Knowledge, Attitude and Practice on Infection - Control Among IIUM Kuantan Nursing Students During Coronavirus 2019 Disease (COVID-19) Outbreak

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ABSTRACT

Introduction: Infection Control (IC) is a procedure and evidence-based practice applied in healthcare settings that can prevent the transmission of pathogens and microorganisms to health care workers, patients and visitors. It is reported that nursing students were found lacking knowledge and skills regarding standard precautions in infection control. Low knowledge and skills were reported to have a negative effect on the students' compliance to standard precautions. Objectives: This study aims to discover the knowledge, attitude and practice on infection control after COVID-19 outbreak among nursing students. **Method:** A cross-sectional study was conducted on 194 nursing students in IIUM Kuantan using online self-administered questionnaire. Data was interpreted in descriptive and inferential analysis using Statistical Package for the Social Sciences (SPSS) version 20.0. **Results:** From 194 nursing students who participated in the study, the nursing students with good knowledge, attitude and practice were 57.2%, 56.2 % and 53.1%, respectively. There is association between gender and level of attitude (p=0.047). The results presented show that nursing students that have good knowledge showed significantly good attitude (p=0.002) and good attitude showed significantly good practice (p=0.001). **Conclusion:** The nursing student's level of knowledge, attitude and practice were fairly good. There are association between gender and level of attitude but there are no significant associations between the other sociodemographic characteristics and level of knowledge, attitude, and practice on infection control. There are also associations between level of knowledge, attitude, and practice on infection control.

Keywords: : Knowledge, Attitude, Practice, Infection Control, Nursing Student

INTRODUCTION

Infection Control (IC) is a procedure and evidence-based practice applied in healthcare settings to prevent the transmission of pathogens and microorganisms to health care workers, patients and visitors. According to the World Health Organization (WHO), the basic principles of infection control include handwashing and utilisation of personal protective equipment such as gloves, masks, gowns, and eyewear to prevent

contact with potentially infectious materials, as well as safe handling of sharps [1]. As known, health care providers in these trying times are exposed to various risks that can lead to spread of countless diseases transmissible through fluids such as saliva and blood; especially hepatitis B and HIV that are considered major public health problems. Furthermore, a study conducted from 2010 to 2011 reported that 48.3% of patients were from Hospital Acquired Infection (HAI) group [2]. The HAI included 25.3% urinary tract infections, 32.3% respiratory tract infections, 12.9% surgical site infections and 18.2% blood infections [2].

The escalating infectious diseases instances had heightened the health care providers' awareness and strengthened their precautionary measures needed to face the disease. Thus, the health care workers should be careful and well prepared to establish workplace infection control measures [3]. The recent emergence and re-emergence of infectious diseases have made the practice of higher standard infection control precautions

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becomes more important than ever.

Nursing students are considered as part of health care providers. Their practical requirements needed them to be in hospitals and this may cause them to be exposed to infection. Many studies showed that nursing students faces few problems regarding infection control. Recently, there is an outbreak of Coronavirus 2019 disease (COVID-19) worldwide which Malaysia is not spared. Due to that, the chances for the nursing students to be infected and transmit the infection are high. There are many studies that covered infection control among health care providers, however, only few studies are related to infection control among students. Despite the small number of studies, the finding however shows that there are lacking knowledge and skills among nursing students in infection control found.

A cross sectional study done by Rahiman and colleagues [4]. concerning infection prevention and control precautions guidelines were made available to 301 nursing students (second, third & final year) enrolled in a nursing degree in Western Cape. The finding shows little different between good level of knowledge (47.4%) and poor attitude (41.7%) scores, with little difference in practice scores observed between different years of study.

Similarly, in a correlational descriptive study was done by Darawad & Al-Hussami [5]to explore Jordanian nursing students' knowledge of, attitudes toward, and compliance with infection control precautions. Participants were found to have inadequate knowledge about infection control precautions (M=49.64%), positive attitudes (M=89.8%), and moderate compliance (M=75.91%). Participants' attitudes toward infection control precautions were the only variable that predicts (B=.410, p=0.000) and correlates (r=.51, p<0.01) with their compliance score. Special courses for infection control precautions within nursing schools in Jordan are recommended with special focus on students' attitudes.

In another cross-sectional online survey was done by Albaqawi and colleagues [6]. among 1,226 student nurses from seven universities in Saudi Arabia between March 22 to April 4, 2020. The finding shows the average score in the knowledge questionnaire was 9.85 (SD = 1.62, range = 0–12), which is equivalent to 82.1%. Most of the students always performed most of the preventive behaviour identified in the survey, except "washing hands with soap and water for at least 20 s after blowing my nose, coughing, or sneezing" (39.2%) and "daily cleaning and disinfecting frequently touched surfaces" (41.6%).

The findings revealed some areas that should be focused on by nursing education, as well as health agencies, to ensure that the students have adequate knowledge and correct preventive behaviour.

Looking at the study findings, it is therefore, essential for us to study the nursing student's knowledge, attitude and practice towards infection control during the Covid-19 outbreak. As a result of increase in the number of COVID-19 cases, the health care providers' and students' precautionary steps on infection control were different from before. They should be extra cautious and perform all steps following the standard operating procedure. Thus, it is necessary to investigate their knowledge, attitude and practice towards infection control post COVID-19 outbreak.

METHODS

This cross-sectional study was conducted at Kulliyyah of Nursing, International Islamic University Malaysia, Kuantan, Pahang. Convenience sampling method was used, and 194 nursing students with clinical posting experience participated in this study.

Questionnaire

The online self-administered questionnaire was prepared in English and divided into four parts. The questionnaire was adapted from the previous study investigating the knowledge, attitude and practice on infection control. Part A consist of sociodemographic questions that includes gender, age and level of study. Part B consists of questions regarding the knowledge on the infection control. A total of 15 questions were asked regarding their knowledge on infection control and total scores ranged from a minimum of 0 to a maximum of 15, with the correct answer giving the score of 1 and incorrect answer scores 0. Part C consist of questions regarding attitudes towards infection control. Eight (8) questions were asked regarding attitude towards infection control using 5-points Likert scale which are 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree. Part D of the questionnaire includes questions regarding practice in infection control. Twelve (12) infection control practices' questions were asked with 5-points Likert scale used are 1= never, 2 = seldom, 3 = sometimes, 4 = often and 5 = were always used.

Data collection

Data collection was conducted from mid-October until December 2020. Students who met the inclusion criteria were approached by the

researcher and invited to voluntarily answer the questionnaire. The link for the online questionnaires is given to the group leader in each year of study to be distributed to the participants. The link to the consent also given with the questionnaire, explaining the purpose of the study, its procedure, confidentiality statement, and the right to withdraw, as well as the contact information of the researcher. All information given by the participants is kept confidential throughout the study process.

Data analysis

Descriptive analysis was conducted to describe the sociodemographic characteristics, in terms of frequency (n) and percentage (%). Inferential analysis such as Pearson Chi square test and Fisher's Exact test were used to analyse the association between sociodemographic characteristics and level of knowledge, attitude and practice on infection control and also association between level of knowledge, attitude and practice on infection control. Moreover, P-value<0.05 is categorised as statistically significant.

RESULTS

Sociodemographic characteristics

Table 1 illustrates sociodemographic characteristics of the respondents. Majority of the respondents are female 88.7% (n=172) compared to male 11.3% (n=22). In term of age, 49.5% (n=96) of the respondents aged between 20-21 years old, 48.5% (n=94) respondents aged 22-23 years old and only 2.1% (n=4) of the respondents are more than 23 years old. Fourth year students constitute the highest percentage at 51.0% (n=99) compared to third year 28.9% (n=56) and second year 20.1% (n=39).

Table 1: Sociodemographic characteristics of nursing student

n= 194	Variables	Frequency (n)	Percentage (%)
Gender	Male	22	11.3
	Female	172	88.7
Age	20-21 years old	96	49.5
	22-23 years old	94	48.5
	>23 years old	4	2.1
Year of study	Second year	39	20.1
	Third year	56	28.9
	Fourth year	99	51.0

The level of knowledge, attitude, and practice on infection control among nursing students

The level of knowledge, attitude, and practice of nursing students on infection control was assessed based on median score. Scoring above the median score shows that the respondents have a good level of knowledge while scoring below the median score shows that the respondents have poor level of knowledge. The finding in Table 2 indicates that the median knowledge score was 13.0 (IQR±1.0) with 57.2% (n=111) students scored above the average showing good level of knowledge and 42.8% (n=83) scored below the average. Based on the results, the median attitude score was 32.0 (IQR ± 2.0) with 56.2% (n=109) students scored above the average indicating good level of attitude and 43.8% (n=85) scored below the average showing poor level of attitude. Also, the finding shows that the median practice score was 53.0 (IQR ± 6.0) with 53.1% (n=103) students scored above the average which shows good level of practice and 46.9% (n=91) exhibits poor level of practice.

Table 2: The level of knowledge, attitude, and practice of the respondents on infection control

Variables	Frequency (n)	Percentage (%)	Median ± IQR
Knowledge			13.0 ± 1.0
Good knowledge	111	57.2	
Poor Knowledge	83	42.8	
Attitude			32.0 ± 2.0
Good Attitude	109	56.2	
Poor Attitude	85	43.8	
Practice			53.0 ± 6.0
Good Practice	103	53.1	
Poor Practice	91	46.9	

The association between sociodemographic characteristics and level of knowledge on infection control among nursing students

There are no associations seen between gender (p-value= 0.236), age (p=0.181) and level of study (p=0.364) to knowledge of respondents. Overall, it can be said that the level of knowledge on infection control is not influenced by sociodemographic characteristics.

There is an association between gender and level of attitude (p-value= 0.047). However, statistical test shows no significant association between respondents' age and level of attitude (p=0.736) and level of study and level of attitude (p=0.726). Overall, it can be said that the level of attitude is

affected by gender with females having good attitude on infection control compared to males. However, the level of attitude on infection control is not influenced by age and level of study (Table 3).

There is no significant association between the respondents' gender and level of practice (p-value=0.758), age and level of practice (p=0.992) and level of study and level of practice (p=0.441). Overall, it can be said that the level of practice on infection control is not influenced by sociodemographic characteristics (Table 3).

Table 3: Association between the sociodemographic characteristics with the level of knowledge, attitude and practice of nursing student

Variables	n (%)	Knowledge level		p	Attitude level		p	Practice level		p
		Poor knowledge (n (%))	Good knowledge (n (%))		Poor attitude (n (%))	Good attitude (n (%))		Poor practice (n (%))	High practice (n (%))	
Gender										
Male	22 (13.3)	12 (14.5)	10 (9.0)	0.236	14 (16.5)	8 (7.3)	0.047	11 (12.1)	11 (10.7)	0.758
Female	172 (88.7)	71 (85.5)	101 (91.0)		71 (83.5)	101 (92.7)		80 (87.9)	92 (89.3)	
Age										
20-21 years old	96 (49.5)	44 (53.0)	52 (46.8)	0.181	43 (50.6)	53 (48.6)	0.736	45 (49.5)	51 (49.5)	0.992
22- 23 years old	94 (48.5)	39 (47.0)	55 (49.5)		41 (48.2)	53 (48.6)		44 (48.4)	50 (48.5)	
>23 years old	4 (2.1)	0 (0.0)	4 (3.6)		1 (1.2)	3 (2.8)		2 (2.2)	2 (1.9)	
Year of study										
Second year	39 (20.1)	14 (16.9)	25 (22.5)	0.364	16 (18.8)	23 (21.1)	0.726	15 (16.5)	24 (23.3)	0.441
Third year	56 (28.9)	28 (33.7)	28 (25.2)		27 (31.8)	29 (26.6)		26 (28.6)	30 (29.1)	
Fourth year	99 (51.0)	41 (49.4)	58 (52.3)		42 (49.4)	57 (52.3)		50 (54.9)	49 (47.6)	

* Pearson Chi Square test
* Fisher's exact test

The association between level of knowledge, attitude and practice on infection control among nursing students

Table 4 displays that there is an association between level of knowledge and level of attitude on infection control with p-value of 0.002. Thus, the nursing students' level of knowledge influences their level of attitude. This study found that the nursing students with higher level of knowledge showed significantly higher level of attitude.

Table 4: Association between level of knowledge and level of attitude among nursing students

Knowledge level	Attitude level		n (%)	x^2	p-value
	Poor Attitude (n (%))	Good Attitude (n (%))			
Poor knowledge	47 (55.3)	36 (33.0)	83 (42.8)	9.673	0.002
Good knowledge	38 (44.7)	73 (67.0)	111 (57.2)		

* Pearson Chi Square test

There is no significant association between level of knowledge and level of practice on infection control with p-value of 0.756. Thus, this study found that the nursing students' level of knowledge does not influence their level of practice (Table 5).

Table 5: Association between level of knowledge and level of practice among nursing students

Knowledge level	Practice level		n (%)	x^2	p-value
	Poor Practice (n (%))	Good Practice (n (%))			
Poor knowledge	40 (44.0)	43 (41.7)	83 (42.8)	0.096	0.756
Good knowledge	51 (56.0)	60 (58.3)	111 (57.2)		

* Pearson Chi Square test

There is an association between level of attitude and level of practice on infection control with p-value being 0.001. Thus, the level of attitude of the nursing student influences their level of practice. This study found that the nursing students with higher level of attitude showed significantly higher level of practice (Table 6).

Table 6: Association between level of attitude and level of practice among nursing students

Attitude level	Practice level		n (%)	x^2	p-value
	Poor Practice (n (%))	Good Practice (n (%))			
Poor attitude	54 (59.3)	31 (30.1)	85 (43.8)	16.784	0.001
Good attitude	37 (40.7)	72 (69.9)	109 (56.2)		

* Pearson Chi Square test

DISCUSSION

Majority of the respondents are female 88.7% (n=172) compared to male 11.3% (n=22). This consistent with the previous study finding which stated that female was the majority (75.8%, n= 125) while the rest (24.2%, n=40) were male [7]. The finding could be due to many of student nurses are female. The age group of the nursing students in this study are almost equal as the entry age to the program 20 years old and the respondents recruited within that age (year 2 to fourth year). Majority of nursing students level involved in this study are from fourth year students 51.0% (n=99) followed by third year students 28.9% (n=56) and second year students 20.1% (n=39). These group of students have started their clinical attachment at the hospital. Similarly, to previous study, respondents only involved students with clinical posting experience [7].

The findings from the statistical test shows that the nursing students' have fairly good knowledge towards infection control. The study is like previous study where the students also had fairly good knowledge on infection control 66.7% (n=110) [7]. However, it is contradicted with

recent studies where they stated that the level of knowledge of nursing students towards infection control was low [8,9].

In this study, 56.2% (n=109) of the nursing students scored above the average and 43.8% (n=85) scored below the average with the median attitude score of 32.0 (IQR±2.0). It shows that the nursing students had fairly good attitude towards infection control. This finding is similar with previous study in which the student was having fairly good attitude 57.6% (n=95) [7]. It is contradicted with the recent studies which stated that the attitudes about standard precaution was not sufficiently high and had poor attitudes towards hand hygiene [8, 9]. As a conclusion, the researcher could say that despite fairly good attitude toward infection control in general, there are part of standard precautions behaviours that needs to be concerned such as hand hygiene.

The statistical finding shows that more than half of the nursing students scored above the average 53.1% (n=103) and 46.9% (n=91) scored below the average with the median practice score of 53.0 (IQR±6.0). It clearly showed that the nursing students had fairly good practice in infection control. Previous study also stated that the level of practice of the student were fairly good at 51.5%

(n=85) [8]. This study also had the same result with recent study in which it declared that the nursing students' practice was good [9]. Hence, this markedly shows that the nursing students from IIUM Kuantan who voluntarily involved in this study have fairly good knowledge, attitude and practice.

In term of gender, the statistical test indicates no significant associations between gender and the level of knowledge with p-value of 0.236 and gender and level of practice with p value of 0.758. However, there is an association between gender and level of attitude with p-value of 0.047. In this study, it was found that gender does not affect the level of knowledge and level of practice, but gender has affected the level of attitude towards infection control among the nursing students. It can be deduced that female have good attitude towards infection control compared to male. It is also reported that females are more likely to have higher knowledge and practice on infection control compared to male [10]. This study is contradicted with the previous study which stated that there was no significant association between gender and knowledge, attitude, and practice of infection control (p-value>0.05 for all categories) [8].

In term of age, there is no significant difference between age and level of knowledge of respondents (p=0.181), age and level of attitude (p=0.736) and age with level of practice (p=0.992). This brought the tendency that it does not matter whether they were in 20-21 years old, 22-23 years old or >23 years old groups, they are able to display similar levels of knowledge, attitude and practice. Another study showed that age was not the determining factor to their level of knowledge, attitude, and practice on infection control.

In term of level of study, statistical test shows that there is no significant association between the respondents' level of study and level of knowledge (p=0.364), level of study and level of attitude (p=0.726) along with level of study and level of practice (p=0.441). It shows that the knowledge, attitude and practice of the nursing students on infection control were not affected by their level of study. Thus, their longer period of clinical exposure did not guarantee the students to have a better knowledge, attitude or practice on the infection control measures. Consistent with the previous study which stated that there were no significant association in the knowledge, attitude and practice levels between years of study (clinical exposure) (p-value>0.05) [8].

However, this study contradicts with a study which stated that the nursing students has significant differences in their knowledge and practice according to years of education in which the knowledge and practice was higher in year 1 study and worst in year 3 study [11].

The statistical test shows an association between level of knowledge and level of attitude (p=0.002). From the results, it can be seen that the level of knowledge influenced the level of attitude. In this study, the nursing students that have good knowledge showed significantly higher attitude on infection control. The high level of knowledge indicated that they have adequate knowledge on infection control thus their attitude level will be high too. is the finding that shows no significant association between level of knowledge and level of practice may indicate that the level of knowledge does not influence the level of practice. This possibly means that despite perceiving their good knowledge in infection control behaviour it does not guarantee good practice.

The finding that shows that there are association between level of attitude and level of practice (p=0.001) could mean that the level of respondents' attitude did influence the level of their infection control practice. Overall, it can be concluded that the nursing students that have good attitude showed significantly higher practice on infection control. It obviously showed that when the nursing students have good attitude, they will practice it at the clinical setting according to infection control guidelines. This current finding is consistent to recent study in which both stated that the students' level of knowledge was found to be significantly (p < 0.01) associated with attitude and practice [4].

CONCLUSION

Majority of the nursing students in IIUM Kuantan scored more than half of the average median score in each section which indicate that they have fairly good level in all these: knowledge, attitude, and practice.

Inferential analysis findings show that there are no significant associations between sociodemographic characteristics and level of knowledge on infection control among the nursing students. However, there is an association between gender and level of attitude on infection control among the nursing student, and that indicates females have good attitude compared to males. The level of attitude was not affected by age and level of study. It can also be concluded

that, there are no significant association between sociodemographic characteristics and level of practice on infection control among the nursing students.

Lastly, the findings show that there are associations between level of knowledge and level of attitude (p=0.002) and level of attitude and level of practice (p=0.001). It indicates that the nursing students with good knowledge will have good attitude and good practice on infection control. However, there is no significant association between level of knowledge and level of practice (p=0.756).

ETHICAL MATTERS

The study was approved by the Kulliyyah Nursing Committee (KON) and the University Ethics Committee (IREC). Information regarding the study's purpose, procedures, assurance of confidentiality and statements about their right to withdraw at any time. The return of the completed questionnaire was treated as informed consent to participate.

LIMITATION OF THE STUDY

This study had been successfully conducted. However, some limitations may affect the overall findings of this study. First, the study had to be postponed for a few months due to Movement Control Order (MCO) as the data was collected during the Covid-19 pandemic. Some of the respondents were at home and only able to return to campus and resume their clinical placement in the hospital after the approval obtained. This may affect their responds to the questionnaire as they must recall on their infection control practice back to answer the questionnaire. Also, due to online survey, some respondent may have internet problem thus this may affect the response rate.

CONFLICT OF INTEREST

We declare no conflict of interest for this study.

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