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Knowledge, Attitudes and Practice of Medical Students Regarding Infection prevention and control in Faculty of Medicine, In Sana'a City, Yemen

A Research submitted to the department of community medicine, faculty of medicine and health sciences, Emirates University, in partial fulfillment for the degree of MBBH in general medicine and surgery.

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DEDICATION

We dedicate our research to **our parents**, who did more for us than we did for ourselves.

Our family members who believed in us more than we believed in ourselves.

To our sisters, who have been our source of inspiration and gave us strength when we thought of giving up.

To our brothers, relatives, mentors, friends, and colleagues who have always been there for us every time we need.

To everyone who has prayed for us and wished to see us the best doctors ever.

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Finally, we would also like to thank all the **participating students** of the medical faculty for their cooperation and help during fieldwork.

Abstract

Introduction:

Knowledge of infection prevention and control (IPC) procedures among medical student is crucial for effective IPC. Compliance with IPC measures has critical implications for medical student safety, patient protection, and the care environment, so Medical students who do not practice (IPC) can become vulnerable to life-threatening healthcare-associated illnesses. There is a lack of data on medical students' understanding of IPC as well as the instructional strategies they were exposed to in order to learn these behaviors.

Objectives:

To assess the level of knowledge, attitude, and practice of infection prevention and control among medical students in the medicine department at Sana'a City Universities.

Methods:

During April 2023, a descriptive cross-sectional study in faculties of medicine In Sana'a, Yemen, 370 students from different Sana'a city universities by using a modified questionnaire with closed questions, the data was analyzed by IBM SPSS. Version 28,

a $P \leq 0.05$ is considered significant in all tests.

Results:

In total, 370 individuals participated in this study, with a mean age of 25.2 ± 2.6. years. More than half of the respondents were male (58.1%), and 21 September university. had the highest number of participants (41.1%), followed by Emirates International university (23.2), one third of them (34.3%) from the fifth level, and in addition, half of the Participants (50.0%) reported having received training regarding infection control and prevention training in the last 12 months. The main sources of information were lectures and hospital staff (67.8%, 46.2%), respectively. More than half (56.5%) of the students had good knowledge on IPC, the majority of them (64.9%) had a positive attitude, and half of the students 50.3% had good practice. . There is statically significant between knowledge score and university and training in last 12.participants who attended university of science

and technology (UST) followed by Emirates International University, Sanaa had higher knowledge score than others respectively. In addition students who had training within the last 12 months had higher mean scores than their counterparts. Its may vary across different demographic groups and levels of training in attitude score. Participants from UST had the highest mean ICP practice score

Conclusion:

More than half of the students had good knowledge of IPC; the majority of students had a positive attitude, and half of the students had well-practiced.

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Abbreviation

AMR	Antimicrobial resistance
CAUTI	Catheter-associated urinary tract infection
CDC	Centers for disease control and prevention
CDI	Clostridium diffcile infection
CLABSI	Central line-associated bloodstream infection
EIU	Emirates International University
HAI	Hospital acquired infections
HAIs	Healthcare associated infections
HAP	Hospital acquired pneumonia
HCW	Health care workers
HPV	Human Papillomavirus
ICP	Infection control and prevention
ICU	Intensive care unit
IPC	Infection prevention and control
MDR	Multidrug resistant
MDRO	Multidrug resistant organism
MENA	Middle Eastern and North African
MERS CoV	Middle East Respiratory Syndrome COVID
MLT	Medical laboratory students
MRSA	Methicillin resistant staphylococcus aureus
PPE's	Personal Protective Equipment's
SSI	Surgical site infection
TB	Tuberculosis
TrACSS	Tripartite AMR country self-assessment survey
US	United States of America
UST	University of science and technology
UTI	Urinary tract infection
VAP	Ventilator associated pneumonia
WHO	World Health Organization

CHAPTER 1
INTRODUCTION

Healthcare providers (HCPs) may serve as a mechanical vector for the transfer of nosocomial illnesses from one patient to another (Yazie, et al., 2019). Healthcare associated Infections (HAIs) continue to be the most common adverse event in any healthcare setting. Delivery system, affecting millions of people annually and significantly increasing morbidity and mortality (Akinwaare, *et al., 2020).*

Healthcare-associated infections (HAIs) are illnesses that patients contract. From healthcare facilities while undergoing treatment for another condition. Any healthcare facility, including hospitals, ambulatory surgery centers, and facilities for people with end-stage renal illness, and long-term care homes, is susceptible to HAIs. HAIs can be brought on by bacteria, fungi, viruses, or other diseases that are less frequent. Infections that first manifest in a healthcare setting 48 hours or more after hospital admission or within 30 days of receiving medical care are referred to as healthcare-associated infections. HAIs are a significant cause of disease and mortality, and they can have negative emotional, financial, and medical effects. A hospital-associated infection affects about 1 in every 31 inpatients. at any given moment. 4 Several studies indicate that uncomplicated infection-control Measures, such as washing hands with an alcohol-based hand rub thereafter, can help avoid HAIs save lives, lower morbidity, and cut down on medical expenses. Health care Providers can alter their hand-washing habits to stop the transmission of illness with the support of routine educational initiatives (Singh, 2023).

It is possible to describe infection prevention and control as a scientific strategy and a workable solution created to reduce the risk of infection-related harm to patients and the healthcare system. According to the World Health Organization (WHO), healthcare-associated Infections are a problem in all nations and medical facilities, including the most cutting-edge and sophisticated ones (Melesse Gt, volume 2021.).

The main goal of an infection control program is to prevent and stop the spread of infections. Depending on the microorganism, a certain precaution must be taken to prevent infection transmission.

1.1 Globally

The WHO reported that developing countries were up to 20 times more likely than developed countries to contract a nosocomial infection, with an average of 8.7% of hospitalized patients, Because of poor infection control procedures among medical staff and patient overcrowding in most clinical settings, hospitals serve as an ideal transmission vector for the development of nosocomial illnesses.

The importance of preventing infection and antimicrobial resistance (AMR) in health care is being recognized increasingly in many national and global health Situation analysis of the implementation of IPC around the world IPC implementation at the national level.

In 2020–2021, according to the system established to monitor the status of country progress towards the implementation of the AMR global action plan (the Tripartite Antimicrobial Resistance Country Self-assessment Survey or TrACSS), among 162 countries submitting data, 11% of countries reported that they did not have an IPC programme or an operational plan and 54% that they had national IPC programmes or operational plans that had not been implemented, or that were being implemented only in selected health facilities. Only 34% of countries reported having an IPC programme implemented nationwide, and only 19% of these had a system to monitor its effectiveness and compliance.

In 2021–2022, a detailed global survey on the minimum requirements for national IPC programmes carried out by WHO 3, 24 showed that an active IPC programme (a functioning programme with annual workplans and budget) existed in 54.7% (58/106) of countries. However, only four of the participating countries (3.8%) met all minimum requirements for IPC. According to this survey, relevant gaps were limited availability of a budget specifically dedicated to IPC, limited support at the national level for IPC training roll-out and monitoring of its effectiveness, and lack of expertise to conduct IPC monitoring.

Conversely, a high percentage of countries (75%) reported that multimodal improvement strategies (that comprise several components or elements implemented in an integrated way with the aim of improving an outcome and changing behaviour), which are considered the gold standard, were included in national IPC guidelines and IPC education and training as the best implementation approach. A similar percentage of countries stated

that their national IPC focal point was responsible for coordinating support for interventions aimed at improving IPC at the facility level. Across all surveys and data sets mentioned in the global report, there is a significant positive association between the World Bank income level of a country and the implementation of IPC at the national level .This can be seen in Fig.1. (WHO, 2022)

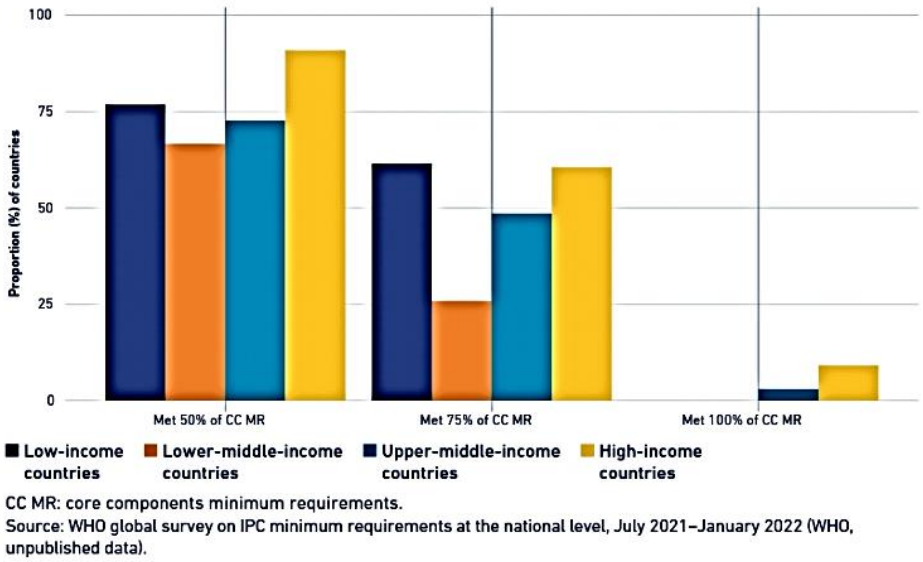

Figure1: proportion of countries meeting IPC minimum requirements, by World Bank level of income.

1.2Regionally

IPC programs in the Middle Eastern and North African (MENA) countries are evolving. The objective was to characterize IPC personnel and programs in MENA countries.

A total of 269 participants were included in the current analysis. The mean age was 39.9 ± 8.4 years and the majority of the participants were females (67.7%), nurses (63.7%), and of Middle Eastern origin (57.3%). The most frequent nationalities were Egyptian (21.8%), Filipinos (16.8%), and Indian (15.3%). The average years of experience was 16.4 ± 8.2 years, including 8.1 ± 5.6 years working in IPC programs. (Tannous, et al., 2021)

1.1.3Nationally

Knowledge and Practice of Nurses toward Standard Precautions of Infection Control in the government hospitals of Sana'a City, Yemen. Study results revealed a statistically significant difference between nurses' knowledge and practice of standard

infection control procedures (P = 0.037). The percentage of nurses who practiced safety precautions (53%), which was significantly lower than the average percentage of assessed knowledge (81.4%). Only 48 (20.7%) of the respondents practiced a good level of standard infection control procedures, despite the fact that less than half of the respondents, 106 (45.7%) had a very good knowledge level (>80%). Significant statistical differences were identified between knowledge and gender (P = 0.028), as well as the practice of working experience and the name of the hospital (P = 0.047 and 0.001, respectively) (ALwabr & AL-Salehi, 2022).

On August 8, 2022, Yemen's First Center for Infectious Diseases was inaugurated in Hodeida has been opened due to the absence of a specialized medical center to control Infectious diseases in Hodeida have had huge ramifications. Medical statistics issued by Al-Thawrah Hospital shows that between November 2019 and March 2020, the hospital had over 5,200 infectious disease cases, with more than 50 deaths. Sadly, children were the most vulnerable, with a death rate of 70 percent. With no dedicated center, the infectious Patients were housed in the main hospital, resulting in overcrowding and adding to the risk. Of further outbreaks (UNDP, 2022).

1.2Objectives:

1.2.1General objective

- To assess the level of knowledge, attitude, and practice of infection prevention and control among medical students of the medicine department at Sanaa City University.

1.2.2Specific objectives

- To identify the knowledge of medical students about infection control.
- To assess student's attitude toward infection prevention control.
- To assess student's practice toward infection prevention control.
- To measure the relationship between age, sex, university, knowledge, attitude, and practice of infection prevention and control

1.3 Study Justification

- Infection prevention and control are critical for clinical medical students, as they will turn out to be health care providers.
- It is important for clinical medical students to be knowledgeable about infection control practice to decrease hospitalization and costs.
- A lack of data of IPC among medical students.

1.4 Hypothesis

Despite the high level of knowledge of medical students regarding infection prevention and control, their clinical practice is poor.

Chapter 2:
LITERATURE REVIEW

2.1 Introduction

BACKGROND

HAIs are infections that patients acquire while receiving medical care, and they can occur in any healthcare setting, including hospitals, outpatient clinics, and long-term care facilities Healthcare workers from all specialties are in charge of avoiding and controlling HAIs are a major public health risk (Singh, 2023).

Because of their prevalence, severity, and socioeconomic impact, nosocomial Infections are a serious public health concern. These infections typically have a number of contributing factors, including environmental factors, including the cleanliness of equipment, floors, and walls, and antibiotic resistance, as well as factors connected to the knowledge and attitudes of health staff regarding infection control (Baba, 2023).

According to the Centers for Disease Control and Prevention (CDC), healthcare-associated infections include catheter-associated urinary tract infections, ventilator-associated pneumonia, and central line-associated bloodstream infections (CAUTI). Infections at the surgical site that develop after surgery are also considered HAIs. These illnesses represent a major danger to patient safety; therefore, the CDC keeps an eye out for them and works to avoid them (Alrebish, 2023).

Depending on the infection site, nosocomial infections can lead to serious consequences, such as longer hospital stays, higher costs, and even mortality. To focus prevention and control efforts and reduce the severity of these consequences and related costs, it is essential to determine patients who are most at risk for infection (AL rawas, 2023).

ETIOLOGY

Hospital infection control procedures, a patient's immune system, and the frequency Different pathogens in the environment all affect the chance of contracting infections. While receiving care there. Immunosuppression, advanced age, duration of hospital stay, several underlying comorbidities, and frequent trips to healthcare facilities, mechanical ventilation assistance, recent invasive surgeries, indwelling devices, and hospitalization in an intensive care unit (ICU) are risk factors for HAI. One of the main risk factors for

developing AMR to various medicines is receiving intravenous antibiotics within the previous 90 days.

Hospitalizations are crucial for the treatment of acute illnesses, but they also put patients at greater risk for contracting several nosocomial bacteria that are frequently resistant to antibiotics. The hospital itself, the employees, or other patients may carry these infections. Patients in the ICU are more at danger. About 19.5% of patients in ICU had at least one HAI, according to a point prevalence study that included 231,459 patients in 947 institutions.

The microorganism that causes Clostridium difficile colitis is called Clostridium difficile (CDI). Staph aureus, candida spp. (adult ICU), Enterobacteriaceae (adult wards, pediatric wards, and oncology wards), and Enterobacteriaceae are typical CLABSI species. Staphylococcus aureus, Enterococcus, Pseudomonas, Proteus, Klebsiella, and Candida are common organisms that have been linked to CAUTI. The common causal organisms causing SSI, according to the National Hospital Safety Network, are staph aureus, coagulase-negative staphylococcus, enterococcus, e coli, pseudomonas aeruginosa, enterobacter, and klebsiella pneumoniae. Staph aureus and pseudomonas aeruginosa are the most frequent causes of HAP and VAP, but E coli and Klebsiella pneumoniae are more prevalent in populations of children (Monegro AF, 2022 .)

EPIDEMOLOGY

The WHO published a multistate point prevalence study of HAIs in 2014 that included 11,282 patients from 183 US hospitals. This study discovered that at least one HAI affected 4% of patients who were hospitalized. Over 648,000 hospitalized individuals were thought to have had 721,800 infections in 2011, Pneumonia (21.8%), surgical site infections (21.8%), gastrointestinal infections (17.1%), urinary tract infections (UTIs) (12.9%), and primary bloodstream infections (9.9%), including catheter-associated bloodstream infections) are the most common infections.

C. difficile (12.1%) is the most common pathogen responsible for HAI, and it is closely followed by Staphylococcus aureus (10.7%), Klebsiella (9.9%), and Escherichia coli (9.3%). Staphylococcus aureus typically causes skin and surgical site infections, while it can also cause methicillin-resistant staphylococcus aureus (MRSA) (Monegro AF, 2022 .)

TRANSMISSION

The transmission methods for pathogens linked to HAIs can vary. (Ferioli M, 2020.)

The following are examples of indications for transmission-based precautions:

Standard precautions: For every patient treatment, standard precautions are used. It involves hand hygiene, personal protection equipment, suitable patient location, clean and sterile patient care equipment, textile and laundry management, safe injection techniques, and proper disposal of needles and other sharp objects.

Contact precaution: Applied to patients with known or suspected contact-transmittable illnesses. Standard precautions, together with restrictions on patient mobility and transportation, the use of disposable patient care supplies, and stringent washing and disinfection techniques are required for those patients. Contact precautions must be taken for patients who have acute infectious diarrhea, such as Clostridium difficile, vesicular rash, respiratory tract infection caused by a multidrug-resistant bacterium, abscess, or draining wound that cannot be covered.

Droplet precautions: used on patients who have known or suspected airborne illnesses that can spread through talking, sneezing, or coughing. In these situations, it's crucial to contain the source by covering the patient with a mask, take the usual precautions, and restrict mobility and transport. Individuals who have meningitis, petechial or ecchymosis rash with fever, or respiratory tract infection in newborns and young children are subject to droplet precautions.

Airborne precautions: Those with known or suspected airborne infections should use this medication. These patients must be kept in an isolation room for airborne infections with the aforementioned safeguards. Tuberculosis, measles, chicken pox, and disseminated herpes zoster are the most significant infections that require airborne protection. Individuals who have a suspected vesicular rash, lung infiltration and cough/fever, or maculopapular rash with cough/coryza/fever, should be placed under airborne precaution. This can be seen in Fig. 2

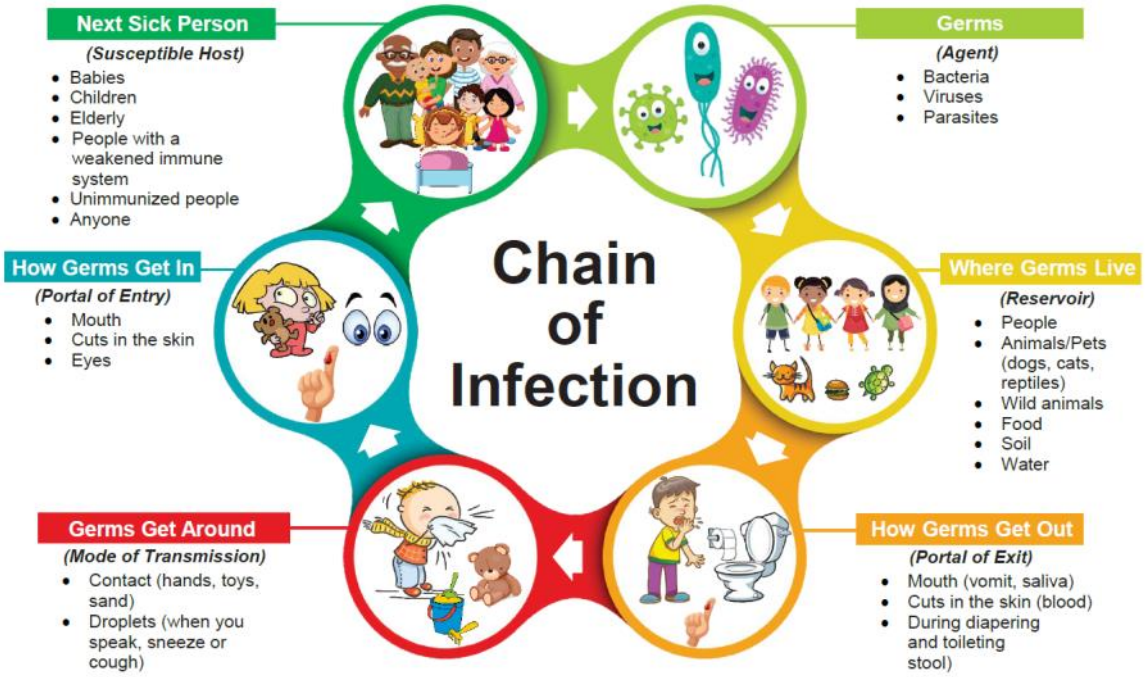

Figure2: Chain of Infection Transmission (OPH, 2023)

Multiple of those indications might require more than one precaution to ensure efficient standard and transmission-based precautions. For example, patients with suspected C. difficile need to be under contract and standard precautions, tuberculosis need to be under airborne, contact, and standard precautions. (Habboush Y, 2022 Sep 12.)

COMPLICATION

Complications of HAIs are broad and depend on the type of infection, the severity of illness, and implicated pathogen. The list of complications of each type of HAI can be extensive, below a few of the more common complications of each HAI are listed. (Kózka M, 2020)

Complications of Hospital Acquired Pneumonia (HAP)/Ventilator Associated Pneumonia (VAP)

- Respiratory failure
- Empyema
- Parapneumonic effusions
- Sepsis

Complications of Central Line-Associated Blood Stream Infection (CLABSI)

- Suppurative thrombophlebitis
- Endocarditis
- Septic arthritis
- Osteomyelitis
- Abscess
- Sepsis

Complications of Catheter-Associated Urinary Tract Infection (CAUTI)

- Upper urinary tract involvement
- Sepsis

Complications of Skin and Soft Tissue Infection (SSI)

- Delayed wound healing
- Rejection of implanted devices/prosthetics
- Repeat surgery or removal of infected devices/prosthetics
- Abscess formation
- Body cavity infections
- Sepsis

Complications of Hospital Acquired C. difficile Infection (HO-CDI)

- Recurrent or difficult to treat infections
- Ileus with toxic megacolon
- Dehydration.

Prevention

Hand hygiene is the most important aspect of infection control and prevention of HAIs. Pathogenic microorganisms that are transiently on the HCW are readily removed with routine hand hygiene and limit the risk of transmission to the patient. Hand hygiene also prevents colonization and infection in the HCW and the contamination of the environment. The WHO has identified five moments in which hand hygiene should always be practiced. This can be seen in Fig.3:

1. Before touching a patient
2. Before any clean or aseptic procedure
3. After exposure to body fluid
4. After touching a patient
5. After touching patient surroundings

Figure3: Hand Hygiene (surewash, 2014)

Alcohol-based hand sanitizers are preferred over soap and water washing except when hands are visibly soiled, contact with body fluids after using the toilet, or there is exposure to spore-forming pathogens such as C. difficile. Studies have shown that complying to hand hygiene recommendations reduces the pathogen load, prevents transmission of HAI.

Standard precautions should be practiced to protect HCW. This includes the use of personal protective equipment such as gloves, gowns, masks, and eye protection to protect from blood and body fluids. This can be seen in Fig.4

Figure4: Standard Precautions (CARE, 2023)

Transmission based precautions should be used to prevent airborne, droplet, and contact transmission. A fit-tested N-95 respirator should be worn and patient placement in an isolated negative pressure room to prevent airborne transmission. Surgical masks and physical distancing are precautions to prevent droplet transmission. Patient placement in a single room and healthcare worker gown and gloves are worn to avoid contact transmission of MDRO and C.difficile. Aseptic techniques should be practiced for invasive procedures and surgery. Environmental contamination is a potential source of pathogens that may be transmitted through contact. One study found that hospital water taps, door handles, and working surfaces had the highest number of microbes. Patient equipment and environment are potential sources and should be kept clean. Hospital waste often acts as a reservoir for pathogenic bacteria. Estimates are that 20 to 25% of hospital waste was high potential to cause HAI, and care should be given to ensure appropriate handling and disposal. Given the high potential for bacterial transmission from environmental sources, monitoring and enforcing appropriate cleaning regimens are recommended to prevent HAI.

Antimicrobial stewardship involves monitoring appropriate antimicrobial use and antibiotic resistance and implementing antibiotic control policies. Millions of antibiotics Prescriptions are prescribed to patients each year during office visits, but it is estimated that approximately 50% of these are not necessary. Overuse of antibiotics not only places patients at risk for developing medication side effects and CDI, but also contributes to the increasing problem of antimicrobial resistance (Sikora A, 2022 Sep 23.).

Patient Education

Patients and their families play an important role in infection prevention. Take time to educate them on infection prevention basics and help them feel comfortable. asking questions and voicing concerns to healthcare professionals in your facility. Your patients should:

1. Be aware of healthcare-associated infections (HAIs). HAIs are infections. that patients can get into a healthcare facility while receiving medical care. These infections are often preventable. No matter where a patient is, hospital, a long-term care facility, an outpatient surgery center, a dialysis center, doctor's office, they are at risk for infections.
2. Feel empowered to speak up for their care. Remind your patients that they should never feel shy or reluctant to ask for more information. After all, the Doctors, nurses, and other members of their care team want them to have a voice in their care.
3. Know to clean their hands often. Hand hygiene is the most important way to help prevent infection! Tell your patients that it is okay to ask healthcare questions. workers and visitors to clean their hands if they don't see them do it.
4. Understand the basics of safe injection practices. Teach your patients to recognize unsafe injection practices and speak up if they have a concern. Remember: one needle, one syringe, and one time.
5. Know to monitor the cleanliness of their area. Keeping the patient's keeping the environment and equipment clean is extremely important, especially frequently touched items. Germs on a bedrail, call bell, or keyboard could infect patients if not properly cleaned.

6. Be prepared to ask questions about their medications. Patients need to understand what medicines they are taking and why, especially if antibiotics
7. Know how to practice good post-surgical care. Preventing infections after surgery is essential. Teach your patients how to care for their wound after leaving the healthcare facility and to verify that any person that inspects their wounds or changes their dressings uses appropriate hand hygiene. Patients need to understand the importance of their own hand hygiene, as well.
8. Understand how to care for their devices. Advise your patients to ask if their device (catheter, etc.) is necessary. If your patient is sent home with a device, teach them how to care for it so they don't develop an infection.
9. Have a plan to stay up to date with their vaccinations. Help your patients get the shots they need to stay healthy. Vaccines can prevent the suffering and costs (including time lost from work) associated with the flu, pneumonia, human papillomavirus (HPV), and hepatitis B.

   At the end All the patients go to the hospital to get well not to get the infection ,so remember, by educating your patients, you can help stop the spread of infection. (Epidemiology, 2023)

Technique to achieve a successful and functioning infection control program, a hospital can implement the following measures

1. Surveillance: The primary aim of surveillance programs is to assess the rate of infections and endemic likelihood. Generally, hospitals target surveillance for HAIs in areas where the highest rate of infection is, including intensive care units (ICUs), hematology/oncology, and surgery units.
2. Isolation: The main purpose of isolation is to prevent the transmission of microorganisms from infected patients to others. Isolation is an expensive and time-consuming process, therefore, should only be utilized if necessary. On the other hand, if isolation is not implemented then we risk the increase in morbidity and mortality, henceforth, increasing overall healthcare cost
3. Outbreak Investigation and Management: Microorganisms outbreaks can be identified through the surveillance system. Once a particular infection

monthly rate crosses the 95% confidence interval threshold, an investigation is warranted for a possible outbreak.

4. Education: Healthcare professionals need to be educated and periodically reinforce their knowledge through seminars and workshops to ensure high understanding of how to prevent communicable diseases transmission. The hospital might develop infection prevention liaison program by appointing a healthcare professional who could reach out and disseminate the infection prevention information to all members of the hospital.
5. Employee Health: It is essential for the infection control program to work closely with employee health service. Both teams need to address important topics related to the well-being of employees and infection prevention, including management of exposure to blood borne communicable diseases and other communicable infections
6. Antimicrobial Stewardship: Antimicrobials are widely used in the inpatient and outpatient settings. Antimicrobial usage widely varies between hospitals, commonly, a high percentage of patients admitted to hospitals are administered with antibiotics. Increasingly, hospitals are adapting antimicrobial stewardship programs to control AMR, improve outcomes, and reduce healthcare costs
7. Policy and Interventions: The main purpose of the infection control program is to develop, implement, and evaluate policies and interventions to minimize the risk for HAIs.
8. Environmental Hygiene: As the inpatient population becomes more susceptible to infections the emphasize on environmental hygiene has increased. Hospital decontamination through the traditional cleaning methods is notoriously inefficient. Newer methods including steam, antimicrobial surfaces, automated dispersal systems, sterilization techniques and disinfectants have a better effect in limiting transmission of pathogens through the surrounding environment (Habboush Y, 2022 Sep 12.)

TREATMENT

HAI are treated according to standardized guidelines that include fluid resuscitation, antibiotics, goal-directed therapy for sepsis, and close organ monitoring. After administering fluids, the clinical and hemodynamic responses should be repeatedly evaluated. It is important to select the right antibiotic and start using it at the right time.

Empiric antibiotics should be chosen depending on the patient's clinical stability and risk factors for MDR infections. Before beginning antibiotic therapy, two sets of blood cultures, one from a peripheral venous site and the other from the site of the central venous catheter, should be obtained if central line-associated bloodstream infection is suspected. Antibiotics should also be started as soon as possible, ideally within an hour. In the event of surgical site infections, antibiotics must be used as soon as possible and after that adjusted based on culture results. Depending on the clinical situation, antibiotics to treat staphylococcus aureus and other pathogens like Pseudomonas are typically started. Antibiotics with activity against MDR infections, like MRSA and carbapenemase-producing Enterobacteria, must frequently be considered for treatment. (Monegro AF, 022 Aug 22.)

2.2Previous studies

1: A study was done in Sanaa City in 2022 on the knowledge and practice of Nurses toward Standard Precautions of Infection Control in Government Hospitals of Sana'a City, Yemen

The study results revealed a statistically significant difference between nurses' knowledge and practice of standard infection control procedures (P = 0.037). The percentage of nurses who practiced safety precautions (53%), which was significantly lower than the average percentage of assessed knowledge (81.4%). Only 48 (20.7%) of the Respondents practiced a good level of standard infection control procedures, despite the fact that less than half of the respondents, 106 (45.7%), had a very good knowledge level (>80%). Significant statistical differences were identified between knowledge and gender. (P = 0.028), as well as the practice of working experience and the name of the hospital.

(P = 0.047 and 0.001, respectively) (ALwabr & AL-Salehi, 2022).

2: A study was done in Gujarat in 2022 on the Knowledge, Attitude, and Behavior on Infection Prevention and Control Practices of Undergraduate Medical and Paramedical Students.

It was found that a total of 465 undergraduate medical and paramedical students participated. with an overall knowledge score of 71.38%, an attitude score of 77.27%, and a behavior score was 81.24%. MLT students had significantly lower scores compared to students of other fields. No significant difference in scores was observed among various ages, genders, and phase of undergraduate study (Dabhi, 2022).

3: A Study was done in Saudi Arabia in 2021 on the Knowledge of infection prevention and control among healthcare workers and factors influencing compliance.

The study revealed that, overall, the level of HCW knowledge of IPC appears to be adequate, good, and/or high concerning standard precautions, hand hygiene, and care pertaining to urinary catheters Acceptable levels of knowledge were also detected in Regarding IPC measures for specific diseases, including TB, MRSA, and MERS-CoV, COVID-19 and Ebola However, gaps were identified in several HCWs' knowledge. concerning occupational vaccinations, the modes of transmission of infectious diseases, and the risk of infection from needle stick and sharps injuries. Several factors Noncompliance with IPC guidelines is discussed, as are recommendations for improving adherence to those guidelines (ALhumaid, 2021).

4: Also, study was conducted in Ethiopia in 2019, to study (Knowledge, attitude, and practice of healthcare professionals regarding infection prevention at Gondar University referral hospital, northwest Ethiopia)

Demonstrated that among 282 study participants, 230 (81.6%), 181 (64.2%), and 162 (57.4%) had adequate knowledge, favorable attitudes, and adequate practice scores. respectively. More than half (55.3%) of the study participants were untrained. There was a high (26.6%) prevalence of needle stick injury; however, the use of post-exposure Prophylaxis after potential exposures was very limited. Generally, the levels of knowledge attitude, and practice scores among the study participants were low. Therefore, there should be an adequate and consistent supply of personal protective devices and other materials used for infection prevention and control. In addition, there should be awareness. Raising mechanisms, including the provision of job aids and periodic training.

Further, Comprehensive studies should be conducted, including different types and levels of health facilities (YAZIE, et al., 2019)

5: A Study was done in Lebanon in 2019, titled (Knowledge, Attitude and Practice for Healthcare Workers and Clinical Students about Infection Control Measures Awareness at Hospitals)

The results showed that knowledge between the three groups was good regarding standard precautions, but moderate regarding post-exposure prophylaxis and vaccination. The results showed 41.7% of participants knew the correct vaccines recommended, and medical labs were significantly higher than the other two groups (p = 0.00). Despite the good knowledge about standard precautions, the main reason for noncompliance was that They don't have time to wear PPE while working, and nurses were significantly higher than the other two groups (p = 0.00). The adherence to the use of PPE significantly related to whether they have regular access to them in the facility (p=0.00).Among those who had occupational exposure as nurses reported the exposure, (p=0.001). In addition, 62.9% reported that PEP medications were available at their work place, while 52.5% experienced the sometimes unavailability of these medications. This study revealed good knowledge and attitudes toward infection prevention among the majority of participants with a relatively minimal practice rate (Safadi, 2019).

6: A study was done in Pakistan in 2018 titled (knowledge, Attitude and practices regarding infection control measure among medical students).

The study found 413 medical students with an average age of 21.78 plus 1.10 years. Overall, 206 (49.9%) students were from the private university and 207 (50%) from the Students from public institutions in private situations had better knowledge compared to those from the public initiative regarding hand hygiene (p 0,001) and needle stick injury (p 0,001). and surgical scrubbing (p = 0,007) as better reported practices. Regarding hand hygiene (p 0,001) and surgical scrubbing (p 0,001) (Sharif, *et al*., 2018).

CHAPTER 3:
Methodology

3. Material and Methods

3.1. Study Design:

Analytic cross-sectional institutional-based study.

3.2 Study Area:

Faculties of Medicine (Emirates University, Sana'a University, 21 September University and University of Science and Technology) in Sana'a City, Yemen.

3.3 Study Duration:

The study duration from 1st April to 30 April, 2023.

3.4 Study Population:

Clinical Year Medical Students of Faculties of Medicine (Emirates University, Sana'a University, 21 September University, and University of Science and Technology) in Sana'a City, Yemen.

3.5 Study tool:

A self-administrated, structured, modified online questionnaire with closed questions was used, which consist of four parts: demographic data, knowledge, attitude, and practice.

3.6.1 Variables:

3.6.2.1 Dependent Variables:

Knowledge, attitude and practice.

3.6.2.2 Independent and background Variables:

Gender, Age, Education Level, university, Sources of information regarding infection control and prevention, training Program in infection control and prevention.

3.7 Sample Size and Sampling Techniques: -

3.7.1: Sampling Techniques:

The sample collected through convenience non- random technique.

3.7.2: Sample Size:

The total study population at four universities was = 5,100 clinical students. Faculty of medicine (Emirates University, Sana'a University, 21 September University, and University of Science and Technology)

The sample size calculated by using Slovene's formula is:

$n = \frac{N}{(1+Ne^2)}$ (Adhikari, 2021)

Whereas:

n = no. of samples

N = total population of students

e = error margin / margin of error

So the sample size $n = \frac{5100}{(1+5100*0.05^2)}$ = 370 students.

3.8 Data Analysis:

The data was analyzed by IBM SPSS version 28. Both descriptive and inferential Statistics were used. The result showed up on data-displaying methods like graphs or tables. A t-test and an ANOVA test were used to evaluate the relationship between variables; the P value ≤ 0.05. considered significant in all tests.

Knowledge was assessed by answering 20 questions, followed by the calculation of a total cumulative knowledge score for each participant. Questions were given one point. for correct responses and zero points for incorrect answers. Less than the median is classified as poor, whereas equal or higher than the median is classified as good. To evaluate the attitude Questions were asked. A 3-likert scale was used (agree = 3, natural = 2, and disagree =1). A score of under the median classified as negative, equal to the median classified as positive, or above the median classified as positive Regarding practice, 14 questions were asked, with a similar scoring system as attitude. (Always = 3, sometimes = 2, never =1) A score below the median is classified as poor. Whereas equal or higher is classified as good.

3.9 Ethical Consideration

The researchers obtained ethical approval from the faculty of medicine and health science Emirates University, Sana'a. It was also voluntarily approved before the a questionnaire was answered by a medical student.

CHAPTER 4:
Results

Results

According to the aim of this study, 370 medical students participated. Their mean age was 25.2 ± 2.6 years. More than half of the participants (58.1%) were male. 21 September University had the highest number of participants (41.1%), followed by Emirates International University (23.2%), Sana'a University (23.0%), and the University of Science and technology (12.7%) Participants in the fifth level had the highest representation (34.3%), followed by the sixth level (31.4%), the fourth level (23.8%), and seventh level (10.5%). Furthermore, half of the participants (50.0%) reported having received training regarding infection control and prevention in the last 12 months. Table (1)

Table 1. Demographic data of participants (N=370)

Variables	Frequency (%)	
Age, mean ±SD, years	25.2 ± 2.6	
< 25 years	160	43.2
≥ 25 years	210	56.8
Sex		
Male	215	58.1%
Female	155	41.9%
University		
Sana'a University	85	23.0%
21 September University	152	41.1%
Emirates International University, Sanaa	86	23.2%
University of Science and Technology	47	12.7%
Level		
Fourth	88	23.8%
Fifth	127	34.3%
Sixth	116	31.4%
7^{TH}	39	10.5%
Had infection control and prevention training in last 12 months		
Yes	185	50.0%
No	185	50.0%

Lecturers were the main source of information (67.8%), which suggests that Education and academic settings may be important avenues for disseminating health information. The second most commonly reported source of information is hospital staff. (46.2%), this finding may indicate that hospital staff play an important role in providing Health information and education for students are followed by the Internet. The most commonly reported source of information is the internet (35.9%). This could reflect the ease and accessibility of online resources and suggests that there may be a need for reliable health information available on the internet. Friends, family, and others: Friends, family, and others were reported as sources of information by a lower percentage of participants (8.6%, 9.7% and 25.9%, respectively), these sources can still be important for promoting health. Behaviors and education, especially if they are reliable and trustworthy sources. (Figure1)

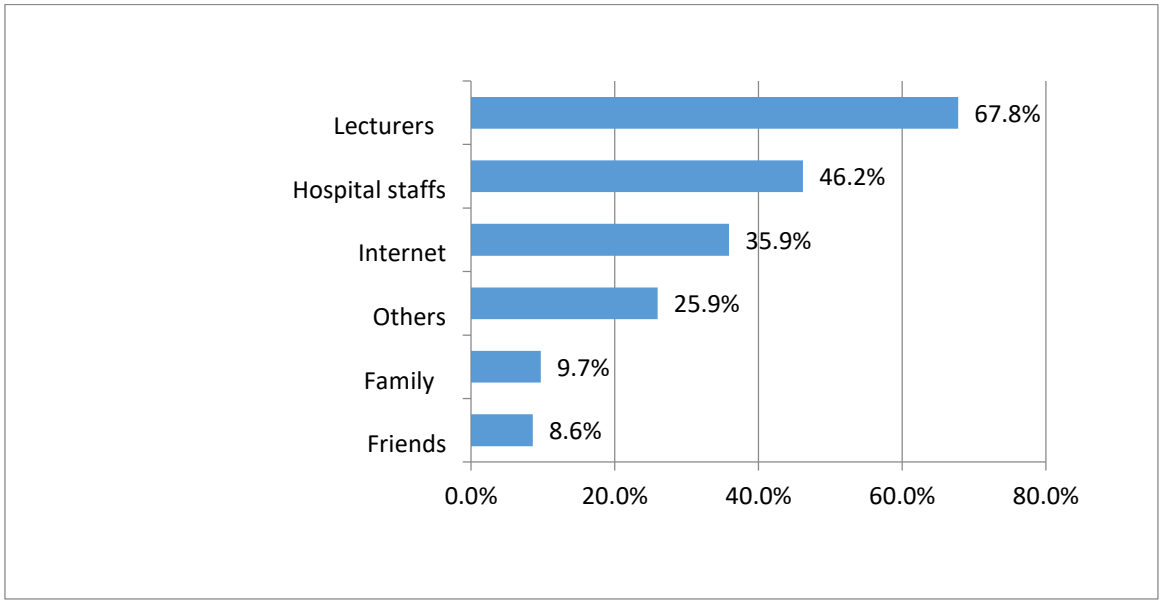

Figure 5: Sources of information of IPC (n= 370)

The mean knowledge score was 17.3 ± 3.6.More than half of the students 56.5% had good knowledge (table 2)

The mean attitude score was 32.9 ± 3.7 .More than half of the students 64.9% had good attitude (table 2).

The mean practice score was 36.8 ± 6.8. Half of the students 50.3% had good practice (table 2).

Table 2: Overall Knowledge, attitude and practices

Variables (Mean ±Std.Deviation)	Classification	Frequency	Percent
Knowledge score (17.3±3.6)	**Poor**	161	43.5
	Good	209	56.5
Attitude score (32.9±3.7)	**Poor**	130	35.1
	Good	240	64.9
Practice score (36.8±6.8)	**Poor**	184	49.7
	Good	186	50.3

Most of the students 95.9% reported that washing hands after contact with the patient's environment is one of the elements in standard precaution whereas only 77.3% reported that Alcohol-based rubs are used after removing gloves .The percentages of correct answers to questions on IC knowledge are shown in Table 3.

Table 3. Knowledge about ICP among medical students, Sana'a Yemen (n=370).

Knowledge items		**Yes**	**No**	**I don't Know**
1.	Standard precautions are used for the care of all patients regardless of their diagnosis and perceived infection status	293 79.2%	40 10.8%	37 10.0%
2.	Isolation precaution is one of the elements in standard precaution	328 88.6%	6.5%	18 4.9%
3.	Washing hands after contact with the patient's environment is one of the elements in standard precaution	355 95.9%	8 2.2%	7 1.9%
4.	Alcohol-based rubs are used after removing gloves	286 77.3%	48 13.0%	36 9.7%
5.	Performing hand hygiene is required before and after patient care	347 93.8%	9 2.4%	14 3.8%
6.	Hands should be washed with soap and water before and after handling potentially infectious materials irrespective of wearing gloves	328 88.6%	27 7.3%	15 4.1%
7.	personal protective equipment is important in infection control because it acts as a barrier between infectious materials such as viral and bacterial contaminants and your skin, mouth, nose, or eyes (mucous membranes)	348 94.1%	14 3.8%	8 2.2%
8.	Gloves must be worn every time during handling potentially infectious materials	337 91.1%	17 4.6%	16 4.3%
9.	Gloves must be changed during patient care if you move hands from 'contaminated body site' to 'clean body site'	329 88.9%	23 6.2%	18 4.9%
10.	Surgical masks can protect the nose and mouth when procedures and activities are likely to generate splashes or sprays of blood and body fluids	330 89.2%	15 4.1%	25 6.8%
11.	The purpose of using a gown or apron is to protect clothes from splashes or sprays of blood and body fluids	315 85.1%	31 8.4%	24 6.5%
12.	Removed all personal protective equipment before leaving the patient's environment	308 83.2%	41 11.1%	21 5.7%
13.	Stationary, telephones kept in wards, and doorknobs can be sources of infections	317 85.7%	28 7.6%	25 6.8%

Knowledge items		Yes	No	I don't Know
14	All linen from an infectious patient should be thrown in a red linen bag even when it is free from visible blood or body fluids	300 81.1%	14 3.8%	56 15.1%
15	Segregation of clinical and non-clinical waste is important for preventing the spread of infection	333 90.0%	13 3.5%	24 6.5%
16	Ampoules injection that has been used must be disposed of in the clinical waste bin	329 88.9%	16 4.3%	25 6.8%
17	Recapping of needles, in general, is not appropriate	239 64.6%	93 25.1%	38 10.3%
18	If you puncture hand with sharp instruments, you must report to the concerned authorities	326 88.1%	20 5.4%	24 6.5%
19	Puncture-proof containers should be used for disposal of sharps objects	325 87.8%	20 5.4%	25 6.8%
20	Mask must be placed on coughing patients to prevent potential dissemination of infectious respiratory secretions from the patient to others	337 91.1%	20 5.4%	13 3.5%

its good mentioning that most of the students reported that adequate disinfection of medical equipment should be ensured and Standard precautions prevent the spread of infections from patients to health care workers and vice versa (85.1%, 83.0%) respectively. however 40.0% think that It is not logical to assume all patients contagious unless their infection has been confirmed and 35.9% it is difficult to work wearing personal protective equipment thought and 35.5% reported that standard precaution is not easy to follow. Attitude items in details in table (4).

Table 4. Attitude towards ICP among medical students, Sana'a Yemen (n=370).

Attitude items		Agree	Natural	Disagree
1.	Standard precaution is not easy to follow	131* 35.4%	49 13.2%	190 51.3%
2.	Standard precautions prevent the spread of infections from patients to health care workers and vice versa	307* 83.0%	39 10.5%	24 6.5%
3.	Infectious diseases can be treated hence personal protective equipment are not required	104 28.1%	45 12.2%	221* 59.7%
4.	Prefers to perform hand hygiene before and after any intervention with patients	306* 82.7%	36 9.7%	28 7.6%
5.	personal protective equipment can be used during emergencies	282* 76.2%	40 10.8%	48 13.0%
6.	Changing gloves is necessary during procedures if heavily contaminated	231* 62.4%	34 9.2%	105 28.4%
7.	It is difficult to work wearing personal protective equipment	133 35.9%	52 14.1%	185* 50.0%
8.	Healthcare providers should ensure the availability of adequate protective barriers	308* 83.2%	31 8.4%	31 8.4%
9.	HCWs should not use personal protective equipment because it may harm patients psychologically	125 33.8%	52 14.1%	193* 52.2%
10.	Stationeries, telephones, and doorknobs are sources of infections	218* 73.9%	35 9.5%	117 31.6%
11.	Segregation of clinical and non-clinical waste is useful to prevent transmission of infections from one to another	282* 76.2%	45 12.2%	43 11.6%
12.	Adequate disinfection of medical equipment should be ensured	315* 85.1%	31 8.4%	24 6.5%
13.	Transmission of infectious organisms can be reduced by adhering to standard and contact precautions	300* 81.1%	39 10.5%	31 10.5%
14.	It is not logical to assume all patients contagious unless their infection has been confirmed	148* 40.0%	67 18.1%	155 41.9%

*: correct response

(ICP): Infection control and prevention

Its good mentioning that three-quarter of the students reported they always wears mask when performing operations/procedures that might induce the spraying of blood, body fluid, secretions, or excretions whereas only 58.9% wears gloves when performing parenteral injections of medications. Practice items in details on table 5.

Table 5. Practice of ICP rules among medical students, Sana'a Yemen (n=370).

Practice items		Always	Sometimes	Never
1.	Performs hand hygiene when they come in contact with patients.	238 64.3%	110 29.7%	22 5.9%
2.	Performs hand hygiene after taking off gloves.	216 58.4%	121 32.7%	33 8.9%
3.	Washes hands immediately after contacting any blood, body fluid, secretion, excretion, or dirty substances.	266 71.9%	84 22.7%	20 5.4%
4.	Wears gloves when drawing blood samples.	233 63.0%	107 28.9%	30 8.1%
5.	Wears gloves when disposing of stool or urine.	276 74.6%	72 19.5%	22 5.9%
6.	Wears gloves when handling impaired patient skin.	253 68.4%	93 25.1%	24 6.5%
7.	Wears gloves when handling the patient's mucosa.	272 73.5%	73 19.7%	25 6.8%
8.	Wears gloves when handling saliva or sputum culture.	260 70.3%	84 22.7%	26 7.0%
9.	Wears gloves when performing parenteral injections of medications.	218 58.9%	118 31.9%	34 9.2%
10	Wears gloves when dressing wounds.	272 73.5%	75 20.3%	23 6.2%
11	Wears gloves when they come in contact with blood.	275 74.3%	75 20.3%	20 5.4%
12	Wears mask when performing operations/procedures that might induce the spraying of blood, body fluid, secretions, or excretions.	278 75.1%	74 20.0%	18 4.9%
13	Wears protective suits or gown when performing operations/procedures that might induce spraying of blood, body fluid, secretions, or excretions.	266 71.9%	79 21.4%	25 6.8%
14	Dispose of needles, blades, or any other single use sharp objects in a sharp disposal container after use.	268 72.4%	76 20.5%	26 7.0%

(ICP): Infection control and prevention

Table 6 appears a summary of demographic data related to knowledge of infection control and prevention practices. There is statically significant between knowledge score and university and training in last 12 months. participants who attended university of science and technology (UST) followed by Emirates International University, Sanaa had higher knowledge score than others respectively. In addition students who had training within the last 12 months had higher mean scores than their counterparts.

Table 6: relationship between demographic data and knowledge score.

Variables	Frequency	Mean of ICP knowledge	SD	P. value
Age				**.196**
< 25 years	160	17.1	3.72	
≥ 25 years	210	17.5	3.43	
Sex				**.277**
Male	215	17.2	3.75	
Female	155	17.6	3.28	
University				**.005**
Sana'a University	85	17.2	3.38	
21 September University	152	16.7	3.96	
EIU	86	17.6	3.27	
UST	47	18.8	2.46	
Level				**.074**
Fourth	88	16.8	4.14	
Fifth	127	17.0	3.78	
Sixth	116	17.7	2.84	
7^{TH}	39	18.3	3.13	
			3.56	
Had ICP training in last 12 months				**.001**
Yes	185	18.1	2.72	
No	185	16.6	4.11	

Table 7 the results suggest that attitudes towards infection control and prevention practices may vary across different demographic groups and levels of training. For example, participants who attended 21 September University had slightly lower mean scores than those who attended other universities. Additionally, participants who were in their sixth and seventh level of education had higher mean scores than their counterparts. However, there were no significant differences between the attitudes of males and females or between participants of different age groups and pervious training.

Table 7: relationship between demographic data and attitude score.

Variables	Frequency	Mean of ICP attitude	SD	P. value
Age				.890
< 25 years	160	32.9	3.63	
≥ 25 years	210	32.9	3.73	
Sex				.371
Male	215	33.1	3.66	
Female	155	32.7	3.72	
University				**.006**
Sana'a University	85	32.6	3.74	
21 September University	152	32.4	4.13	
EIU	86	33.4	3.17	
UST	47	34.4	2.25	
Level				**.018**
Fourth	88	32.7	4.11	
Fifth	127	32.3	4.05	
Sixth	116	33.7	2.74	
7^{TH}	39	33.2	3.56	
Had ICP training in last 12 months				.069
Yes	185	33.3	3.41	
No	185	32.6	3.92	

Table 8 the summary of practice of students to infection control and prevention rules, participants from UST had the highest mean ICP practice score, and participants from Sana'a University had the lowest, with 21 September University and EIU falling somewhere in the middle. It's was statistically significant. No statistically significant differences were found between practice of students to ICP rules with education levels .age, sex and pervious training.

Table 8: relationship between demographic data and practice score.

Variables	Frequency	Mean of ICP practice	SD	P. value
Age				.109
< 25 years	160	37.4	6.84	
≥ 25 years	210	36.3	6.81	
Sex				.216
Male	215	36.4	6.80	
Female	155	37.3	6.88	
University				**.017**
Sana'a University	85	35.4	7.25	
21 September University	152	36.4	7.68	
EIU	86	37.7	5.47	
UST	47	38.9	4.46	
Level				.221
Fourth	88	36.6	7.07	
Fifth	127	36.2	7.98	
Sixth	116	37.8	5.11	
7^{TH}	39	35.9	6.63	
Had ICP training in last 12 months				.127
Yes	185	37.3	6.19	
No	185	36.2	7.41	

CHAPTER 5
Discussion

The study was conducted to assess the level of knowledge, attitude, and practice of clinical medical students regarding infection prevention and control.

The study reveals that the demographic and characteristic data of the sample show that more than half of participants were male, while there is no significant correlation between age and training regarding infection control and prevention. This outcome is In line with a study done among nurses working in five government hospitals in Sana'a city, Yemen. (ALwabr & AL-Salehi, 2022) And disagreement with the study conducted in Gujarat, India, could be due to the number of male students in Arabic countries is higher than that of female students. (Dabhi, 2022)

Lectures were the main source of information, which suggests that education and Academic settings may be important avenues for disseminating health information. The second most commonly reported source of information is hospital staff. This finding is in line with studies involving Lebanese nurses, medical lab technologists, and clinical students practicing in various hospitals around Lebanon. (Safadi, 2019)

More than half of the students had good knowledge and a good attitude. This outcome was consistent with prior research in a Yemeni study, the majority of nurses had sufficient understanding of standard infection control procedures. (ALwabr & AL-Salehi, 2022) Also, this outcome is linked with a study conducted in Lebanon about knowledge, attitude, and practice for healthcare workers and clinical students about infection control measures. (Safadi, 2019)

The study revealed that half of the students had good practice. It's good to mention that. Three-quarters of the students reported they always wear masks when performing. operations or procedures that might induce the spraying of blood, body fluid, secretions, or excretions, whereas only 58.9% wear gloves when performing parenteral injections of medications. This differs from the study done among nurses working in five governments. Hospitals in Sana'a city, Yemen, show that the majority of nurses had poor practice, which could be due to a lack of training among health care workers. (ALwabr & AL-Salehi, 2022)

Moreover, the University of Science and Technology, which is a private university, had a more good knowledge, practice, and positive attitude followed by EIU compared to other universities, similar to the study done in Pakistan regarding infection control measures among Medical students revealed that students from private situations had better knowledge. Compared to those from public initiatives. This is because the number of students in private universities is less than in public universities, so their understanding is more. (Sharif, *et al.*, 2018)

Limitation of the study

1. This study focused on medical students only, without the other paramedical colleges, and the study also included only two private universities and two governmental universities and didn't include all universities due to a lack of time.
2. Observation of practice in real life scenario was not assessed as part of research due to technical difficulties.
3. We lost 2 months in many studies (caesarean section and renal transplantation) that we could not complete it due to difficulties in Sana'a hospitals to find data .
4. A lack of data of IPC among medical students.
5. A stratified coordinating sample was not taken because most of the students on vacation and were not available during the sample collection and we also could not obtain a list of students from universities.

CHAPTER 6

Conclusion & Recommendation

6.1Conclusion

1. Majority of participants receive training regarding infection control and prevention training in last 12 months.
2. The main sources of information are lectures and hospital staff, this finding may indicate that hospital staff play an important role in providing health information and education to patients.
3. More than half of the students have a good knowledge, attitude and practice of ICP.
4. UST have the best practice regarding ICP.
5. More than half of respondent are male of September University have the highest member of participants follow by Emirates International University.

6.2Recommendation

1. Educate health care professionals and periodically reinforce their knowledge through seminars and workshops.

2. Delivering periodic training seminars on infection control for newly admitted medical students.

3. Evaluate the level of practice by using an observation checklist.

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APPENDIX

Online Questionnaire:

1. Demographic data of participants:

Variables
Age
Sex ○ Male ○ Female
University ○ Sana'a University ○ 21 September University ○ Emirates International University, Sanaa ○ University of Science and Technology
Year of study ○ 4th ○ 5th ○ 6th ○ 7th
Sources of information regarding infection control and prevention ○ Lecturers ○ Hospital ○ Friends ○ Family ○ Internet ○ Others
Infection control and prevention training in last 12 months ○ Yes ○ No

2. Knowledge on Infection Control Standard Precaution

Knowledge items		Yes	No	I don't Know
1.	Standard precautions are used for the care of all patients regardless of their diagnosis and perceived infection status			
2.	Isolation precaution is one of the elements in standard precaution			
3.	Washing hands after contact with the patient's environment is one of the elements in standard precaution			
4.	Alcohol-based rubs are used after removing gloves			
5.	Performing hand hygiene is required before and after patient care			
6.	Hands should be washed with soap and water before and after handling potentially infectious materials irrespective of wearing gloves			
7.	personal protective equipment is important in infection control because it acts as a barrier between infectious materials such as viral and bacterial contaminants and your skin, mouth, nose, or eyes (mucous membranes)			
8.	Gloves must be worn every time during handling potentially infectious materials			
9.	Gloves must be changed during patient care if you move hands from 'contaminated body site' to 'clean body site'			
10.	Surgical masks can protect the nose and mouth when procedures and activities are likely to generate splashes or sprays of blood and body fluids			
11.	The purpose of using a gown or apron is to protect clothes from splashes or sprays of blood and body fluids			
12.	Removed all personal protective equipment before leaving the patient's environment			
13.	Stationary, telephones kept in wards, and doorknobs can be sources of infections			
14.	All linen from an infectious patient should be thrown in a red linen bag even when it is free from visible blood or body fluids			
15.	Segregation of clinical and non-clinical waste is important for preventing the spread of infection			
16.	Ampoules injection that has been used must be disposed of in the clinical waste bin			

17.	Recapping of needles, in general, is not appropriate			
18.	If you puncture hand with sharp instruments, you must report to the concerned authorities			
19.	Puncture-proof containers should be used for disposal of sharps objects			
20.	Mask must be placed on coughing patients to prevent potential dissemination of infectious respiratory secretions from the patient to others			

3. Attitude towards Standard Infection Control Precaution

Attitude items		**Agree**	**Natural**	**Disagree**
1.	Standard precaution is not easy to follow			
2.	Standard precautions prevent the spread of infections from patients to health care workers and vice versa			
3.	Infectious diseases can be treated hence personal protective equipment are not required			
4.	Prefers to perform hand hygiene before and after any intervention with patients			
5.	personal protective equipment can be used during emergencies			
6.	Changing gloves is necessary during procedures if heavily contaminated			
7.	It is difficult to work wearing personal protective equipment			
8.	Healthcare providers should ensure the availability of adequate protective barriers			
9.	HCWs should not use personal protective equipment because it may harm patients psychologically			
10.	Stationeries, telephones, and doorknobs are sources of infections			
11.	Segregation of clinical and non-clinical waste is useful to prevent transmission of infections from one to another			
12.	Adequate disinfection of medical equipment should be ensured			
13.	Transmission of infectious organisms can be reduced by adhering to standard and contact precautions			
14.	It is not logical to assume all patients contagious unless their infection has been confirmed			

4. Practice of Standard Infection Control Precaution

Practice items		Always	Sometimes	Never
1.	Performs hand hygiene when they come in contact with patients.			
2.	Performs hand hygiene after taking off gloves.			
3.	Washes hands immediately after contacting any blood, body fluid, secretion, excretion, or dirty substances.			
4.	Wears gloves when drawing blood samples.			
5.	Wears gloves when disposing of stool or urine.			
6.	Wears gloves when handling impaired patient skin.			
7.	Wears gloves when handling the patient's mucosa.			
8.	Wears gloves when handling saliva or sputum culture.			
9.	Wears gloves when performing parenteral injections of medications.			
10	Wears gloves when dressing wounds.			
11	Wears gloves when they come in contact with blood.			
12	Wears mask when performing operations/procedures that might induce the spraying of blood, body fluid, secretions, or excretions.			
13	Wears protective suits or gown when performing operations/procedures that might induce spraying of blood, body fluid, secretions, or excretions.			
14	Dispose of needles, blades, or any other single use sharp objects in a sharp disposal container after use.			

الملخص العربي

المقدمة:

معرفة إجراءات الوقاية من العدوى ومكافحتها بين طلاب الطب أمر بالغ الأهمية للوقاية الفعالة من العدوى ومكافحتها. إن عدم الامتثال لتدابير مكافحة العدوى له آثار خطيرة على سلامة طلاب الطب وحماية المرضى وبيئة الرعاية ، لذا فإن طلاب الطب الذين لا يمارسون الوقاية من العدوى ومكافحتها يمكن أن يصبحوا عرضة للأمراض المرتبطة بالرعاية الصحية التي تهدد الحياة. هناك نقص في البيانات حول فهم طلاب الطب للوقاية من العدوى ومكافحتها ، فضلاً عن الاستراتيجيات التعليمية التي تعرضوا لها من أجل تعلم هذه السلوكيات.

الأهداف:

تقييم المعرفة ،المواقف والممارسات المتعلقة بمكافحة العدوى بين طلاب كليات الطب بجامعات مدينة صنعاء.

منهجيه البحث:

خلال أبريل 2023 ، أجريت دراسة وصفية مقطعية على طلاب كليات الطب في مدينة صنعاء باليمن باستخدام استبيان منظم يتكون من أربعة أجزاء: البيانات الديموغرافية والمعرفة والمواقف والممارسة موزعة على 370 طالب طب سريري ، تم استخدام الحزمة الإحصائية للعلوم الاجتماعية (SPSS) الاصدار 28 لإجراء التحليل الإحصائي وفحص البيانات الموجودة.

النتائج:

في المجموع ، شارك 370 فردًا في هذه الدراسة ، بمتوسط عمر 25.2 ± 2.6 سنة. أكثر من نصف المبحوثين هم من الذكور (58.1٪) ، وحصلت جامعة 21 سبتمبر على أعلى نسبة مشاركة (41.1٪) ، تليها جامعة الإمارات الدولية (23.2) ، ثلثهم (34.3٪) من المستوى الخامس ، بالإضافة إلى ذلك، أفاد نصف المشاركين (50.0٪) أنهم تلقوا تدريبًا بشأن مكافحة العدوى والتدريب على الوقاية في الأشهر الـ 12 الماضية. كانت المصادر الرئيسية للمعلومات هي المحاضرات وطاقم المستشفى (67.8٪ ، 46.2٪) على التوالي. أكثر من نصف الطلاب 56.5٪ لديهم معرفة جيدة بالوقاية من العدوى ومكافحتها ، معظمهم 64.9٪ لديهم موقف إيجابي ونصف الطلاب 50.3٪ يمارسون بشكل جيد.

الخلاصة:

كان لدى أكثر من نصف الطلاب معرفة جيدة بـالوقاية من العدوى ومكافحتها ، وكان لدى الغالبية موقف إيجابي ونصف الطلاب يمارسون بشكل جيد.

الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
الجامعة الإماراتية الدولية
كلية الطب والعلوم الصحية

المعرفة والمواقف والممارسات لطلاب الطب فيما يخص الوقاية من العدوى ومكافحتها بكلية الطب ، في مدينة صنعاء ، اليمن

بحث مقدم لقسم طب المجتمع ، كلية الطب والعلوم الصحية ، الجامعة الإماراتيه ، لتحصيل درجة البكالوريوس في الطب العام والجراحة.

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