent present in aerosols (particles smaller than 5 μm in diameter). In contrast, droplet infections are caused by larger droplets that carry the infectious agent (greater than 5 μm in diameter).

Large droplets can spread an infection over short distances, while droplet nuclei produced by sneezing and coughing can spread it over longer distances. Droplet nuclei have the capability to remain airborne for prolonged durations and can disperse extensively within environments such as hospital wards or operating rooms. These nuclei can infect patients directly or indirectly via contaminated medical equipment.

Housekeeping activities like sweeping, using dry dust mops or cloths, or shaking out linens can aerosolize particles that potentially contain microorganisms. The quantity of activity, the number of individuals occupying the space, and the rate of air exchange will all affect the number of organisms in the air. Bacteria found in air samples are typically Gram-positive cocci that originate from the skin. These bacteria can become numerous if they are dispersed from an infected lesion, especially an infected exfoliative skin lesion. Gram-negative bacteria, on the other hand, are usually present in the air only when linked to aerosols from contaminated fluids and tend to die upon drying.

Droplets expelled from the infected upper respiratory tract can carry a diverse range of microorganisms, including viruses, and this route can spread many infections (such as respiratory viruses, influenza, measles, chickenpox, tuberculosis). Typically, these infections are transmitted by large droplets, and an infectious dose generally does not travel more than a few feet from the infected patient (WHO/CDS/CSR/ EPH/ 2002.12, 2002).

For pathogens transmitted through the airborne route, enhance Standard Precautions with the following additional measures:

1. Place patients in a designated Airborne Precaution room.
2. If a ventilated isolation room is unavailable, isolate patients in separate, well-ventilated rooms.
3. If single rooms are not feasible, group patients with the same etiological diagnosis in adequately ventilated areas.

4. When performing aerosol-generating procedures linked to pathogen transmission, use appropriate personal protective equipment (PPE) in an Airborne Precaution room.
5. Minimize patient movement and ensure patients wear medical masks when outside their designated room or area (WHO, 2014).

Droplet Precautions should be added to Standard Precautions during patient care for most diseases that can be opportunistically transmitted through droplet nuclei.

1. Use adequately ventilated rooms. Group patients according to the laboratory-confirmed etiological diagnosis (cohorting) or suspected diagnosis. Patients should be positioned at least one meter apart if more than one is being kept in a room.
2. Airborne Precaution rooms are not obligatory. Patients with diseases that can spread by air should be given priority if they are available.
3. To perform aerosol-generating procedures associated with increased risk of pathogen transmission, use adequately ventilated single rooms.
4. Limit the movement of patients and ensure that they wear medical masks when outside their room or area (WHO, 2014).

2.3.3 Contact precautions

Infection by direct or indirect contact occurs through direct contact between the source of infection and the recipient or indirectly through contaminated objects. For individuals with uncontrollable diarrhea, intestinal infections, or uncontainable skin lesions, the following precautions are necessary.

1. Provide a separate room for the patient when possible; consider cohorting patients if necessary.
2. Ensure that staff wear gloves upon entering the room and use a gown for any patient contact or contact with contaminated surfaces or materials.
3. Wash hands thoroughly before and after interacting with the patient, as well as upon exiting the room.
4. Limit patient movement outside their designated room.
5. Implement thorough environmental and equipment cleaning, disinfection, and sterilization procedures as needed (WHO/CDS/CSR/EPH/2002.12, 2002).

2.3.4 Absolute (strict) isolation

Absolute (strict) isolation is necessary in cases of high viral load or other unique agents of concern with many modes of transmission implicated. Examples of such agents include vancomycin-resistant S. aureus and hemorrhagic fever. The following precautions are required for the absolute isolation.

1. individual room, in an isolation ward if possible
2. mask, gloves, gowns, cap, eye protection for all entering the room
3. hygienic handwashing at entry to and exit from the room incineration of needles, syringes
4. disinfection of medical instruments
5. incineration of excreta, body fluids, nasopharyngeal secretions
6. disinfection of linen
7. restrict visitors and staff
8. daily disinfection and terminal disinfection at the end of the stay
9. use of disposable (single-use) equipment
10. appropriate transport and laboratory management of patient specimens (WHO/CDS/CSR/EPH/2002.12, 2002).

2.4 Respiratory Hygiene and Cough Etiquette

The terms "respiratory hygiene" and "cough etiquette" refer to infection control practices that lessen the spread of respiratory illnesses. When someone with a virus coughs or sneezes, it might spread to other people and cause a respiratory infection. As a result, maintaining good respiratory hygiene and practicing proper coughing etiquette are crucial for both patients and healthcare workers in healthcare facility.

People with respiratory symptoms should apply source control measures such as using tissues or masks to cover their mouth and nose when they cough or sneeze, properly discarding used masks and tissues, and washing their hands after handling respiratory secretions.

For healthcare facilities, some of the following measures may need to be adapted according to the type of facility, and the types of persons (employees, patients, and visitors) in the facility.

The elements of respiratory hygiene/cough etiquette include:

1. Patients with acute fever with respiratory symptoms should ideally be positioned at least one meter (3 feet) apart from other patients in shared waiting spaces.
2. Post visual alerts at the entrance to health-care facilities instructing persons with respiratory symptoms to practice respiratory hygiene/cough etiquette.
3. Consider making hand hygiene resources, tissues and masks available in common areas and areas used for the evaluation of patients with respiratory illnesses (WHO, 2007).

2.5 Personal Protective Equipment (PPE)

Microorganisms cannot physically enter the wearer's body when they are wearing personal protective equipment. Gloves, goggles for protecting eyes, masks, aprons, gowns, boots or shoe covers, and caps or hair covers are examples of personal protective equipment. Personal protective equipment should be used by:

1. Healthcare professionals who deal directly with patients and who may come into touch with blood, bodily fluids, excretions, or secretions;
2. Support personnel in circumstances where they might come into contact with blood, bodily fluids, secretions, or excretions include medical assistants, cleaners, and laundry personnel.
3. Laboratory staff, who handle patient specimens; and
4. Family members who work with patients and may come into contact with bodily fluids such as blood or saliva and excretions.

Wearing personal protective equipment lowers the chance of contracting an infection, but it does not totally remove it. In situations where patient blood or bodily fluids may come into touch with it, it is crucial that PPE should be utilized consistently, appropriately, and efficaciously. Maintaining the availability of personal protective equipment and providing sufficient training for its appropriate usage are crucial. Employees also need to understand that wearing personal protective equipment does not replace the need of adhering to basic infection control practices, including hand hygiene. The use of personal protection equipment is guided by the following principles:

1. Consider the risk of exposure while selecting personal protective equipment. A healthcare professional should determine if they are at danger of coming into

contact with blood, bodily fluids, excretions, or secretions and select their personal protective equipment accordingly.

2. Prevent contaminated (used) PPE from coming into contact with objects, people, or clothing beyond the patient care area.
3. Discard used personal protection equipment in the proper disposal bags and dispose of it in accordance with hospital policy.
4. Never exchange personal safety equipment.
5. Every time you leave a patient to respond to another patient or another duty, you should totally change your personal protective equipment and wash your hands (WHO, 2004).

2.6 Hand Hygiene

The primary means of germ transmission in healthcare settings are the hands. Thus, maintaining good hand hygiene is crucial to preventing the spread of pathogens and diseases linked to medical care.

2.6.1 Hand Hygiene Methods

Hands should be cleaned with soap and water after using the restroom or if they are obviously stained or soiled with blood or other bodily fluids. Hand cleaning with soap and water is the recommended course of action if exposure to potentially spore-forming pathogens such as epidemics of Clostridium difficile is highly suspected or proved. Proper handwashing is a crucial practice for maintaining hygiene and preventing the spread of germs. The entire procedure should take 40-60 seconds. Begin by wetting hands with water. Next, cover every surface of your hands with adequate soap. Start by rubbing hands palm to palm. Then, place right palm over left dorsum with interlaced fingers, and vice versa. Follow this by rubbing hands palm to palm with fingers interlaced. Then, with fingers intertwined, gently massage the backs of each other's palms. Continue with rotational rubbing of left thumb clasped in right palm, and vice versa. Rotate your right hand's clasped fingers inside your left palm, then rub back and forth. Rinse hands thoroughly with water. Dry your hands using a single-use towel, and use the towel to turn off the faucet. Finally, once these steps are completed, hands are now safe and clean. This method ensures that all parts of hands are properly cleaned, reducing the risk of spreading infections.

It takes 20 to 30 seconds to properly use hand sanitizer and practice good hand hygiene. Begin by applying a palmful of the product in a cupped hand, making sure to cover all surfaces. Rub your hands palm to palm, then place your right palm over the back of your left hand with fingers interlaced, and repeat with the opposite hand. Continue by rubbing palm to palm with fingers interlaced, followed by rubbing the backs of your fingers against the opposing palms with fingers interlocked. Next, perform rotational rubbing of your left thumb clasped in your right palm, then switch to your right thumb. Follow this with rotational rubbing, moving backward and forward, with the clasped fingers of your right hand in your left palm and vice versa. Finally, once your hands are dry, they are safe and sanitized. This thorough method ensures complete coverage and effective hand hygiene. (WHO, Revised August 2009)

2.6.2 Five Moments of Hand Washing

The "five moments for hand hygiene" concept seeks to enhance positive outcome evaluation by correlating specific hand hygiene practices with particular infection outcomes in patients and healthcare workers, thus encouraging positive outcome beliefs. Additionally, it aims to boost the sense of self-efficacy by providing healthcare workers with clear guidance on incorporating hand hygiene into the multifaceted task of patient care, thereby fostering positive control belief. The concept utilizes the number 5 in reference to the five fingers of the hand, it has the potential to "stick" in the target public's minds and shape their behavior going forward. This could help it spread the word about hand hygiene and reach the tipping point of exponential popularity (WHO, 2009).

Table (2.1) Five Moments of Hand Washing

No.	Moments	WHY?	WHEN?
1.	Before touching a patient	To protect the patient against colonization and, in some cases, against exogenous infection, by harmful germs carried on your hands	Clean your hands before touching a patient when approaching him/her
2.	Before clean /aseptic procedure	To shield the patient from becoming infected with hazardous germs that could enter their body, including their own germs	Before you contact a vital area where the patient is at danger of infection (such as a mucous membrane, non-intact skin, or an intrusive medical device), wash your hands immediately.
3.	After body fluid exposure risk	To protect you from colonization or infection with patient's harmful germs and to protect the health-care environment from germ spread	As soon as the task containing the possibility of coming into contact with bodily fluids has concluded, wash your hands (and following glove removal)
4.	After touching a patient	To protect you from colonization with patient germs and to protect the health-care environment from germ spread	Clean your hands when leaving the patient's side, after having touched the patient
5.	After touching patient surroundings	To protect you from colonization with patient germs that may be present on surfaces/ objects in patient surroundings and to protect the healthcare environment against germ spread	Clean your hands after touching any object or furniture when living the patient surroundings, without having touched the patient

Source: Hand Hygiene (WHO, Revised August 2009)

Hand hygiene is essential in healthcare settings to protect patients from colonization and exogenous infections caused by germs on healthcare workers' hands. It is crucial to clean your hands before touching a patient to ensure their safety. This practice is necessary in various situations: before social interactions such as shaking hands or stroking a child's forehead, before assisting with personal care activities like helping a patient move, bathe, eat, or get dressed, and before delivering non-invasive care and treatments such as applying an oxygen mask or giving a massage. Additionally, hand hygiene must be maintained before performing physical non-invasive examinations, including taking a pulse, measuring blood pressure, conducting chest auscultation, or recording an electrocardiogram (ECG).

It also needs to clean hands immediately before doing the aseptic procedures like accessing a critical site with infectious risk for the patient, such as a mucous membrane, non-intact skin, or an invasive medical device. This precaution applies in various situations, including before brushing the patient’s teeth, instilling eye drops, performing digital vaginal or rectal examinations, examining the mouth, nose, or ear with or without an instrument, inserting a suppository or pessary, and suctioning mucus. It is also necessary before dressing a wound with or without an instrument, applying ointment on a vesicle, and making a percutaneous injection or puncture. Additionally, it is essential when disrupting or opening any circuit of an invasive medical device for purposes like food administration, medication, draining, suctioning, or monitoring. Lastly, hands must be cleaned before preparing food, medications, pharmaceutical products, or sterile materials.

It is also crucial to practice hand hygiene after any task involving a risk of exposure to body fluids to protect healthcare workers and prevent the spread of germs within the healthcare environment. It is important to clean your hands immediately after the task involving exposure risk has ended and after glove removal. This practice should be followed in various situations: when contact with a mucous membrane or non-intact skin ends, after a percutaneous injection or puncture, after inserting an invasive medical device such as vascular access, catheters, tubes, or drains, and after disrupting or opening an invasive circuit. Hand hygiene is also necessary after removing any invasive medical device and after taking off any protective material, such as napkins, dressings, gauze, or sanitary towels. Additionally, hands must be cleaned after handling samples containing organic matter, clearing excreta and any other body fluids, and cleaning any

contaminated surfaces and soiled materials, including soiled bed linen, dentures, instruments, urinals, bedpans, and lavatories.

After touching a patient, it is essential to clean hands when leaving the patient's side, following any physical contact with the patient. This includes moments after handshakes and helping the patient with personal care tasks like eating, dressing, moving, or taking a shower. Hand hygiene must also be practiced after delivering care and non-invasive treatments, such as changing bed linen while the patient is in bed, applying an oxygen mask, or giving a massage. Additionally, it is necessary after performing any physical non-invasive examination, including taking a pulse, measuring blood pressure, conducting chest auscultation, or recording an electrocardiogram (ECG).

It is crucial to clean hands after touching any object or furniture when leaving the patient's surroundings, even not touched the patient. These situations include activities involving physical contact with the patient's immediate environment, such as changing bed linen with the patient out of the bed, holding a bed tray, or clearing a bedside table. (WHO, Revised August 2009)

2.7 Cleaning and Sterilization

2.7.1 Cleaning

In order to attain sterility or disinfection, every piece of equipment and instrument needs to be cleaned before being reprocessed. Organic debris can bind and inactivate the chemical activity of disinfectants, as well as prevent them from coming into contact with instruments or equipment if they are not cleaned thoroughly.

There are four primary techniques for instrument and equipment cleaning:

(a) Manual cleaning

Cleaning must be done on all of the instrument's surfaces, being careful to get inside the bores and channels. When manually washing instruments, follow these steps:

1. Wear appropriate personal protective equipment, including a plastic apron, thick rubber gloves, eye protection, and a surgical mask or face shield.
2. Remove any visible debris from the instrument by rinsing it in tepid water (15-18 degrees Celsius).
3. Disassemble the instrument completely and immerse all parts in warm water with a biodegradable, non-corrosive, non-abrasive, low-foaming, and easily rinseable detergent, or use an enzymatic cleaner if necessary.

4. Ensure thorough removal of all visible soil from the instrument according to the manufacturer's instructions.
5. Rinse the instrument in hot water unless otherwise advised against.
6. Dry the instrument using a drying cabinet or hand dry it with a clean, lint-free cloth.
7. Inspect the instrument to confirm that it is thoroughly clean.

(b) Enzymatic cleaners

Used for items that are challenging to clean, such as fiberoptic equipment and accessories. When handling these goods, caution should be exercised as they pose a risk.

(c) Ultrasonic cleaners and automated washers

Ultrasonic cleaners for instruments do not achieve disinfection. Instead, they facilitate the removal of soiling material from instruments or equipment by using high-frequency, high-energy sound waves, making it easier to clean during the rinsing process.

(d) Disinfection

Microorganisms are eliminated through disinfection without complete sterilization. When single-use items are not accessible or there are organisms on delicate or heat-sensitive instruments that cannot be sterilized, disinfection is performed to eliminate them. It is not appropriate to utilize disinfection as a convenient replacement for sterilization because it is not the same as sterilizing. Chemical and thermal disinfection are the two ways that disinfection can be accomplished. Different products and processes offer varying degrees of disinfection effectiveness, categorized as follows:

1. High-level disinfection: Eliminates all microorganisms except certain bacterial spores, particularly under conditions of significant contamination.
2. Intermediate disinfection: Inactivates Mycobacterium tuberculosis, vegetative bacteria, most viruses, and most fungi, but may not always eliminate bacterial spores.
3. Low-level disinfection: Capable of eliminating the majority of bacteria, certain viruses, and certain fungi, but not certain of eliminating bacterial spores or more resilient germs like M. tuberculosis.

2.7.2 Sterilization

The destruction of all microorganisms is known as sterilization, and it can be accomplished chemically or physically. Medical equipment entering sterile bodily areas must be sterilized. Sterilization of reusable equipment should always come after cleaning to remove obvious soiling. It is necessary to wrap every item before sterilizing it. The term "sterile" should only be applied to wrapped or packed sterilized items.
One of the following methods ensures the sterility of instruments and equipment:

1. Steam under pressure (moist heat)
2. Dry heat
3. Ethylene oxide
4. Automated systems using low-temperature peracetic acid, hydrogen peroxide plasma, or other chemical sterilant
5. Irradiation

It's important not to use ultraviolet light units, incubators, microwave ovens, or domestic ovens for sterilization purposes (WHO, 2004).

2.8 Reviews on Previous Studies

Salam et al. (2014) studied infection control awareness among healthcare providers in family health settings. The self-administered anonymous questionnaire was administered to 412 respondents. Selected the respondents by using cluster sampling followed by stratified random sampling. Healthcare providers included physicians, nurses and paramedical personnel. Questionnaire were related to facts about HAIs, hand hygiene, use of PPE, waste disposal, environment cleaning and sterilization. Overall, 32.5% had a high level of knowledge and 96.6% had positive attitude towards infection control. By comparing physicians and nurses, 54.3% of physicians showed high practice score and only 32.6% in nurses (Salam et al., 2014).

In Alshathri's (2021) study, a self-administered questionnaire was used to assess the knowledge, attitudes, and practices related to infection control measures among healthcare workers, including physicians, nurses, optometrists, radiographers, and ophthalmic assistants at King Khaled Eye Specialist Hospital in Riyadh, Kingdom of Saudi Arabia. This cross-sectional survey involved 285 healthcare workers. Findings from the study indicated that 89% of respondents acknowledged that standard precautions should be applied to all patients, and 94% understood the importance of changing gloves between patients. A majority of healthcare workers (76%) recognized

the necessity of decontaminating equipment prior to sterilization. Overall, 90% of respondents agreed that hospital-acquired infections can lead to serious consequences. Approximately 82% of participants reported washing their hands after removing gloves, while 98% practiced hand hygiene between each patient encounter. However, more than half (73%) did not use a wet N95 mask, and 60% disposed of sharps containers before they were full. Doctors exhibited the highest level of knowledge, while nurses demonstrated a strong positive attitude and adherence to safe practices. While most healthcare workers demonstrated adequate knowledge and positive attitudes, the study identified area for improvement in their practices (Alshathri, 2021).

Olatade and Ifeoluwa (2021) assessed the knowledge and preventive practices concerning nosocomial infections among healthcare workers in two tertiary hospitals located in Ogun State, Nigeria. The study utilized a self-designed questionnaire for data collection. The study found that a significant proportion of respondents fell within the age group of 30-39 years. The majority of participants were female, and most identified as nurses. The majority worked full-time, and many had between 1 to 10 years of professional experience. Majority of respondents (94.8%) knew nosocomial infection gotten from hospital and 97.4% knew that nosocomial infection is the same with hospital acquired infection. Most of the respondents (94.8%) agreed that standard precautions apply to all patients regardless of their diagnosis. Only 66.1% of respondents always put on a mask and glasses when performing invasive and body fluid procedures. In total, 94.1% of the participants demonstrated a strong understanding of nosocomial infections, while 95.9% showed high levels of knowledge regarding preventive practices against nosocomial infections (Olatade and Ifeoluwa, 2021).

Harun et al. (2022) examined the pre-COVID-19 knowledge, attitude, and practice of nurses in Bangladesh regard to infection prevention and control. It was hospital based cross-sectional survey and used systematic sampling procedure to select the respondents. The study employed a structured questionnaire for data collection, where each question was assigned a score of 1 for correct responses and 0 for incorrect answers. Findings indicated that most nurses demonstrated strong knowledge of infection prevention and control (IPC), but their practices did not consistently align with this knowledge. The study recommended that nurses enhance their adherence to proper IPC practices to improve patient care quality and ensure their own protection (Harun et al., 2022).

CHAPTER III
NEW YANGON GENERAL HOSPITAL

3.1 Profile of New Yangon General Hospital

New Yangon General Hospital is located at the corner of Bo Gyoke Aung San Road and Pyay Road. It is involved in 12th quarter, Lanmadaw township. It was built as a token of Japan and Myanmar good relationship. It was started to build in 1982 and finished in March 1984. It was opened on 3rd October 1984. Its total cost is 1734 lakh of Myanmar kyat. Its compound has an area of 5.14 Acre.

Primarily, it has one number of four-story main building, one number of two-story building and sixteen numbers of small buildings. Firstly, four-story building consists General Medical Ward, General Surgical Ward, Uro-surgical Ward, Emergency and Outpatient Department, Medical Record Department and Medical Store. Two story building has Operation Theater, Intensive Care Unit, Laboratory and Radiology Department. Supportive departments are mostly situated on small buildings. Three-story private room extension building was constructed in 2010. It was opened in 2nd June 2012. It costs 11368 lakh of Myanmar kyat. It is mainly donated by Naing Group Construction and contributed by other donors.

In 2003, one of the poison treatment centers of Ministry of Health was reallocated from Yangon General Hospital to New Yangon General Hospital. Now it is the only one most important functioning poison treatment center in Myanmar. In 2014, the Uro-surgical Ward was reallocated to Yangon Specialist Hospital from New Yangon General Hospital. Now New Yangon General Hospital has mainly General Medical Ward, General Surgical Ward, Isolation Ward, Poison Treatment Center and Emergency and Outpatient Department.

The wards and waiting area are wide, well ventilated and lighted. It has 24 hours clean running water system that is supplied by safe underground water sources. It has emergency generator to supply 24 hours electricity. It also has clean and systematic sewage and drainage system and well-structured temporary isolation place for hospital wages.

It is 200 beds General and Teaching Hospital. It is affiliated hospital of University of Medicine (1) Yangon, University of Nursing, University of Public Health and University of Medical Technology. This collaboration leads to the development of new treatments, medical technologies, and improved healthcare practices. Research conducted in hospital can provide invaluable insights into disease mechanisms and treatment efficacy. Moreover, it serves as teaching facilities for medical students, nursing students, and other healthcare professionals. Through hands-on experience and mentorship, it helps shape the next generation of healthcare providers. Residency programs, in particular, are an integral part of medical training, allowing new doctors to gain practical experience under the supervision of experienced clinicians.

It is a tertiary center and catchment areas are all townships in Yangon Division, Ayeyarwady Division, Bago Division, Mon State, Rakhaing State, Magway Division, Taninthary Division, Sagaing Division, Kayin State, Mandalay Division, Shan State, Naypyitaw, Kachin State, Kayah State and Chin State.

3.2 Medical Care Departments

The medical care department in a hospital, often referred to as the medical services department, encompasses a range of specialized units and services dedicated to the diagnosis, treatment, and management of patients' medical conditions. Each of these units works collaboratively to ensure comprehensive medical care, according to the specific needs of patients. The medical care department is essential for maintaining overall health, managing chronic diseases, and addressing acute medical issues within the hospital setting.

Emergency and Outpatient department

In emergency department, there is rapid assessment and treatment of acute medical, surgical and poisoning conditions. It includes triage areas, treatment rooms and observation units. The ED is equipped with life-saving equipment and staffed by emergency medical officer, nurses, and support staff who are trained to provide immediate care and stabilization.

The outpatient department (OPD) in a hospital plays a critical role in healthcare delivery, serving as the initial point of contact between patients and healthcare providers. It offers various functions and services essential to the overall healthcare

system**.** In this department, initial consultation including initial diagnosis and treatment is provided by emergency medical officer.

If the patient needs specialist consultation, emergency medical officer refers the patient to specialist outpatient department. The specialist outpatient department (SOPD) in a hospital is dedicated to providing specialized medical care and services that require the expertise of medical specialists. It plays a crucial role in the management of complex and chronic conditions that cannot be adequately addressed by general outpatient services. It offers detailed assessments and consultations by medical specialists from various fields such as medical, surgical and poison treatment wards.

Table (3.1) Yearly Outpatient Attendance at Emergency and Outpatient Department

Years	Outpatient Attendance
2019	9013
2020	4246
2021	810
2022	2789
2023	5635

Source: New Yangon General Hospital

There was a sharp decline in 2020, with attendance dropping to 4246. This reduction of more than 50% compared to 2019 is likely attributable to the COVID-19 pandemic. The attendance further plummeted to 810 in 2021. This could be due to the continuation of the pandemic. The fluctuations reflect the broader societal and healthcare system disruptions caused by the pandemic, as well as the subsequent efforts to restore normal operations.

General Medical Ward

The medical ward provides care for patients with a wide range of medical conditions, such as infections, chronic diseases, and acute illnesses. It is mainly driven by many junior and senior physicians, medical officers, undergraduate and post graduate medical students, sister in charge, senior and junior nurses under the supervision of Professor and Head physician.

Physicians identify medical conditions based on symptoms, patient history, physical examinations, and diagnostic tests. They treat long-term conditions like diabetes, hypertension, and heart disease and also inform patients about their health, treatment options, and preventive measures.

Table (3.2) Yearly Admission, Outpatient, Discharge and Death at Medical Ward

Years	Outpatient	Admission	Discharge	Death
2019	12625	3084	2855	201
2020	6152	2705	2474	237
2021	1504	1473	1226	267
2022	5233	1662	1535	123
2023	7196	2036	1856	166

Source: New Yangon General Hospital

The pandemic had a significant impact on all data, with the lowest points in 2020 and 2021 for outpatient attendance, admissions, and discharges. There is a clear recovery trend starting in 2022 and continuing into 2023 for outpatient attendance, admissions, and discharges. However, the numbers have not yet returned to pre-pandemic levels.

General Surgical Ward

The surgical ward in NYGH is general surgical ward. It has pre-operative and post-operative care units and recovery rooms. Surgical team includes junior and senior surgeons, medical officers, undergraduate and post graduate students and well-trained nurses. Surgical team is mainly guided and supported by Professor and Head of surgeon.

Surgical team conducts various surgical procedures, including both elective and emergency surgeries. They evaluate patients before surgery to ensure they are fit for the procedure, including physical examinations and reviewing medical history. The team discuss the surgical options, risks, benefits, and alternatives with patients and their families.

They monitor and manage patients' recovery after surgery, including pain management, wound care, and detecting complications. Surgical team also work as multidisciplinary team, including anesthesiologists, nurses, and other specialists, to provide comprehensive care.

Table (3.3) Yearly Admission, Outpatient, Discharge and Death at Surgical Ward

Years	Outpatient	Admission	Discharge	Death
2019	8873	2425	2398	56
2020	4570	1335	1335	46
2021	1661	386	373	14
2022	5111	1040	1008	12
2023	5400	1312	1257	28

Source: New Yangon General Hospital

The trends are consistent across outpatient visits, admissions, and discharges, demonstrating the interrelated nature of these hospital activities. The data reflects the substantial impact of the COVID-19 pandemic on hospital operations, with notable reductions in outpatient visits, admissions, discharges, and deaths during 2020 and 2021.

Poison Treatment Center

Poison treatment center provide immediate assistance to individuals exposed to toxic substances mostly come from lower Myanmar. Poison consultant and medical officers offer treatment advice tailored to the type and severity of the poisoning.

Poison consultant provide expert consultations to physicians, nurses, and other healthcare providers on managing poisoning cases from all areas of Myanmar. This center collects data on poisoning incidents to monitor trends and identify emerging hazards and report poisoning cases to public health authorities to aid in tracking and managing public health risks. Medical officers from poison center also educate the patients and attendance about poison prevention, safe handling of chemicals, and the risks of certain substances and provide emotional support and counseling to affected individuals and their families. Most of the poisoning cases are medicines overdose, insecticide poisoning and herbicide poisoning.

Table (3.4) Yearly Admission, Outpatient, Discharge and Death at Poison Treatment Center

Years	Outpatient	Admission	Discharge	Death
2019	87	1298	1223	74
2020	68	1059	1008	54
2021	16	479	449	31
2022	39	1099	1052	50
2023	34	1261	1212	48

Source: New Yangon General Hospital

The sharp declines in outpatient visits, admissions, discharges, and deaths during 2020 and 2021 align with the impact of pandemic. The recovery phase begins in 2022, with figures for admissions and discharges almost reaching pre-pandemic levels by 2023, indicating a normalization of hospital activities. However, outpatient visits remain lower than in 2019, suggesting a reduction in follow up care after discharge from hospital.

Operation Theater

Operating theater is highly sterile environments where surgical procedures are performed. It is equipped with advanced medical equipment, including surgical tables, lighting, anesthesia machines, and monitoring devices. Surgical suites are designed to accommodate a range of procedures, from minor surgeries to complex operations, and often include pre-operative and post-operative recovery areas. Maintaining strict aseptic techniques to prevent infections during surgical procedures.

Intensive Care Unit

The ICU provides critical care for patients with severe and life-threatening conditions. Modern monitoring and life support systems are installed in it. Anesthesiologist, physician, surgeon and critical care nurses work together to provide continuous and intensive care.

Rehabilitation department

Rehabilitation department offers physical, occupational, and speech therapy services to help patients recover and regain function after injury or illness. These services are provided in both inpatient and outpatient settings.

Direct Observe Treatment center for Tuberculosis (DOTS Center)

Directly Observed Treatment, Short-course (DOTS) is a comprehensive tuberculosis (TB) control strategy recommended by the World Health Organization (WHO). DOTS center is specialized healthcare facility and designed to implement this strategy to combat TB effectively.

This center maintains a continuous and adequate supply of quality-assured anti-TB drugs. With the help of emergency medical officer and well-trained nurse for DOTS programme, the center regularly monitors and evaluates treatment outcomes and manage any side effects of TB medications.

3.3 Supporting Departments

Supporting departments in a hospital play a critical role in ensuring the efficient and effective delivery of healthcare services. These departments provide essential services that support the clinical and medical functions of the hospital. These supporting departments are integral to the hospital's overall operation, working behind the scenes to ensure that clinical staff can provide high-quality patient care.

Administrative Department

The administrative department plays a pivotal role in ensuring the smooth and efficient operation of the facility. It encompasses a wide range of functions and responsibilities that support both clinical and non-clinical activities.

The superior person of administrative department is Director level Senior Medical Superintendent. Others are Deputy Medical Superintendent, Matron, Administrative Officer, Branch Clerk, Upper Division Clerk, Lower Division Clerk and office workers.

The Administrative team oversee the day-to-day operations of the hospital to ensure efficiency and effectiveness and coordinate between various departments to ensure seamless service delivery. Moreover, the team manages the hospital's budget,

accounting, and financial reporting to ensure the financial sustainability of the hospital through effective billing, coding, and reimbursement processes.

And also, the admin team perform human resource management through recruiting, hiring, training, retaining hospital staff and managing employee benefits, payroll, and performance evaluations.

Admin team ensure the hospital complies with all relevant laws, regulations, and standards. Monitor and evaluate the hospital's growth and improvement by following the strategic plans developed by MOH.

Manage patient admissions, discharges, transfers and the hospital's IT systems, including digital health information system (DHIS) and communication networks. Oversee patient records and ensuring their accuracy, security, and confidentiality.

The admin team maintains hospital's infrastructure and medical equipment are well-functioned and safe and also supervise housekeeping and security services. Monitor the patient satisfaction and addressing any issues related to the quality of care. The admin team serves as a liaison between hospital management, staff, patients, and external stakeholders.

Laboratory

Clinical laboratory performs a wide range of tests on blood, tissues, and other specimens to aid in diagnosis and treatment. It includes hematology, microbiology, pathology, and biochemistry labs, each equipped with specialized equipment and staffed by trained laboratory technicians, senior microbiologist and senior pathologist.

Radiology Department

Radiology department is diagnostic and imaging center equipped with advanced technology for accurate diagnosis and treatment planning. Imaging facilities include X-ray, MRI, CT scan and ultrasound. This center is staffed by senior and junior radiologists and technicians who specialize in imaging procedures. They are under the supervision of professor radiologist.

Pharmacy and Medical Store

The hospital pharmacy is responsible for dispensing medications to inpatients and outpatients. It maintains a comprehensive inventory of drugs and ensures that medications are stored, prepared, and administered safely. Pharmacists collaborate with

medical staff to manage medication therapies and provide patient counselling. This department is closely supervised by pharmacist officer and follow the guidance of Deputy Medical Superintendent.

Medico-social and Reception

Medico-social workers play a critical role in addressing the social, emotional, and environmental factors that influence patients' health and well-being. They bridge the gap between medical care and social support, ensuring holistic care for patients. Provide counselling and emotional support to patients and their families to help them cope with illness, treatment, and recovery especially poisoning patients. Aid in discharge plans to ensure a smooth transition from hospital to home or other care facilities, taking into account the patient's medical, social, and environmental needs.

Receptionists facilitate the admission process by coordinating with various departments and ensuring all necessary paperwork is completed. Provide information about hospital services, departments, and locations to patients and visitors and direct them to the appropriate departments, clinics, or specialists.

Medical record department

The department runs by medical record technicians under the supervision of Deputy Medical Superintendent. The technicians create, update, and maintain patient medical records, ensuring all documentation is accurate and complete. Enter patient data into digital health information system (DHIS), including patient’s personal information, diagnoses and outcomes. Facilitate the retrieval of medical records for healthcare providers and authorized personnel when needed. Assist in the preparation of data for clinical studies and research projects.

Engineering department

Engineering department is essential for the smooth functioning of the hospital, supporting patient care and safety. This department has one assistant engineer, technicians and general workers. They ensure that the hospital buildings, including walls, roofs, floors, and structural components, are in good condition. Maintain a reliable power supply, including the electrical systems, wiring, and circuits and plumbing systems, including water supply lines, drainage, and sewage systems, ensuring they are functional and sanitary.

Oxygen and medical gases supply department

This department is driven by the oxygen and medical gases technicians. They ensure the availability and maintenance of medical gas systems, including oxygen, and nitrous oxide which are critical for patient care. Perform regular safety checks and maintenance on gas supply systems to prevent leaks and ensure proper functioning.

Ambulance department

This department has senior and junior drivers under the guidance of Administrative Officer and Deputy Medical Superintendent. They are responsible for the timely transportation of patients to and from the hospital and ensure ambulances are regularly maintained, inspected, and equipped with necessary medical supplies and equipment.

Mortuary

The mortuary in a hospital is responsible for the care and management of deceased patients. It plays a critical role in ensuring that the deceased are handled with dignity and respect, while also facilitating necessary procedures for the legal and medical aspects of death.

Accept deceased patients from various hospital departments, ensuring proper documentation and identification. Store bodies in refrigerated units to preserve them until they are released to the family or funeral home. Maintain accurate records of all deceased individuals, including personal details, date and time of death, and cause of death if known. Assist pathologists and medical officers in conducting autopsies to determine the cause of death when required by medical or legal authorities. Communicate with the families of the deceased, providing information and support regarding the release of the body and other related matters.

3.4 Hospital Service Indicators

Hospital service indicators are metrics used to evaluate the efficiency, effectiveness, quality, and safety of healthcare services provided by a hospital. These indicators help in assessing various aspects of hospital performance, identifying areas for improvement, and ensuring that the hospital meets certain standards. Some key hospital service indicators include hospital utility data, bed occupancy rate, duration of stay, bed turnover interval and mortality rate.

Table (3.5) Admission, Outpatient, Discharge and Death (NYGH)

Years	Admission	Outpatient	Discharge	Death
2014	7071	26235	6796	325
2015	6980	26617	6698	333
2016	7445	33800	7056	360
2017	6938	31123	6653	317
2018	7122	33964	6768	333
2019	6807	32636	6476	331
2020	5099	15676	4817	337
2021	2338	4051	2048	312
2022	3801	13592	3595	185
2023	4609	18873	4325	242

Source: New Yangon General Hospital

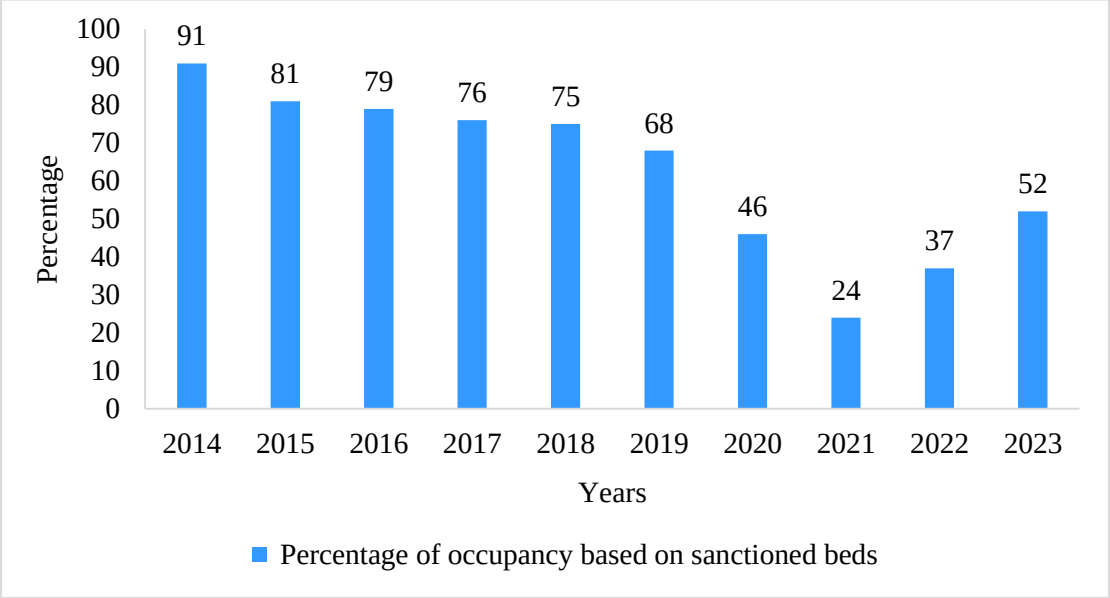
Admissions fluctuate between a high of 7445 in 2016 and a low of 2338 in 2021. There is a notable drop in admissions starting in 2020, reaching the lowest point in 2021. This is due to the impact of the COVID-19 pandemic and NYGH is designated as major COVID-19 hospital in 2021.

Outpatient visits show an overall increasing trend from 2014 (26235) to 2018 (33964), followed by fluctuations. A significant decline occurs in 2020 (15676) and 2021 (4051), again due to the pandemic. Outpatient visit is approximately 4 to 5 times of admission throughout the years because outpatient data involve both new and old patients for follow up care. In 2021, in which approximately 1.7 times of admission. This is due to NYGH accepted COVID-19 inpatient only during 3rd wave of COVID-19 pandemic in 2021.

Discharges generally follow the trend of admissions, peaking in 2016 (7056) and then showing a marked decrease in 2020 (4817) and 2021 (2048). The low discharges in 2021 align with the significant drop in admissions during the same year. The number of deaths remains relatively stable throughout the years, ranging from a low of 185 in 2022 to a high of 360 in 2016. In 2021, despite the significant reduced in admission, there was nearly the same number of deaths to other years. The increase in hospital death rate was severe impact of COVID-19 pandemic.

Overall, the data highlights the significant impact of the COVID-19 pandemic on hospital functions, with a marked decrease in admissions, outpatient visits, and discharges during the peak years of the pandemic, followed by a slow recovery. This suggests a gradual return to normal hospital function as the impact of the pandemic lessened and healthcare services adapted.

Figure (3.1) Percentage of Occupancy Based on Sanctioned Beds (NYGH)

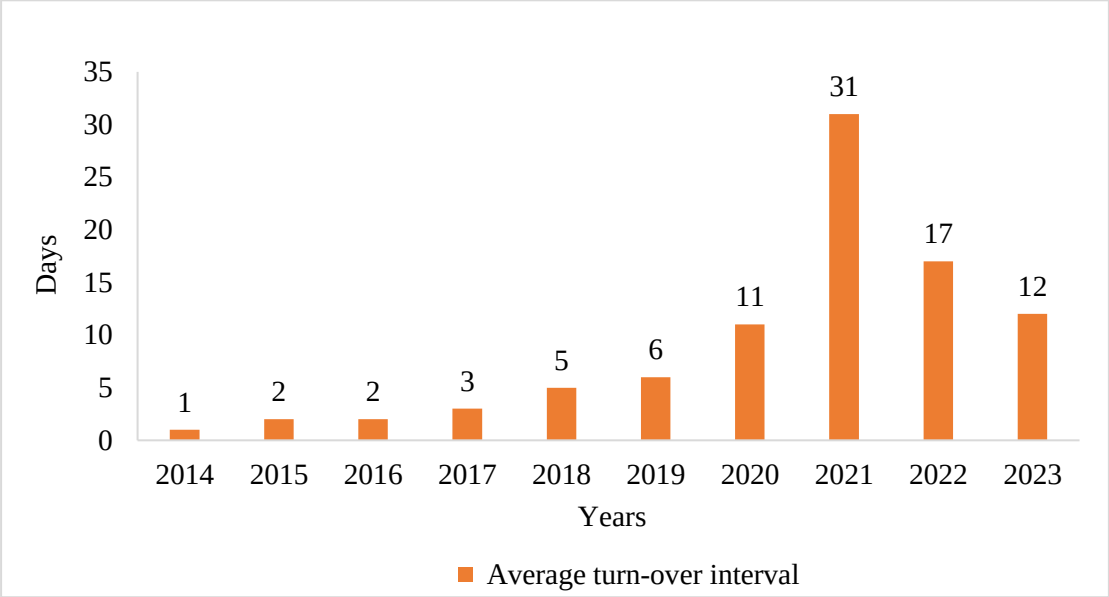


Source: New Yangon General Hospital

From 2014 to 2019, there is a clear declining trend in occupancy rates, dropping from 91% in 2014 to 68% in 2019. This suggests a gradual decrease in hospital bed utilization over these years. In 2020, the occupancy rate drops significantly to 46%, and even more drastically to 24% in 2021. These years correspond to the height of the COVID-19 pandemic.

There is a recovery in occupancy rates in 2022, increasing to 37%. This recovery continues into 2023, with the occupancy rate rising to 52%. However, it has not yet returned to pre-2020 levels.

Figure (3.2) Average Turnover Interval (NYGH)



Source: New Yangon General Hospital

Initially, from 2014 to 2017, the hospital maintained a low and consistent turn-over interval, indicating efficient patient processing and bed management. The sharp increase in turn-over intervals observed in 2020 and peaking in 2021 can be attributed to the COVID-19 pandemic, which overwhelmed healthcare systems globally. Post-2021, there is a noticeable decline in the interval, reflecting the easing of pandemic pressures and gradual adaptation to new operational norms, yet the intervals remain higher than pre-pandemic levels.

3.5 Core Components of Infection Prevention and Control Programme at Healthcare Facility

The guidelines on the core components of Infection Prevention and Control (IPC) programs are integral to the World Health Organization's (WHO) strategies for addressing current and future health threats, enhancing the resilience of health services, and combating antimicrobial resistance (AMR). These guidelines offer evidence-based recommendations for the essential components of IPC programs at both the national and acute facility levels, aiming to prevent healthcare-associated infections (HAIs) and combat AMR through effective IPC practices.

At the national level, these guidelines primarily offer direction to policymakers who are responsible for establishing and overseeing national IPC programs and

implementing AMR national action plans within health ministries. At the facility level, the primary audience includes facility administrators, such as chief executive officers, as well as individuals tasked with planning, developing, and executing local IPC programs. These guidelines outline the following key best practices for IPC at the healthcare facility level.

Core Component 1: IPC Programs

Every acute healthcare facility should have an IPC program led by a dedicated and trained team, aimed at preventing healthcare-associated infections (HAIs) and combating antimicrobial resistance (AMR) through effective IPC practices.

Core Component 2: IPC Guidelines

Develop and implement evidence-based guidelines to reduce HAIs and AMR. Successful implementation requires educating and training relevant healthcare workers on these guidelines and monitoring their adherence.

Core Component 3: IPC Education and Training

All healthcare workers should receive IPC education using participatory, team- and task-based strategies, including bedside and simulation training, to minimize the risk of HAIs and AMR.

Core Component 4: Surveillance

Conduct facility-based HAIs surveillance to guide IPC interventions and detect outbreaks. This includes AMR surveillance with timely feedback to healthcare workers and stakeholders, integrated into national networks.

Core Component 5: Multimodal Strategies

Implement IPC activities using multimodal strategies to improve practices and reduce HAI and AMR. Successful interventions should foster an organizational culture change, reflecting quality care, positive culture, and enhanced patient safety. Link these strategies with national quality aims and initiatives, including healthcare quality improvement and accreditation bodies.

Core Component 6: Monitoring/Audit of IPC Practices and Feedback

At the facility level, prevent and manage HAIs and AMR by routinely monitoring/auditing healthcare activities in accordance with IPC guidelines and promptly providing feedback. Feedback should be given to all audited individuals and relevant staff.

Core Component 7: Workload, Staffing, and Bed Occupancy

To reduce the risk of HAI and the spread of AMR, ensure that (1) bed occupancy does not exceed the facility's standard capacity, and (2) healthcare worker staffing levels are adequately assigned according to patient workload (WHO, 2016).

3.6 Infection Prevention and Control Programme of NYGH

There is infection control program in New Yangon General Hospital to mitigate the risk of infections among patients and healthcare workers. Central to this program are basic measures for infection control, which include standard and additional precautions like hand hygiene and the proper use of personal protective equipment (PPE). Additionally, education and training programs are crucial for healthcare workers, focusing on infection control practices to prevent the spread of infections within healthcare settings. These practices align with guidelines and protocols developed by the Ministry of Health, covering disinfection, sterilization, environmental cleaning, and the management of infectious waste. Implementing surveillance systems to monitor healthcare-associated infections (HAIs) and outbreaks is also essential, involving data collection and analysis to identify trends and areas for improvement.

To ensure adherence to best practices, regular audits and inspections are conducted using checklists distributed by the Ministry of Health. Furthermore, educating patients and their attendants on infection prevention measures, such as vaccination, hand hygiene, and staying home when sick, is vital. During outbreaks or infectious disease emergencies, the infection prevention and control team coordinates response efforts, implements control measures, deploys resources, and provides guidance to healthcare workers. Collaboration with stakeholders, including healthcare providers, professional associations, and regulatory bodies, is essential for a coordinated approach to infection prevention and control.

The Infection Control Committee, led by the Senior Medical Superintendent as Chairman, includes key members such as professors from medical, surgical, and

radiology departments, senior consultants in microbiology and pathology, a consultant from the poison treatment center, the matron, deputy matron, and the Deputy Medical Superintendent, who serves as the Secretary. This committee reviews and approves yearly program activities for surveillance and prevention, assesses epidemiological data to identify areas for intervention, promotes improved practices at all levels of the health facility, ensures appropriate staff training, and oversees the training of healthcare workers.

The Infection Control Team, led by a Consultant Microbiologist as the Infection Control Officer, includes infection control nurses (sisters in charge from all wards), the Deputy Medical Superintendent, doctors from all clinical wards, pharmacists, laboratory technicians, and an assistant engineer. This team is responsible for the day-to-day activities of the infection control program, assessing the function of infection control using checklists, implementing surveillance programs, creating and distributing infection control policies, monitoring and managing important incidents, and planning and conducting training activities (NYGH, 2024).

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

The study was conducted from January to June, 2024 at New Yangon General Hospital. It is 200 beds General and Teaching Hospital. It is located in Lanmadaw Township, Yangon. The study population were doctors, nurses, pharmacists, technicians and nurse aid at NYGH. The involved areas are medical, surgical, emergency and outpatient, operation theatre, isolation ward, radiology, laboratory and medical store departments of New Yangon General Hospital.

4.2 Survey Design

The study assessed the knowledge, attitudes and practices of healthcare workers towards infection prevention and control. Healthcare workers who involve in daily patient care are included. Healthcare workers who absent during data collection for various types of leave are excluded. The study included 165 healthcare workers who are 50 doctors, 71 nurses, 3 pharmacists, 22 technicians and 19 nurse aids. The data is collected by using structured questionnaire which includes four parts. The first part contains 6 questions to assess general characteristics of respondents. The second part contains 17 questions which related to knowledge of infection prevention and control. The third part contains 10 questions which focus on the attitudes of infection prevention and control. The fourth part contains 16 questions which assess the practices of infection prevention and control.

The data and answers were collected and analyzed by using STATA version 14 software for statistical analysis. All variables were checked for correct data entry and missing values prior to analysis. To assess the relationship between variables, chi square test was applied and statistical significance was set at a p value of <0.05.

4.3 Survey Results

4.3.1 General Characteristics of Respondents

Table (4.1) Age and Gender of Respondents

Age and Gender	Number	Percentage
Age		
20-29 years	97	58.8
30-39 years	37	22.4
40-49 years	20	12.1
50-59 years	8	4.9
60-62 years	3	1.8
Mean age-31.04 years (SD=9.44)	**Minimum**-20	**Maximum**-62
Gender		
Male	32	19.4
Female	133	80.6

Source: Survey data, 2024

Among 165 respondents, majority of the respondents are between twenty to twenty-nine years old. The respondents' age ranged from 20 to 62 years and the mean age of respondents is 31 years. Male represented 19.4% of respondents compare to 80.6% female.

Table (4.2) Educational Level of Respondents

Educational Level	Number	Percentage
PhD	10	6.1
Master	17	10.3
Bachelors	54	32.7
Diploma	52	31.5
Certificate	32	19.4

Source: Survey data, 2024

According to above table, the largest group (32.7%) of respondents are Bachelor's degree holders and it is followed by diploma holders (31.5%) of respondents.

Table (4.3) Occupational Characteristics of Respondents

Occupational Characteristics	Number	Percentage
Profession		
Doctor	50	30.3
Nurse	71	43.1
Pharmacist	3	1.8
Technician	22	13.3
Nurse Aid	19	11.5
Department		
Medical	48	29.1
Surgical	42	25.5
Emergency and outpatient	17	10.3
Operation theatre	19	11.6
Isolation ward	12	7.3
Radiology	9	5.4
Laboratory	9	5.4
Medical store	9	5.4
Length of service		
1-10 years	122	73.9
11-20 years	30	18.2
21-30 years	9	5.5
31-40 years	4	2.4

Source: Survey data, 2024

Among the 165 respondents, the study respondents were dominated by nurses (43.1%) and doctors (30.3%). Most of the study respondents work in medical ward (29.1%) and surgical ward (25.5%).

Majority of respondents 122 (73.9%) had between 1-10 years length of service. The length of service among the respondents ranged from (1-37) years.

4.3.2 Knowledge of Infection Prevention and Control

Knowledge towards infection prevention and control of respondents is measured with 17 statements. The following tables show knowledge part of questionnaire concerning with nosocomial infection, standard precaution, hand

hygiene, uses of gloves, cough etiquette, personal protective equipment, physical distancing and isolation, disposal of sharp materials, disinfection and sterilization.

Table (4.4) Knowledge of Nosocomial Infection

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Nosocomial infection is an infection gotten from the hospital during admission of the patient	142	86.1	18	10.9	5	3.0
Nosocomial infection is also known as hospital acquired infection	151	91.5	11	6.7	3	1.8

Source: Survey data, 2024

Most of the respondents (86.1%) knew the nosocomial infection is an infection gotten from the hospital. Majority of respondents (91.5%) knew the nosocomial infection is also knowns as hospital acquired infection. This indicates that most healthcare workers understand the concept of nosocomial infections.

Table (4.5) Knowledge of Standard Precaution

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Standard precautions are set of Infection Control practices used to prevent transmission of Healthcare Acquired Infections (HAI'S)	163	98.8	1	0.6	1	0.6
Standard precautions apply to all patients regardless of their diagnosis	151	91.5	10	6.1	4	2.4

Source: Survey data, 2024

According to the findings, 163 out of 165 respondents knew the standard precautions are set of infection control practices used to prevent HAI's. Most of the respondents (91.5%) correctly answered that standard precautions apply to all patients regardless of their diagnosis. This reflects respondents are knowledgeable for standard precautions and it should be used for all patients to prevent HAIs.

Table (4.6) Knowledge of Hand Hygiene

Statement	Yes		No		Don't Know	
	Number	%	Number	%	Number	%
Hand hygiene with soap and water or an alcohol-based antiseptic decreases the risk of transmission of hospital-acquired pathogens	161	97.6	4	2.4	0	0
Hand washing before and after every patient contact will reduce the spread of infectious diseases among the hospitalized patients	163	98.8	1	0.6	1	0.6
Waterless hand gel is an acceptable substitute for hand washing with soap and water, as long as hands are not visibly soiled	134	81.2	30	18.2	1	0.6

Source: Survey data, 2024

Concerning with hand hygiene, 97.6% of respondents knew that hand hygiene decreases the risk of transmission of hospital-acquired pathogens. Nearly all respondents (98.8%) realized the need of hand washing before and after every patient contact. Only 81.2% of respondents thought that waterless hand gel is an acceptable substitute for hand washing and 30 respondents did not accept it. Above results show that respondents have good knowledge about hand washing but poor knowledge on the waterless hand gel and the same effectiveness of hand gel and hand washing.

Table (4.7) Knowledge towards Uses of Gloves

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Healthcare workers should always wear gloves when conducting patient care activities	156	94.6	9	5.4	0	0

Source: Survey data, 2024

Regarding the uses of gloves, 94.6% have the knowledge about the gloves should be wear during the patient care activities. Only very few respondents (5.4%) did not accept it. It may be some respondents have different opinions on specific situations where gloves may not be necessary and they consider that it is over-reliance on gloves instead of proper hand hygiene.

Table (4.8) Knowledge of Cough Etiquette

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Patients and healthcare workers can reduce spread of infections by covering their mouths and noses when coughing or sneezing	159	96.4	5	3.0	1	0.6

Source: Survey data, 2024

Most of the respondents (96.4%) knew well about the covering their mouth and noses when coughing or sneezing can reduce the spread of infections. A very small proportion (3.0%) disagreed with the statement. This could be due to confusions about the effectiveness of this practice or doubt about its importance.

Table (4.9) Knowledge of Personal Protective Equipment

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
The primary use of personal protective equipment (PPE) is to protect healthcare workers (HCWs) and reduce opportunities for transmission of microorganisms in healthcare facilities	151	91.5	11	6.7	3	1.8
N95 mask is needed when in contact with a suspect or a known TB patient	128	77.6	36	21.8	1	0.6

Source: Survey data, 2024

According to table, majority of respondents (91.5%) knew the primary use and importance of PPE. It shows that the respondents have awareness about PPE which can reduce the transmission of infections. A considerable minority (21.8%) disagreed with the need of N95 mask in contact with TB patient, it indicates that there is a lack of knowledge about N95 mask.

Table (4.10) Knowledge of Physical Distancing and Isolation

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Crowded conditions in hospitals increase the chance of spreading infections from one person to another	158	95.8	4	2.4	3	1.8
Patients who have respiratory infections should be physically separated from others by at least 1 meter to prevent the spread of infections	136	82.4	22	13.3	7	4.3
One of the Infection Prevention and Control measures for the control of COVID-19 spread include triaging isolation and cohort of cases and suspects	153	92.8	6	3.6	6	3.6

Source: Survey data, 2024

In this study, most of the respondents have knowledge about the crowded conditions increase the chance of infections spreading and need of isolation for COVID-19 suspect patients. This shows strong awareness on the risks associated with overcrowding in healthcare settings and indicates good awareness of essential COVID-19 infection control practices. But, only 82.4% knew that patients who have respiratory infections should be physically separated from others by at least 1 meter to prevent the spread of infections. It may be the respondents did not sure the minimum distance (1 meter) needs to separate the patients with respiratory infections from others.

Table (4.11) Knowledge towards Disposal of Sharp Materials

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Sharp items should be disposed of in containers that are puncture-resistant, leak-proof, closable, and labeled with the biohazard symbol	158	95.8	4	2.4	3	1.8

Source: Survey data, 2024

Findings of this study shows that most of the respondents were knowledgeable about the disposal of sharp materials. This high percentage suggests that widespread agreement on the importance of using appropriate containers for sharp item disposal, which is critical for preventing injuries and contamination.

Table (4.12) Knowledge Concerning Disinfection and Sterilization

Statement	Yes		No		Don't know	
	Number	%	Number	%	Number	%
Every equipment needs decontamination before sterilization	148	89.7	12	7.3	5	3.0
All microorganisms including spores are distracted by autoclaving	146	88.5	13	7.9	6	3.6

Source: Survey data, 2024

The study reflects that the some of the respondents have less knowledge about the decontamination removes organic and inorganic matter that could inhibit the sterilization process and effectiveness of autoclaving. It may be due to the instruments disinfection and sterilization process are done in central sterile supply department and sterilized instruments are distributed to all departments of hospital.

4.3.3 Attitudes of Infection Prevention and Control

Attitudes of infection prevention and control of respondents is measured with 10 statements. The following tables show attitudes part of questionnaire concerning with standard precaution, hand hygiene, uses of gloves, cough etiquette, personal protective equipment, physical distancing and isolation, disposal of sharp materials, disinfection and sterilization.

Table (4.13) Attitudes towards Standard Precaution

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Following standard precaution reduce the risk of infection	162	98.2	3	1.8	0	0
In the absence of standard precaution, healthcare facilities can be the source of infection and epidemic disease.	146	88.5	13	7.9	6	3.6

Source: Survey data, 2024

In this study, there was complete absence of disagreement response to the statement that following standard precaution reduce the risk of infection. But only 146 respondents out of 165 respondents agreed that in the absence of standard precaution, healthcare facilities can be the source of infection and epidemic disease. It appears that some respondents undervalue the effectiveness of standard precaution.

Table (4.14) Attitudes towards Hand Hygiene

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
One main reason I wash my hands is protection from infections	160	97.0	4	2.4	1	0.6
Washing my hands before and after direct patient contact is a necessary and beneficial part of my job	162	98.2	3	1.8	0	0

Source: Survey data, 2024

According to the above table, respondents have strong attitudes towards the hand hygiene. It reflects that they have high awareness of the role of hand hygiene in patient safety and they accept that it is a critical part of healthcare workers' responsibilities.

Table (4.15) Attitudes towards Uses of Gloves

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Use of gloves for all patient care is a useful strategy for reducing risk of transmission of organisms	160	97.0	4	2.4	1	0.6

Source: Survey data, 2024

This study indicates that there is a strong agreement among healthcare workers on the importance of glove use as a protective measure. Gloves act as a barrier, protecting both the healthcare provider and the patient from potential cross-contamination. The high level of agreement reflects a good understanding of standard infection control practices among healthcare workers.

Table (4.16) Attitudes towards Cough Etiquette

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
It is important to cover my mouth and nose when I cough or sneeze to protect my patients and coworkers from infections	160	97	3	1.8	2	1.2

Source: Survey data, 2024

The above table shows that majority (97%) of respondents agreed that it is important to cover their mouth and nose when coughing or sneezing to protect others from infections. This indicates a strong attitude among healthcare workers about the role of respiratory etiquette in preventing the spread of infectious diseases. It reflects the healthcare workers have an understanding of basic infection control measures that particularly reduce the transmission of respiratory infections.

Table (4.17) Attitudes towards Personal Protective Equipment

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Wearing protective equipment (gowns, masks, gloves, eye protection) are used to controls hospital associated infections	145	87.9	15	9.1	5	3.0

Source: Survey data, 2024

The result shows that while most healthcare workers recognize the importance of PPE, a few respondents lack sufficient understanding of its effectiveness. These respondents may have concerns about the practical aspects of PPE use, such as comfort, accessibility, or perceived efficacy.

Table (4.18) Attitudes towards Physical Distancing and Isolation

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Separating patients with respiratory infections from patients without respiratory infections would be beneficial in this hospital	157	95.2	5	3.0	3	1.8

Source: Survey data, 2024

In this study, the high level of agreement reflects a solid understanding among healthcare workers of the importance of isolating patients with respiratory infections to reduce the risk of cross-contamination. Respiratory infections can spread easily through droplets, and isolating affected patients helps protect those who are not infected, especially vulnerable populations.

Table (4.19) Attitudes towards Disposal of Sharp Materials

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Using puncture-proof containers for disposing of medical waste	147	89.1	15	9.1	3	1.8

Source: Survey data, 2024

Using puncture-proof containers for disposing of medical waste is important. Improper disposal of sharp medical waste can associate with the risks such as needlestick injuries and subsequent infections. The result shows that the majority have good attitude for proper disposal of medical waste but very few respondents (3%) disagreed this important practice. These disagreeing respondents may have worries about the availability, cost and efficacy of puncture-proof containers.

Table (4.20) Attitudes towards Disinfection and Sterilization

Statement	Agree		Neutral		Disagree	
	Number	%	Number	%	Number	%
Believe that instrument sterilization is important for infection control	162	98.2	1	0.6	2	1.2

Source: Survey data, 2024

The strong agreement of respondents on the above statement highlights that they accepted the importance of sterilizing medical instruments to eliminate pathogens and prevent the transmission of infections within healthcare settings. The small percentage (1.2%) of respondents who disagree may reflect either a misunderstanding of sterilization processes or perhaps concerns related to specific aspects of sterilization practices.

4.3.4 Practices of Infection Prevention and Control

Practices of infection prevention and control of respondents is measured with 16 statements. The following tables show practices part of questionnaire concerning hand hygiene, wearing of gloves, cough etiquette, personal protective equipment, physical distancing and isolation, disposal of sharp materials, disinfection and sterilization.

Table (4.21) Practices of Hand Hygiene

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
I wash my hands before touching every patient	98	59.4	67	40.6	0	0
I wash my hands after touching every patient	141	85.5	24	14.5	0	0
Wash hands immediately when encountered unwanted contact with blood, fluids or contaminated items	161	97.6	3	1.8	1	0.6
I wash my hands after removing gloves	133	80.6	28	17.0	4	2.4

Source: Survey data, 2024

The above data shows the respondents have overall good hand hygiene practices but there are significant lapses in routine practices such as washing hands before patient contact and after glove removal. This reflects increased risk of cross infections between healthcare workers and patients. Hand hygiene after glove removal is crucial to prevent contamination from pathogens that may have penetrated from leakage or been present on the gloves' surface.

Table (4.22) Practices of Wearing Gloves

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
Changing gloves before starting handling new patient	124	75.2	39	23.6	2	1.2

Source: Survey data, 2024

According to Table (4.22), indicates 23.6% only change gloves sometimes, and 1.2% never change gloves between patients. These lapses in glove-changing practices can increase the risk of transmitting infections between patients. This may due to in a busy clinical environment or emergency conditions, healthcare workers skip changing gloves to save time. It may also due to not fully understand the importance of changing gloves between patients or not received adequate training on infection control protocols.

Table (4.23) Practices of Cough Etiquette

Statement	Always		Sometimes		Never	
	Number	**%**	**Number**	**%**	**Number**	**%**
Use respiratory hygiene and cough etiquette to reduce the transmission of respiratory infections within the facility	140	84.9	21	12.7	4	2.4

Source: Survey data, 2024

The above data shows high compliance rate (84.9%) suggests a strong understanding and adherence to respiratory hygiene and cough etiquette among most healthcare workers. But 12.7% of respondents who only sometimes follow respiratory hygiene and cough etiquette, along with the 2.4% who never do it. This reflects there is still weak point that can lead to the spread of respiratory infections in this hospital. This may be healthcare workers occasionally forget to practice respiratory hygiene and cough etiquette due to lack of consistent reinforcement and reminders.

Table (4.24) Practices of Using Personal Protective Equipment

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
I put on a mask and glasses when performing invasive and body fluid procedures	136	82.4	26	15.8	3	1.8
I wear a gown if skin or clothing is likely to be exposed to blood or blood fluids	105	63.6	45	27.3	15	9.1
Wear goggles to protect the eyes during procedures that generate spray of blood or body fluids	101	61.2	46	27.9	18	10.9
Put on protective equipment during collection and transportation of hospital waste	135	81.8	20	12.1	10	6.1

Source: Survey data, 2024

According to above table, there is significance low in compliance rate for wearing gowns and goggles during procedures with blood or body fluids. This highlights a significant risk to eye safety and infection spread. This may be some healthcare workers feel uncomfortable when wearing PPE, leading to inconsistent use.

Table (4.25) Practices of Physical Distancing and Isolation

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
When I have patients with transmissible infections, I isolate them	126	76.4	36	21.8	3	1.8
When I am ill with a respiratory infection, I stay home from work	80	48.5	69	41.8	16	9.7

Source: Survey data, 2024

The result shows 76.4% of healthcare workers consistently isolate patients with transmissible infections, which is crucial for preventing the spread of infections within the facility. Less than half (48.5%) of healthcare workers always stay home when ill with a respiratory infection, which is concerning. A substantial proportion (41.8%) only sometimes stay home, and 9.7% never do. This practice increases the risk of spreading respiratory infections to patients and colleagues in a healthcare setting. This may be due to in understaffed condition, healthcare workers might feel their absence will burden their colleagues and impact patient care.

Table (4.26) Practices of Disposal of Sharp Materials

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
Dispose sharp materials in a safety box	162	98.2	2	1.2	1	0.6
Frequency of availability of containers where needles or other sharps are used	137	83.0	21	12.7	7	4.3
Sharp containers emptied or disposed of when they are three quarters full	135	81.8	22	13.3	8	4.9

Source: Survey data, 2024

The results show the compliance rate for disposing of sharp materials in a safety box is exceptionally high and healthcare workers always following this practice. The availability of sharps containers is high and majority of healthcare workers adhere to the guideline of emptying or disposing of sharps containers when they are three quarters full. This indicates strong adherence to safety protocols, minimizing the risk of needlestick injuries and ensuring proper disposal of hazardous materials in this hospital.

Table (4.27) Practices of Disinfection and Sterilization

Statement	Always		Sometimes		Never	
	Number	%	Number	%	Number	%
Medical instruments I use are disinfected or sterilized	151	91.5	10	6.1	4	2.4

Source: Survey data, 2024

The above table shows high compliance rate for the use of sterilized medical instruments and this is a positive sign for infection control. But 2.4% of respondents who never do that raise concerns and it represents a significant risk for transmitting infections, compromising both patient and staff safety. It may be due to lack of awareness on the critical importance of consistent disinfection and sterilization or proper training.

4.3.5 Relationship between Demographic Characteristics and Knowledge, Attitudes and Practices of Respondents

Knowledge of IPC among healthcare workers was measured using 17 questions and responses are assigned score 1 for “Yes” and score 0 for “No” or “Don’t Know”. The overall knowledge score was categorized into “Good Knowledge” which is 80% and above (score ≥ 14) and “Poor Knowledge” which is less than 80% (score < 14).

Attitudes of IPC was measured using 10 questions with a 3 Likert scale responses (Agree, Neutral, and Disagree). A response answered “Agree” receive a score of 3, “Neutral” for score of 2 and “Disagree” for score of 1. The overall attitude score was categorized into “Good Attitude” which is 80% and above (score ≥ 24) and “Poor Attitude” which is less than 80% (score < 24).

IPC practices were evaluated using a set of 16 questions, each rated on a Likert scale with responses categorized as "Always," "Sometimes," and "Never." Scores of 3, 2, and 1 were assigned to these responses, respectively. The overall practice score was categorized as "Good Practice" for scores of 80% and above (score ≥ 38) and "Poor Practice" for scores below 80% (score < 38).

Significant majority of healthcare workers demonstrate good knowledge, attitudes and practices of IPC. Of the respondents, 89.09% of respondents have good level of knowledge, 99.39% of respondents have good attitudes towards infection prevention and control and 88.48% of respondents have good practices of infection prevention and control.

Table (4.28) Relationship between General Characteristics and Knowledge, Attitudes and Practices of Respondents

Category	Knowledge		Attitudes		Practices	
	Good (n=147)	**Poor (n=18)**	**Good (n=164)**	**Poor (n=1)**	**Good (n=146)**	**Poor (n=19)**
	Number (%)		**Number (%)**		**Number (%)**	
Age (years)						
20-29	85 (86.7)	13 (13.3)	97 (99)	1 (1)	82 (83.7)	16 (16.3)
30-39	33 (91.7)	3 (8.3)	36 (100)	0 (0)	33 (91.7)	3 (8.3)
40-49	18 (90)	2 (10)	20 (100)	0 (0)	20 (100)	0 (0)
50-59	8 (100)	0 (0)	8 (100)	0 (0)	8 (100)	0 (0)
60-69	3 (100)	0 (0)	3 (100)	0 (0)	3 (100)	0 (0)
Gender						
Male	29 (90.6)	3 (9.4)	32 (100)	0 (0)	26 (81.3)	6 (18.7)
Female	118 (88.7)	15 (11.3)	132 (99.4)	1 (0.6)	120 (90.2)	13 (9.8)

Table (4.28) Relationship between General Characteristics and Knowledge, Attitudes and Practices of Respondents (Continued)

Category	Knowledge		Attitudes		Practices	
	Good (n=147)	Poor (n=18)	Good (n=164)	Poor (n=1)	Good (n=146)	Poor (n=19)
	Number (%)		Number (%)		Number (%)	
Education						
PhD	10 (100)	0 (0)	10 (100)	0 (0)	9 (90)	1 (10)
Master	16 (94.1)	1 (5.9)	17 (100)	0 (0)	15 (88.2)	2 (11.8)
Bachelors	49 (90.7)	5 (9.3)	54 (100)	0 (0)	45 (83.3)	9 (16.7)
Diploma	45 (86.5)	7 (13.5)	52 (100)	0 (0)	50 (96.2)	2 (3.8)
Certificate	27 (84.4)	5 (15.6)	31 (96.9)	1 (3.1)	27 (84.4)	5 (15.6)

Source: Survey data, 2024

By age group, the majority in each age group have good knowledge. The percentage of those with good knowledge ranges from 86.7% (20-29 years) to 100% (50-59 years and 60-69 years). Attitudes are predominantly good across all age groups, with the lowest at 99% (20-29 years) and highest at 100% in all other age groups. Good practices are also high across age groups, with the lowest in the 20-29 years group (83.7%) and highest (100%) in the 40-49, 50-59, and 60-69 age groups.

By gender, both genders show high levels of good knowledge, with males at 90.6% and females at 88.7%. Attitudes are good among both genders, with males at 100% and females at 99.4%. Good practices are higher among females (90.2%) compared to males (81.3%).

By educational level, those with higher education levels tend to have better knowledge. PhD holders are at 100%, followed closely by Masters (94.1%), Bachelors (90.7%), Diploma (86.5%), and Certificate (84.4%). Attitudes are consistently high across all education levels, with a slight decline for Certificate holders at 96.9%. Good

practices vary, with the highest among Diploma holders (96.2%) and the lowest among Bachelors (83.3%) and Certificate holders (84.4%).

Table (4.29) Relationship between Occupational Characteristics and Knowledge, Attitudes and Practices of Respondents

Category	Knowledge		Attitudes		Practices	
	Good (n=147)	Poor (n=18)	Good (n=164)	Poor (n=1)	Good (n=146)	Poor (n=19)
	Number (%)		Number (%)		Number (%)	
Profession						
Doctor	46 (92)	4 (8)	50 (100)	0 (0)	39 (78)	11 (22)
Nurse	62 (87.3)	9 (12.7)	71 (100)	0 (0)	68 (95.8)	3 (4.2)
Pharmacist	3 (100)	0 (0)	3 (100)	0 (0)	3 (100)	0 (0)
Technician	20 (90.9)	2 (9.1)	22 (100)	0 (0)	20 (90.9)	2 (9.1)
Nurse Aid	16 (84.2)	3 (15.8)	18 (94.7)	1 (5.3)	16 (84.2)	3 (15.8)
Service (years)						
1-10	108 (88.5)	14 (11.5)	121 (99.2)	1 (0.8)	105 (86.1)	17 (13.9)
11-20	27 (90)	3 (10)	30 (100)	0 (0)	28 (93.3)	2 (6.7)
21-30	8 (88.9)	1 (11.1)	9 (100)	0 (0)	9 (100)	0 (0)
31-40	4 (100)	0 (0)	4 (100)	0 (0)	4 (100)	0 (0)

Source: Survey data, 2024

By profession, high levels of good knowledge across all professions, with pharmacists at 100%, followed by doctors (92%), technicians (90.9%), nurses (87.3%), and nurse aids (84.2%). Attitudes are overwhelmingly good in all professions, with 100% for doctors, nurses, pharmacists, and technicians. Nurse aids show slightly lower at 94.7%. Good practices vary more significantly. Pharmacists (100%) and technicians (90.9%) exhibit the highest, followed by nurses (95.8%), nurse aids (84.2%), and doctors (78%).

By experience years, knowledge is consistently high regardless of years of experience, ranging from 88.5% (1-10 years) to 100% (31-40 years). Attitudes are positive across all experience levels, nearly 100% for each category except a slight low for those with 1-10 years. Practices improve with more experience. The highest good practices are seen in the 31-40 years group (100%), 21-30 years (100%), followed by 11-20 years (93.3%), and 1-10 years (86.1%).

Table (4.30) Correlation between Knowledge and Practices toward Infection Prevention and Control among Healthcare Workers

Knowledge of Healthcare Worker	Practices toward Infection Prevention and Control			P-value
	Good	Poor	Total	
Good	135	12	147	0.000
Poor	11	7	18	
Total	146	19	165	

Source: Survey data, 2024 * Chi square test was applied

A significant majority of healthcare workers with good knowledge (135 out of 147, or 91.8%) exhibit good practices. Only 12 (8.2%) of those with good knowledge show poor practices. Among healthcare workers with poor knowledge, 11 out of 18 (61.1%) still demonstrate good practices. However, 7 out of 18 (38.9%) exhibit poor practices.

A P-value of 0.000 (or less than 0.05) suggests that there is a highly significant association between the level of knowledge and the practices of healthcare workers toward infection prevention and control. Healthcare workers with good knowledge are significantly more likely to follow proper infection prevention and control practices.

CHAPTER V
CONCLUSION

This study assessed the awareness towards infection prevention and control among the healthcare workers at New Yangon General Hospital (NYGH). A survey carried out by using the questionnaire on knowledge, attitudes and practices of infection prevention and control. The study areas were medical, surgical, isolation, operation theatre, anesthesiology, emergency and outpatient, medical store, radiology and laboratory departments at NYGH. The study included 165 healthcare workers. After collection, the data were examined and interpreted.

5.1 Findings

According to survey data, the majority of respondents were aged 20-29 years as most of the respondents were juniors. Females constituded the major portion (80.6%) of respondents because NYGH had only female nurses and nearly half of respondents were nurses. Most of the respondents were Bachelor's degree holders. Considering the occupation of healthcare workers, majority of respondents were nurses and doctors. Most of the respondents had ≤ 10 years of length of service.

Regarding the knowledge of IPC, most respondents demonstrated good knowledge about nosocomial infections and standard precautions. However, some respondents showed poor knowledge regarding waterless hand gel, highlighting the need for more education on hand washing and hand rub techniques. The majority were knowledgeable about the use of gloves and cough etiquette. A notable minority (21.8%) disagreed that N95 masks are necessary for contact with TB patients, indicating a significant gap in knowledge or misconceptions about N95 masks, necessitating targeted training on TB transmission and PPE requirements. There is a high awareness among healthcare workers about the increased risk of infection spread in crowded hospital conditions, emphasizing the importance of managing patient flow and hospital occupancy. Additionally, 89.7% agreed that equipment needs decontamination before sterilization, showing strong awareness of its importance in ensuring sterilization

effectiveness. However, 7.9% misunderstood or lacked knowledge about autoclaving's effectiveness against all microorganisms, including spores, indicating a need for further education on sterilization principles.

Regarding attitudes toward infection prevention and control (IPC), a small portion (3.6%) disagreed that in the absence of standard precautions, healthcare facilities can be sources of infection and epidemic disease. This suggests a lack of full awareness of the risks involved. Conversely, almost all participants had positive attitudes towards hand hygiene, glove use, and cough etiquette, reflecting a strong understanding of these measures as critical for protecting themselves and others from infections. However, the presence of neutral and disagreeing responses concerning attitudes on PPE, although a relatively small percentage, highlights the need for further education and reinforcement. These responses indicate that some healthcare workers may not fully understand or believe in the effectiveness of PPE, which could affect their adherence to PPE protocols. Additionally, the findings show that healthcare workers generally have positive attitudes towards the benefits of separating patients with respiratory infections from those without, using puncture-proof containers for medical waste disposal, and recognizing the importance of instrument sterilization for infection control.

Regarding the practices of IPC, the data on infection prevention and control (IPC) practices among healthcare workers (HCWs) reflects high compliance rates with hand hygiene, especially in critical situations. However, there are areas needing improvement, particularly in maintaining consistent hand hygiene before patient contact and after glove removal. A very small percentage (1.2%) reported never changing gloves between patients, posing a significant risk of cross-contamination and infection spread. Regarding PPE usage, most respondents wear masks and glasses during high-risk procedures, but there is relatively weaker compliance with wearing gowns and goggles. The high percentage of HCWs who consistently isolate patients with transmissible infections is a positive and essential aspect of effective infection control. However, less than half of the HCWs always stay home when sick, with a majority either sometimes or never staying home. This behavior, likely influenced by staffing shortages or personal enthusiasm, can contribute to the spread of infections within healthcare facilities and requires attention.

Knowledge levels among healthcare workers (HCWs) are generally high across all age groups, genders, and educational backgrounds, with no significant differences

observed. All professional categories show high knowledge levels however nurse aids, have the highest percentage of poor knowledge (15.8%). Knowledge levels are also consistent across different years of service, with those having 31-40 years of service showing perfect knowledge scores. Attitudes towards infection control are overwhelmingly positive across all demographics, including age, gender, education, and professional background. This indicates a uniformly strong commitment to infection control and patient care among HCWs. In terms of practice, younger HCWs (20-29 years) and male HCWs have slightly higher rates of poor practices. Among professions, doctors have the highest percentage of poor practices (22%), while pharmacists and those with more than 20 years of service maintain perfect practice scores. Additionally, HCWs with the longest service (31-40 years) have perfect practice scores, suggesting that experience positively influences adherence to best practices.

5.2 Suggestions

The study reveals the low knowledge on waterless hand gel and less compliance on hand hygiene before patient contact and after glove removal. This suggests to encourage healthcare workers to remind each other about hand hygiene practices in a supportive manner. Implement regular audits to monitor compliance with hand hygiene practices among healthcare workers and recognize and reward departments or individuals who demonstrate consistent and correct hand hygiene practices to motivate others.

The study shows the need of regular training sessions emphasizing the importance of respiratory hygiene and cough etiquette athough there was a very few number of respondents who had low knowledge on cough etiquette and never practice cough etiquette. And also recommend to place posters and reminders in each ward and waiting area within the facility to reinforce the importance of respiratory hygiene and cough etiquette.

The study found that notable percentage of respondents did not accept the use of N95 in contact with TB patients and never wore PPE during the high risk procedures. Therfore, it needs to provide detailed explanations about why N95 masks are necessary for TB patients, emphasizing the airborne nature of TB and the specific protection that N95 masks offer. Conduct regular audits on PPE use and provide PPE that is comfortable and well-fitting to reduce discomfort.

The study highlights the minority of respondents had low knowledge and weak in practice of physical distancing and isolation of patients with respiratory infections. It needs to provide regular training sessions for healthcare workers on the importance and methods of patient separation. Ensure the hospital also has the necessary infrastructure and resources to support the separation of patients. This includes sufficient isolation rooms, appropriate ventilation systems, and clear signage to guide staff and patients.

To encourage the proper emptying or disposal of sharp containers according to guidelines, ensure that puncture-proof containers are readily accessible in all areas where sharp medical waste is generated. Regular checks and timely replacement or disposal of these containers are essential to maintain high safety standards.

Although the percentage of HCWs who sometimes or never use sterilized instruments is relatively small, this is a serious concern that highlights the need for intervention to ensure all HCWs comply with infection control standards. Recommend to distribute hospital infection control guidelines developed by MOH to various departments. The guidelines describe more detailed decontamination steps and sterilization procedures. Implement regular audits to ensure adherence to disinfection and sterilization guidelines. Ensuring the consistent use of sterilized instruments is crucial for maintaining a safe healthcare environment and protecting both patients and healthcare workers.

The study found that younger HCWs (20-29 years) have less knowledge and practices towards infection prevention and control. Therfore, it needs to provide ongoing, comprehensive training and monitor and evaluate the improvement especially in this peer group.

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ANNEXES

Annex (1) Variables and Operational Definitions

No.	Variables	Operational definition
1.	Age	Completed in years
2.	Gender	Acquired identify for male or female
4.	Length of service	Reported total duration of working years of participants as government staff
5.	Healthcare workers (HCWs)	HCWs of the categories of doctor, nurse, Pharmacists, Technician and Nurse aid
6.	Infection prevention and control	Infection prevention and control (IPC) is an evidence-based approach and practical solution designed to prevent harm to patients and health workers at every single health care encounter across the whole health system by stopping the spread of infection and antimicrobial resistance (AMR)
7.	Knowledge	When providing care for patients, healthcare workers have a clear awareness of and understand of infection prevention measures.
8.	Attitude	When providing care for patients, healthcare workers have a personal opinion about infection prevention measures.
9.	Practice	When providing patient care, healthcare workers use an act or skill to prevent infections.
10.	Pharmacists	Pharmacists store, preserve, compound and dispense medicinal products.
11.	Technicians (Radiology)	Medical imaging and therapeutic equipment technicians test and operate radiographic, ultrasound and other medical imaging equipment to produce images of body structures for the diagnosis and treatment of injury, disease and other impairments.

Variables and Operational Definitions

No.	Variables	Operational definition
12.	Technicians (Laboratory)	Medical and pathology laboratory technicians perform clinical tests on specimens of bodily fluids and tissues in order to get information about the health of a patient or cause of death.
13.	Technicians (Medical store)	Pharmaceutical technicians and assistants perform a variety of tasks associated with dispensing medicinal products under the guidance of a pharmacist or other health professional.
14.	Hand hygiene	Any action of hand cleansing
15.	Hand cleansing	Action of performing hand hygiene for the purpose of physically or mechanically removing dirt, organic material, and/or microorganisms
16.	Handwashing	Washing hands with plain or antimicrobial soap and water.
17.	Alcohol-based (hand) rub	An alcohol-containing preparation (liquid, gel or foam) designed for application to the hands to inactivate microorganisms and/or temporarily suppress their growth. Such preparations may contain one or more types of alcohol, other active ingredients with excipients, and humectants.

Annex (2) Informed consent form (English)

Name of Investigator - Yinn Mar Hlaing

Title of research - Awareness Towards Infection Prevention and Control Among Healthcare Workers at New Yangon General Hospital

Part (A)

1. Introduction

I am Yinn Mar Hlaing, a candidate of MPA attending at Yangon University of Economics. I am doing research on "Awareness Towards Infection Prevention and Control Among Healthcare Workers at New Yangon General Hospital". I am going to give you information and invite you to be part of this research. I will take the time to explain if you need clarification.

2. Purpose of the research

This study is to assess awareness towards infection prevention and control among healthcare workers at New Yangon General Hospital.

3. Participant Selection

You are being invited to take part in this research because you are assigned as medical doctor, nurse, pharmacist, technician or nurse aid at NYGH.

4. Procedure

I would like to invite you to take part in this research. If you accept, you will be asked to answer self administered questionnaires. This will take about thirty minutes.

5. Benefits

Participation in this study will not benefit the participant directly. However, the findings from this study will be useful in improving knowledge, attitude and practices of healthcare workers towards infection prevention and control.

6. Confidentiality

I will not be sharing information about your participation in this study to anyone outside. This information that I collect from this research will be kept private.

7. Sharing the results

The knowledge I get from research will be only to the persons who have responsibility for this study. I will be then publishing the results to be read only by the interested people.

8. Whom to contact

If there are any queries before, during and after the study you can directly contact the investigator Yinn Mar Hlaing, phone: 095054490 or via e-mail yinn51180@gmail.com. This proposal had been reviewed and approved by the Ethical Board, Yangon University of Economics.

Part (B)

Consent Form

I have been invited to participate in research about "Awareness Towards Infection Prevention and Control Among Healthcare Workers at New Yangon General Hospital". I understand that I will have to participate in answering self- administered questionnaires. I am aware that there may be no benefit to me personally and I will be paid only for my time spent. The questionnaires include personal characteristics, knowledge, attitudes, practices towards infection prevention and control.

I have had the opportunity to ask questions about it and any questions I have been asked and have been to my satisfaction. I consent voluntarily to be a participant in this study.

Name of participant ----------

Date ----------

Annex (3) Questionnaires (in English)

Section A - General Characteristics

No.	Statement	Remark
1.	Age ---------- (years)	
2.	Gender o Male o Female	
3.	Profession o Doctor o Nurse o Pharmacist o Technician o Nurse Aid	
4.	Department o Medical o Surgical o Emergency and outpatient o Operation theatre o Isolation ward o Radiology o Laboratory o Medical store	
5.	Length of service ---------- (years)	
6.	Educational Level o PhD o Master o Bachelors o Diploma o Certificate	

Section B - Knowledge of Healthcare Workers towards Infection Prevention and Control

No.	Statement	Answer			Remark
		Yes	No	Don't know	
1.	Nosocomial infection is an infection gotten from the hospital during admission of the patient				
2.	Nosocomial infection is also known as hospital acquired infection				
3.	Standard precautions are set of Infection Control practices used to prevent transmission of Healthcare Acquired Infections (HAI'S)				
4.	Standard precautions apply to all patients regardless of their diagnosis				
5.	Hand hygiene with soap and water or an alcohol-based antiseptic decreases the risk of transmission of hospital-acquired pathogens				
6.	Hand washing before and after every patient contact will reduce the spread of infectious diseases among the hospitalized patients				
7.	Waterless hand gel is an acceptable substitute for hand washing with soap and water, as long as hands are not visibly soiled				
8.	Healthcare workers should always wear gloves when conducting patient care activities				

Section B - Knowledge of Healthcare Workers towards Infection Prevention and Control (Cont'd)

No.	Statement	Answer			Remark
		Yes	No	Don't know	
9.	Patients and health care workers can reduce spread of infections by covering their mouths and noses when coughing or sneezing				
10.	The primary use of personal protective equipment (PPE) is to protect healthcare workers (HCWs) and reduce opportunities for transmission of microorganisms in healthcare facilities				
11.	N95 mask is needed when in contact with a suspect or a known TB patient				
12.	Crowded conditions in hospitals increase the chance of spreading infections from one person to another				
13.	Patients who have respiratory infections should be physically separated from others by at least 1 meter to prevent the spread of infections				
14.	One of the Infection Prevention and Control measures for the control of COVID-19 spread include triaging isolation and cohort of cases and suspects				
15.	Sharp items should be disposed of in containers that are puncture-resistant, leak-proof, closable, and labeled with the biohazard symbol				
16.	Every equipment needs decontamination before sterilization				
17.	All microorganisms including spores are distracted by autoclaving				

Section C - Attitudes of Healthcare Workers towards Infection Prevention and Control

No.	Statement	Answer			Remark
		Agree	Neutral	Disagree	
1.	Following standard precaution reduce the risk of infection				
2.	In the absence of standard precaution, healthcare facilities can be the source of infection and epidemic disease.				
3.	One main reason I wash my hands is protection from infections				
4.	Washing my hands before and after direct patient contact is a necessary and beneficial part of my job				
5.	Use of gloves for all patient care is a useful strategy for reducing risk of transmission of organisms				
6.	It is important to cover my mouth and nose when I cough or sneeze to protect my patients and coworkers from infections				
7.	Wearing protective equipment (gowns, masks, gloves, eye protection) are used to controls hospital associated infections				
8.	Separating patients with respiratory infections from patients without respiratory infections would be beneficial in this hospital				
9.	Using puncture-proof containers for disposing of medical waste				
10.	Believe that instrument sterilization is important for infection control				

Section D - Practices of Healthcare Workers towards Infection Prevention and Control

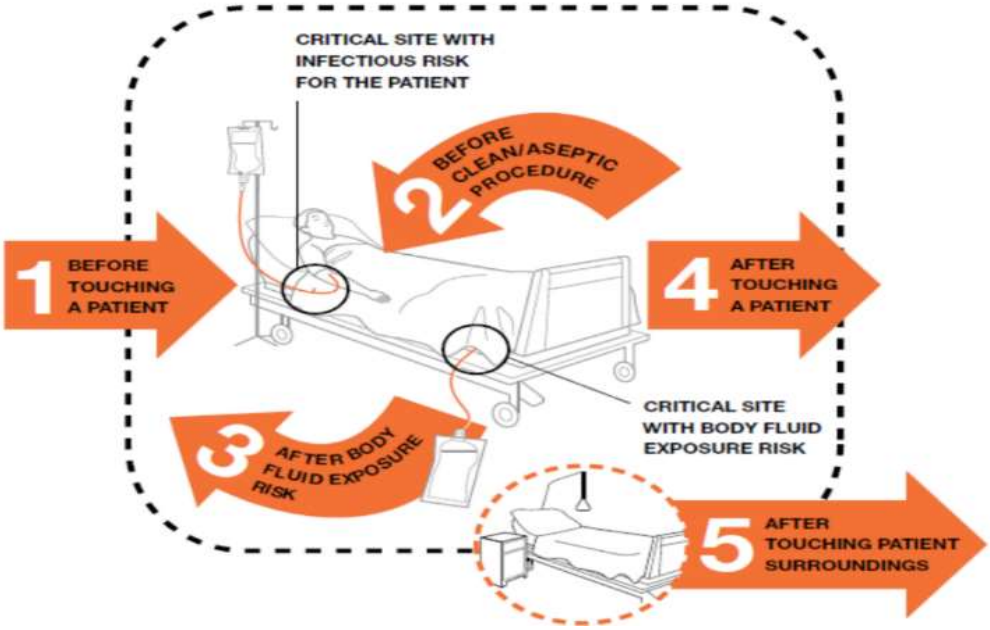
No,	Statement	Answer			Remark
		Always	Sometimes	Never	
1.	I wash my hands before touching every patient				
2.	I wash my hands after touching every patient				
3.	Wash hands immediately when encountered unwanted contact with blood, fluids or contaminated items				
4.	I wash my hands after removing gloves				
5.	Changing gloves before starting handling new patient				
6.	Use respiratory hygiene and cough etiquette to reduce the transmission of respiratory infections within the facility				
7.	I always put on a mask and glasses when performing invasive and body fluid procedures				
8.	I wear a gown if skin or clothing is likely to be exposed to blood or blood fluids				
9.	Wear goggles to protect the eyes during procedures that generate spray of blood or body fluids				

Section D - Practices of Healthcare Workers towards Infection Prevention and Control

No.	Statement	Answer			Remark
		Always	Sometimes	Never	
10.	Put on protective equipment during collection and transportation of hospital waste				
11.	When I have patients with transmissible infections, I isolate them				
12.	When I am ill with a respiratory infection, I stay home from work				
13.	Dispose sharp materials in a safety box				
14.	Frequency of availability of containers where needles or other sharps are used				
15.	Sharp containers emptied or disposed of when they are three quarters full				
16.	Medical instruments I use are disinfected or sterilized				

Annex (4) Hand Hygiene

Five Moments of Hand Washing



Source: Hand Hygiene (WHO, Revised August 2009)

Hand Washing Method

Source: Hand Hygiene (WHO, Revised August 2009)

Hand Rubbing Method

Source: Hand Hygiene (WHO, Revised August 2009)