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Knowledge, Attitude and Practice of Infection Control among Medical Imaging Students in Unisza

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Abstract

Healthcare-associated infection risk in health care settings has caused great concern to medical imaging students during clinical attachment due to high patient interaction rates. Students may spread infections through inadequate knowledge and poor practice, which may then degrade the standard of care. Preventive measures and infection control policies have been developed to prevent the spread of infections, lower morbidity and medical care costs. However, recent evidence had revealed poor health science students' knowledge of infection control. This cross-sectional survey-based study is aimed to determine the level of knowledge, attitude, and practice towards infection control. This study is also aimed to determine the association between knowledge, attitude, and practice level of infection control and standard precautions among uniSZA medical imaging students. The sampling method used was purposive sampling. An online questionnaire was distributed using social media platform, Whatsapp from 21st March to 22nd April 2023. The questionnaire consists of 12 items on knowledge, seven items on attitude and 10 items on practice about infection control. A total of 136 medical imaging students participated in this study, 98 Bachelor's degree students and 38 Diploma students. Overall knowledge, attitude and practice level among students were good. The percentage of respondents who had good knowledge, positive attitude, and good practice were 100% (n=136), 100% (n=136) and 98.5% (n=134) respectively. Fisher's exact test shows there was no association between attitude level and practice level of infection control among respondents (p =1.00). Continuous infection control training and education program are still required to enhance awareness of standard precautions and thus reduce infection exposure. Future recommendations are to include all health science students and medical students to participate in the survey. Further studies may also be conducted to assess the extent of public knowledge regarding infection control.

Keywords

Medical Imaging Students, Infection Prevention and Control, Standard Precautions, Knowledge, Attitude, Practice.

Introduction

Healthcare-associated infections (HCAIs) are serious public-health issues in both developed and developing countries, leading to significant morbidity, mortality rates and financial burden to the

community and healthcare system. Of every 100 hospitalized patients, seven in developed and 10 in developing countries can acquire at least one of the HCAIs [1]. HCAIs or nosocomial infection develops in a patient during the treatment in a hospital or other healthcare institution and was not present at the time of admission. These infections may occur while the patient is being treated for other diseases or after discharge [2].

HCAIs infections are caused by bacteria, viruses and fungal parasites transmitted from a patient to healthcare personnel or vice versa by direct or indirect contact, blood-borne products, droplet, and airborne transmission as well as contaminated food and water [1]. The major concern of HCAIs is that it posed health issue challenges due to a rising number of susceptible patients and multidrug-resistant organisms such as methicillin-resistant staphylococcus aureus (MRSA) and vancomycin-resistant enterococci [3]. HCAIs can develop as a result of a lengthy stay in the Intensive Care Unit (ICU), prolonged antibiotics prescription and improper hygiene due to poor waste management in healthcare. Inadequate medical equipment due to financial constraints and a lack of awareness of infection control precautions among healthcare professionals can also lead to an increase in HCAIs [4].

Infection prevention and control (IPC) is a practical, evidence-based method to prevent healthcare-associated infections from harming patients and healthcare workers [2]. An IPC study carried out in a hospital revealed that 35 to 55 % of HCAIs are preventable, however the incidences vary significantly by the level of effectiveness of IPC procedures [4]. Standard precautions are the basic IPC precautions, designed to minimize the risk of pathogen transmission in a simple and effective manner. This includes hand hygiene, injection safety, use of personal protective equipment (PPE), environmental cleanliness, waste management, respiratory hygiene and cough etiquette [5].

Current evidence suggest low level of infection control knowledge and its awareness. Ojulong et al. conducted a study on knowledge and attitudes of IPCs among health sciences students and discovered a poor mean overall knowledge score which was 67%. Radiography students have the least knowledge (61%) compared to medical students (73%) and nursing (66%) students. The knowledge and attitude towards IPCs were appreciated by most students and they were eager to learn. Nevertheless, they pointed out that the lack of knowledge and attitude was due to failure to initiate IPCs early in the course [6]. In another study of IPC knowledge, Abdelrahman et al. found that Jordanian radiographers have a moderate understanding of infection control techniques [7]. Moderate knowledge suggests that the participant's knowledge of nosocomial infection is limited and thus insufficient. This may indicate that the IPC in these facilities is inadequate and has to be upgraded to prevent unnecessary nosocomial infections [8]. Another study on the effect of training on nurses' knowledge, perception, and risk reduction regarding infection control revealed that in the post-intervention phase compared to the pre-intervention phase, statistically significant higher total knowledge and attitude scores were found. A higher proportion of nurses knew the importance of avoiding recapping syringes and thought that infection control measures may be enough to prevent infections from occurring [9].

Students' behavioural and attitude during clinical practice may be influenced by poor attitude and knowledge amongst senior healthcare personnel. As a result, medical imaging students should have better understanding and acknowledged infection control and standard precautions as their responsibility. Effective infection control practices can help to maintain safe environment for both students and patients from infectious diseases. This knowledge, attitude, and practise (KAP) survey collects information on what students know about infection control, what they think about basic standard precautions and what they do to safeguard patients and themselves from infections. A questionnaire is distributed to the medical imaging students to assess their existing knowledge, attitude and practice about infection control and standard precaution.

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Materials and Methods

Study design

This is a questionnaire-based cross-sectional study conducted within a month starting from 21st March to 22nd April 2023.

Ethical statement

Ethical approval was obtained from Universiti Sultan Zainal Abidin (UniSZA) Human Research Ethics and Committee (UniSZA/UHREC/2022/423) before conducting the survey.

Study population

Universiti Sultan Zainal Abidin is the 18th public university located in the state of Terengganu, Malaysia and consists of three campuses, Gong Badak campus, medical campus and Tembila campus. This study involved 2nd year to 4th year undergraduate medical imaging students and 2nd year to 3rd year Diploma students in Radiography and students from the UniSZA campus of Gong Badak only. Both male and female students with any range of ages, gender, races and religions and who had at least one experience in clinical practice were also invited to participate in the study. All other respondents that did not fulfil the inclusion criteria were excluded.

Variable and measurement

Variables measured in this study include age, gender, years of study, level of education and level of knowledge, attitude and practice.

Data collection

The self-administered questionnaire was distributed to the students who were qualified for the study via an online platform, Whatsapp. The contact number of students were obtained from classmates to approach them personally and given a link to the Google form. The objective, justification, and confidentiality statement for conducting the survey were stated at the beginning of the questionnaire. The consent from the respondents was also obtained prior to answering the survey. The estimated time required to answer the questions was about 5 to 10 minutes. Throughout the study, all of the information provided by the participants was kept private.

Results

Demographic and clinical data

A total of 136 respondents answered this questionnaire. The respondents were undergraduate medical imaging students and Diploma in Radiography students from the UniSZA, Gong Badak campus. Table 1 illustrates the sociodemographic characteristics of the respondents. The majority of students were female (80.1%), aged between 20-22 years (64.7%), year 2 (39%) and Bachelor's degree (72.1%).

Table 1: Sociodemographic characteristics of respondents (n=136)

Independent Variable	Category	Frequency (n)	Percentage (%)
Age	< 20	1	0.7
	20-22	88	64.7
	23-25	43	31.6
	26-29	4	2.9
Gender	Female	109	80.1
	Male	27	19.9
Level of education	Bachelor	98	72.1
	Diploma	38	27.9
Year of study	Year 2	53	39.0
	Year 3	39	28.7
	Year 4	44	32.3

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Source of infection control information

Figure 1 demonstrates that the most common source of information regarding infection control was from lecturers (91.9%) followed by hospital staff (90.4%) and the internet (86.8%). Friends, posters and family was 43.4%, 36% and 30.1% respectively. The least common information source was fliers (20.6%).

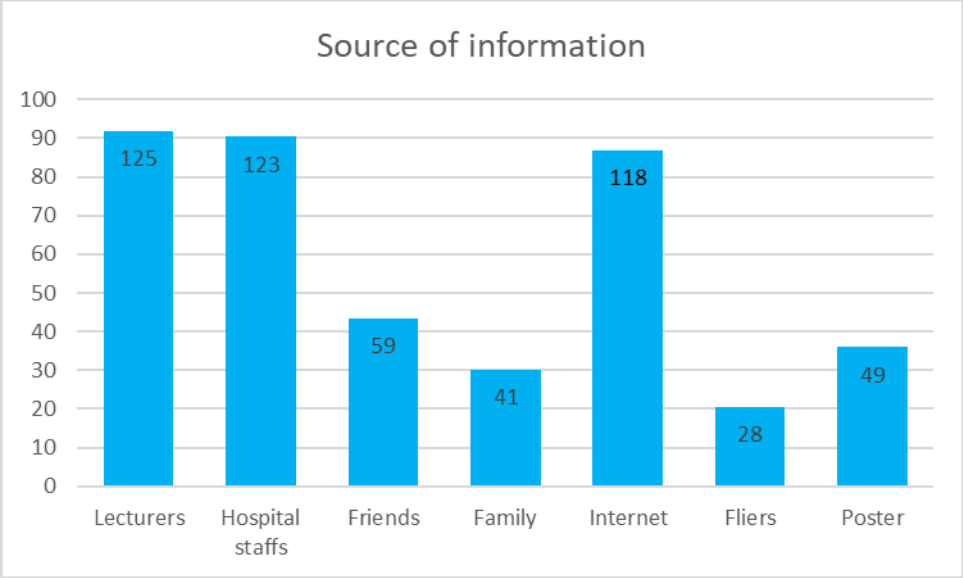

Figure 1: Source of information student obtained on infection control.

Level of knowledge

Figure 2 illustrates the respondents' knowledge of infection control and standard precautions. In this study, most of the respondents (99.3%) knew about infection control. Awareness regarding the importance of cross-infection prevention, and hand hygiene was very high among the study participants. However, the knowledge of prevention on needle-stick/sharp injuries was lower than (72.1%) other standard precautions. The overall knowledge level was evaluated based on a median score, showing that 100% of students had good knowledge.

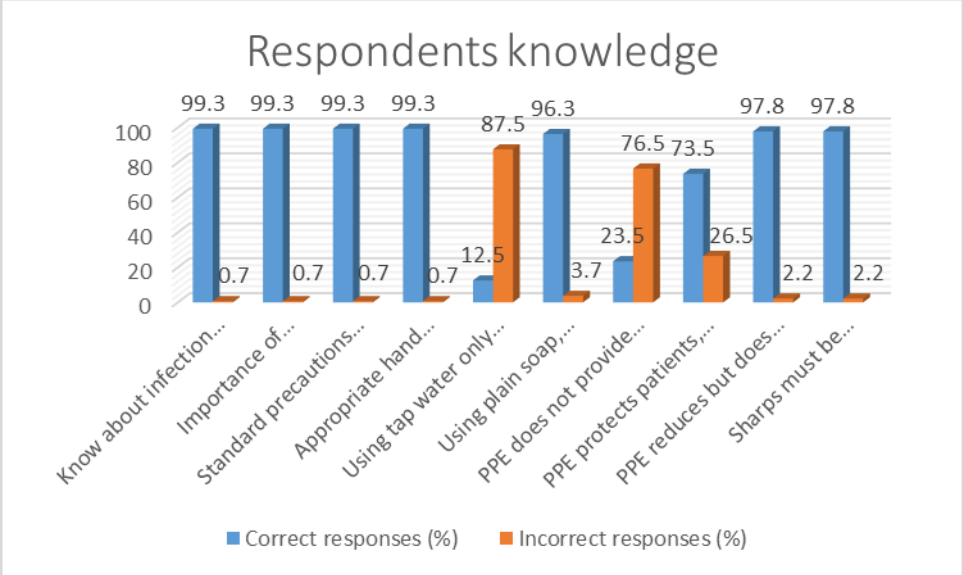

Figure 2: Summary of knowledge responses.

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Level of attitude

Figure 3 illustrates an attitude of study participants on infection control and standard precautions. The attitude regarding wearing masks when conducting procedures that are likely to result in blood, body fluids, secretions or excretions was the highest (97.8%) while handwashing and hand-sanitizer usage before wearing gloves was the least (64.7%). The overall attitude level was evaluated based on a median score, showing that 100% of students had a good level of attitude.

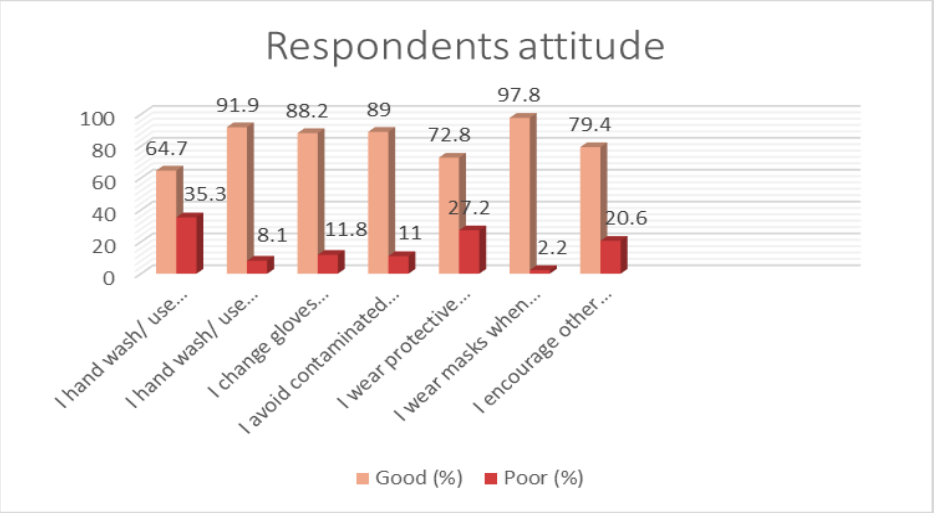

Figure 3: Summary of attitude responses.

Level of Practice

Figure 4 illustrates the practice of infection control and standard precautions by study participants. All of them practiced wearing masks to protect the mucous membranes of the mouth and nose when performing radiological procedures that may cause accidental exposure to blood, body fluids, secretions, or excretions. However, some of them (75.7%) had poor practice of wearing google or eyewear when conducting procedures that are likely to result in contact with blood and body fluids. The overall practice score was evaluated based on a median score, showing that 98.5% of medical imaging students were having good practice.

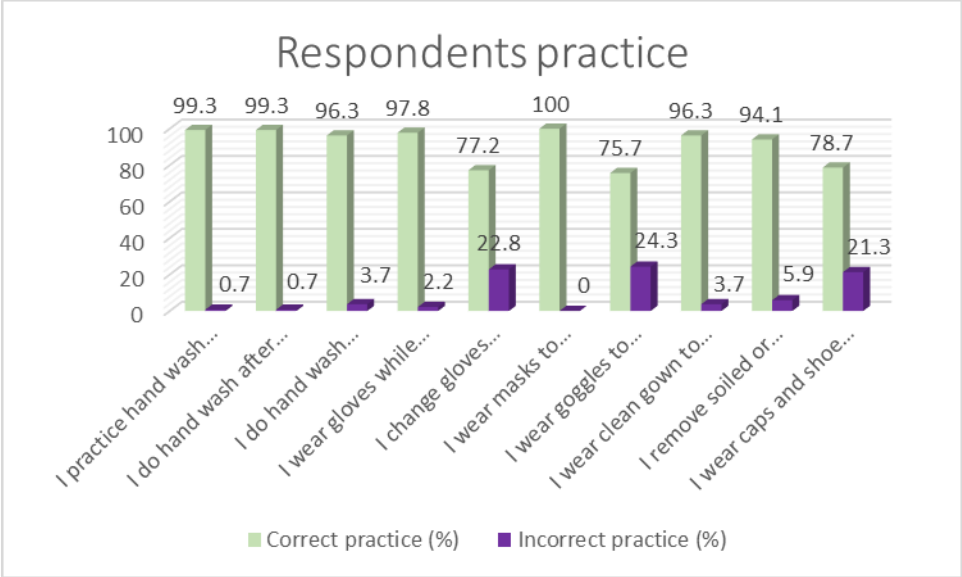

Figure 4: Summary of practice responses.

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Total of respondents achieved the highest score

Figure 5 demonstrates a bar chart that shows a total of respondents with the highest full score in knowledge, attitude, and practice sections. About less than half achieved maximum scores out of the 136 respondents. Nine respondents scored nine in the knowledge, 58 respondents scored seven in attitude and 69 respondents scored 10 in practice. Overall, the practice section had the greatest number of respondents while the knowledge section had the lowest.

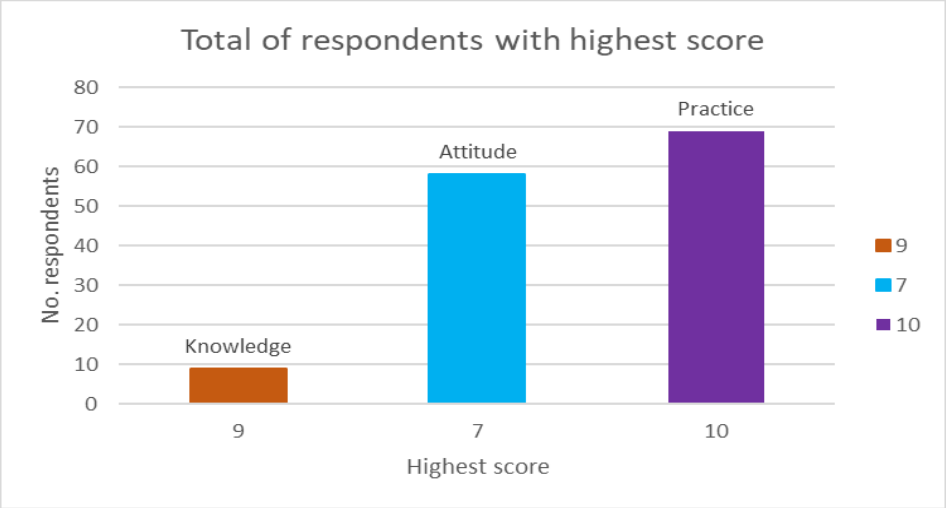

Figure 5: Sum of respondents with the highest score on infection control questionnaire.

Association between the level of knowledge, attitude and practice of the medical imaging students regarding infection control and standard precautions

Table 2 shows the association between the level of attitude and practice of infection control and standard precautions. A Chi-square assumption was not met which more than 20% of expected frequency had less than 5, (50%). Fisher's exact test was used to find the association between attitude and practice level of respondents. Fisher's exact test shows that the attitude score was not significantly associated with practice (p = 1.00). The association between knowledge and attitude level and the association between knowledge and practice level could not be analyzed as there was no variation in knowledge level. This is because all students had good knowledge.

Table 2: Association between the level of attitude and practice of infection control and standard precautions among medical imaging students (n=136)

	Practice [n (%)]		**Attitude [n (%)]**		**OR(95%CI)**	**P-value**
	Good	Poor	Good	Poor		
Attitude					1.016(0.994,1.038)	1.00
Good	(128)98.5	2(1.5)				
Poor	6(100)	0				
Practice						
Good			128(95.5)	6(4.5)		
Poor			2(100)	0		

Fisher's exact test applied
Level of significance was set at 0.05

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Discussion

The need for proper hygiene should be understood and applied by every medical imaging student when performing daily tasks in radiology departments. Resistance to infection control measures may cause bacterial contamination of various departmental surfaces, putting both students and patients at risk of infection. Some patients may also be suffering from other infectious diseases which pose a risk to students. Students ought to be educated about them or at least aware of them.

Most of the participants in this study were female (80.1%) and aged between 20-22 years (64.7%), which was consistent with the gender and age variations of the medical students population of the previous study [10]. This was due to female dominance among students due to their caring nature [11]. The majority of the respondents scored higher than the median score for knowledge, attitude and practice of infection control and standard precautions. The percentage of respondents who had good knowledge, positive attitude and good practice were 100% (n=136), 100% (n=136) and 98.5% (n=134) respectively. Lecturers and hospital staffs were chosen as the most common information source for infection control. This is because students were exposed to infection control learning in subject patient care and clinical practice.

In the 'Knowledge' section, more than half of the respondents correctly answered hand hygiene (100%), personal protective equipment usage (93.4%), appropriate handling of patient care equipment (84.6%) and waste disposal (88.2%), prevention of needle-stick injury (72.1%) and environmental cleanliness (84.6%) as the components of standard precautions. This showed the respondents had adequate awareness of the infection control practices that could minimize the risk of contracting infections. Moreover, the knowledge score in this study was very high (100%) when compared to the study by Sugathan et al. regarding infection control awareness among medical students which was 66.7%, despite having good knowledge [10]. On the contrary, another similar study on the International Islamic University Malaysia (IIUM) medical imaging undergraduate students by Rosli et al. found that the overall infection control knowledge score was low [13]. This could be due to poor coverage and assessment of infection prevention skills like donning and doffing personal protective equipment in the patient care course. Some students might lack of problem-solving skills and incorrectly practise infection control in the clinical setting. Moreover, many studies have shown that insufficient training and education among healthcare professionals could results in poor knowledge and thus worsening healthcare delivery outcomes. Hence, various demonstrations with hands-on practices in healthcare settings are recommended to increase the knowledge and compliance of IPC [5].

In the attitude section, there was a poor attitude towards handwashing and hand sanitizer usage before wearing gloves. Yet, the attitude towards hand hygiene after wearing gloves and wearing masks during radiological procedures was good. They could think that gloves are a substitute to hand washing and wearing gloves without hand washing beforehand is sufficient as long as hand contamination is not visible. Previous studies in Raichur, India showed that 25.80 % of medical students considered the need to wash their hands was reduced by using of gloves [12]. Hand hygiene is critical and is required prior to and after wearing gloves as issued by the WHO to prevent the spread of microorganisms that cause endemic nosocomial infections [12], but it is frequently neglected and valued by healthcare workers [6]. Hand hygiene is critical to preventing the spread of microorganisms that cause endemic nosocomial infections, but it is frequently neglected and valued by healthcare workers. Heavy workload, forgetfulness or fear of skin allergies may have contributed to the fact that they had been unable to properly wash their hands [13].

In the practice section, a good practice of infection control was reflected by the respondents where most of them correctly practiced and applied basic precautions during clinical practice. However, some respondents did not practice changing gloves between procedures on the same patient. According to Lindberg et al., the most frequent source of potential contamination is failing to change potentially contaminated gloves between examinations performed on the same patient [14]. Since improper glove use

enhances the risk of organism transmission, the timely application and removal of gloves is crucial in the delivery of healthcare.

The study finding showed that attitude level of infection control was not associated with practice level through positive attitudes. The students were not guaranteed better practice for infection control measures as a result of the favourable attitude. Therefore, it is recommended that continuous on-the-job and off-the-job trainings be provided, as well as strict adherence to updated standard operating procedure (SOP) in the medical imaging setting. However, evidence suggested that better adherence to infection control standard precautions amongst healthcare workers is associated with knowledge and positive attitudes [15]. This result contradicted with a similar study by Sugathan et al. involving clinical medical students which there was an association between attitude level and practice level (p-value <0.001) [6]. The possible reason for no association between attitude and practice in this study may be due to the differences in attitude and practice levels with higher overall scores.

Conclusion

Knowledge, attitude and practice of medical imaging students on infection control and standard precautions were exceptionally good in this research. Yet, there was no association between attitude and practice level. Nevertheless, continuous infection control training and education program to enhance awareness of standard precautions and thus reduce infection exposure is still compulsory. Future recommendations for this study are to include all health science students and medical students to participate in the survey. A comparison of their knowledge, attitude and practice can be made and thus identified the requirement for better practical training on infection control practices. Last but not least, with current contagious disease outbreaks such as Covid-19 and whopping cough, further studies studies may also be conducted to assess the extent of public knowledge regarding infection control.

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Conflict of Interest Disclosure

None to declare.

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