

**KNOWLEDGE ATTITUDE AND PRACTICE (KAP) AMONG
NURSES TOWARDS COVID-19: A COMPARISON IN COVID-
GAZETTED HOSPITAL AGAINST NON-COVID-19 GAZETTED
HOSPITAL**

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LIST OF SYMBOLS, ABBREVIATIONS OR NOMENCLATURE

COVID-19	Coronavirus disease 2019
SARS-COV-2	Severe acute respiratory syndrome-coronavirus-2
IPC	Infection prevention and control
HCWs	Healthcare workers
HRPZ II	Hospital Raja Perempuan Zainab II
HUSM	Hospital Universiti Sains Malaysia

ABSTRAK

Latar belakang: Banyak kajian telah dijalankan mengenai pengetahuan, sikap dan amalan yang berkaitan dengan wabak COVID-19, tetapi hanya sebahagian kecil yang melibatkan jururawat sebagai populasi kajian. Oleh itu, kajian ini dilaksanakan bertujuan untuk menyiasat KAP berkaitan COVID-19 dalam kalangan jururawat di hospital yang diwartakan untuk merawat COVID-19 dan hospital yang tidak diwartakan untuk merawat COVID-19.

Kaedah: Kajian keratan rentas telah dijalankan antara 1 Oktober 2021 hingga 31 Januari 2022, di kalangan 300 jururawat yang diagihkan secara berkadar antara Hospital Universiti Sains Malaysia (HUSM) dan Hospital Raja Perempuan Zainab II (HRPZ II), dengan pemilihan sistematik melibatkan enam jabatan utama. Soal selidik dalam talian yang menggunakan Bahasa Inggeris yang terdiri daripada 4 bahagian utama dengan 30 soalan mengenai sosiodemografi, dan KAP berkaitan COVID-19 telah diedarkan melalui WhatsApp dan Telegram.

Keputusan: Kajian mendapati 91.3% mempunyai pengetahuan yang baik, 97.7% mempunyai sikap positif, dan 88.3% mempunyai amalan baik berkaitan dengan COVID-19. Walau bagaimanapun, tiada perbezaan yang ketara dalam pengetahuan, sikap dan amalan antara jururawat di hospital yang diwartakan untuk merawat COVID-19 dan jururawat di hospital yang tidak diwartakan untuk merawat COVID-19.

Kesimpulan: Walaupun peratusan pengetahuan dan sikap yang baik adalah tinggi, amalan berkaitan COVID-19 masih perlu dipertingkatkan. Oleh itu, tumpuan bukan sahaja mengenai pengetahuan teori tetapi juga pada penambahbaikan latihan, dan penguatkuasaan prosedur yang betul semasa merawat pesakit COVID-19.

Kata kunci: COVID-19, pengetahuan, sikap, amalan, jururawat, HUSM, HRPZ II

ABSTRACT

Background: Numerous studies have been conducted on knowledge, attitudes, and practices (KAP) related to the COVID-19 outbreak, but only a small proportion included nurses as a study population. Therefore, this study aims to investigate the KAP related to COVID-19 among nurses in a COVID-19 gazetted hospital and a non-COVID-19 gazetted hospital.

Method: A cross-sectional survey was conducted between 1st October 2021 and 31st January 2022, among 300 nurses proportionally distributed between Hospital Universiti Sains Malaysia (HUSM) and Hospital Raja Perempuan Zainab II (HRPZ II), with systematic selection within six key departments. A timed online questionnaire in English consisting of 4 main sections with 30 questions on sociodemographic, and KAP related to COVID-19 was distributed via WhatsApp and Telegram.

Results: The study found that 91.3% had good knowledge, 97.7% had a positive attitude, and 88.3% had good practices related to COVID-19. However, there is no significant difference in knowledge, attitudes, and practices between nurses in the COVID-19 gazetted hospital (HRPZ II) and nurses in the non-COVID-19 gazetted hospital (HUSM).

Conclusion: Despite the high percentage of good knowledge and attitudes, the practices related to COVID-19 still need to be improved. Therefore, the focus should not only be about theoretical knowledge but also on improving the training, and strictly enforcing a proper standard of procedure for COVID-19.

Key words: COVID-19, knowledge, attitude, practice, nurses, HUSM, HRPZ II

CHAPTER 1.0 INTRODUCTION

Coronavirus disease (COVID-19) is an infectious disease from a newly discovered coronavirus. Starting from the year 2020 it has swarmed the world causing a pandemic which affecting the socioeconomic status and the healthcare facilities of the countries involved. The virus infected over 15 million people worldwide within just 6 months and the death tolls from this pandemic has increase to nearly 4.6 million deaths caused by severe acute respiratory syndrome-coronavirus-2 (SARS-COV-2) (World Health Organization, 2021a). Malaysia also was not spared from the detrimental fate brought by the virus. As of September 2021, more than 2 million patients were tested positive for COVID-19 with total of 22,000 deaths (Malaysia, 2021).

SARS-COV2 is transmitted from human-to-human through inhalation of aerosols from an infected individual (Li *et al.*, 2020). Elderly and patients with chronic illnesses such as diabetes, hypertension, cardiac disease, respiratory disease and cancer have been identified as high risk for severe disease and mortality (Tian *et al.*, 2020). It was a very challenging time during the beginning of the pandemic since the knowledge regarding the disease was scarce and there was no specific treatment or vaccination for COVID-19 produced yet (Sahin *et al.*, 2020). The pivotal recommendation from World Health Organization (WHO) is prevention of human-to-human transmission by regular hand washing, social distancing, and respiratory hygiene (covering mouth and nose while coughing or sneezing) (World Health Organization, 2019; 2020a). By preventing its spread, the morbidity and the mortality burden to the healthcare facilities of the affected country has gradually lessen (World Health Organization, 2019).

The constant evolving nature of the COVID-19 pandemic necessitates the need for regular update of scientific literature and research techniques. The quantity of COVID-19 original published research in English-language, general medical journals such as The New England Medical Journal of Medicine (NEJM), British Medical Journal (BMJ) and Journal of American Medical Association (JAMA) in 2020 has increased to 44.5% of total published journal compare to the previous year (Giustini *et al.*, 2021). The crippling effect of this disease is so catastrophic, it has took precedence over other diseases evidently decreasing the amount of published research for non-COVID-19 disease (Shan *et al.*, 2020). Currently, the light at the end of the tunnel is shining brighter with an established guideline for COVID-19 treatment by WHO published in February 2021 which covers a wide range of clinical management (World Health Organization, 2021b). This guideline was the fruition of all the rapid research done throughout the world about the COVID-19. Furthermore the chances to curb this pandemic boosted with the successful development of COVID-19 vaccines accelerated through major global investment and its swift procurement by countries like Malaysia (Jamaluddin, 2021).

Malaysian citizens are lucky to have a dependable healthcare system to fight this pandemic, reinforced by competent healthcare workers (HCWs) who are at the vanguard of COVID-19 pandemic response. The healthcare strength maybe considered a double-edge sword because citizens have good access to treatment but they also bring greater risks for the HCWs working in the hospital who are exposed to the virus, long working hours, psychological distress, fatigue, burnout, and physical violence (World Health Organization, 2020b). We have seen many countries lost their HCWs to COVID-19. In just 6 months of COVID-19 pandemic, Pakistan had recorded 3,635 HCWs tested positive COVID-19 with 37 deaths from the virus(Tajmim, 2020). A

higher number was recorded in Italy where 16,991 HCWs were tested positive up to April 2020 and accumulated HCWs deaths cases of 182 (Lapolla *et al.*, 2021). While in Malaysia the Ministry of Health reported that a total cumulative of about 9000 HCWs were diagnosed with COVID-19 up to August 2021 (Zainal, 2021). In the beginning, HCWs were infected because scarcity and poor quality of personal protective equipment (PPE) (Lapolla *et al.*, 2021). As for now when good quality PPE are widely available, infection and death among HCWs stems from lack of training when putting on and taking off PPE, improper disposal and lack of negative air pressure in COVID wards (Tajmim, 2020). These lost can be prevented with guidelines and training developed by WHO, and various governmental organizations to fortify the knowledge and prevention strategies among HCWs (World Health Organization, 2021b).

However, the HCW adherence to the infection prevention and control (IPC) guidelines varies depend on their knowledge and attitude (Houghton *et al.*, 2020). This variation contributed by factors like feeling overwhelmed because local guidelines were constantly changing as well as increased workloads and fatigue because they had to use PPE with additional cleaning (Houghton *et al.*, 2020). Low adherence to the IPC can increase the occupational accidents and the nosocomial infection rates within that hospital thus render the COVID-19 transmission control guideline useless (Swift, 2020). In addition, 80.0% of these HCWs infected with COVID-19 cases in Malaysia were community acquired (Nienhaus and Hod, 2020). This shows that the nonchalant attitude towards COVID-19 and lack of compliance among the HCWs are not only happened inside the healthcare facilities, but it also occurs when they are among the community. COVID-19 infections among HCWs generate a more complicated situation since it can easily jeopardize the country's healthcare service. One example is that in March 2020, 47 HCWs (including doctors, nurses, and medical assistants) were found positive after

attending a wedding in Bangi, Selangor. They then infected other colleagues when they returned to their healthcare facilities. Hospitals in Kota Bharu Kelantan, Hospital Selayang in Selangor, and Hospital Teluk Intan in Perak were among the badly affected centres. Since these HCWs had to be treated and quarantined for 14 days, the Ministry of Health had to deploy HCWs from other unaffected hospitals to overcome the sudden shortage of staff (Nienhaus and Hod, 2020).

There are a few KAP research targeting HCWs with regards to COVID-19 pandemic in many parts of the countries affected by the disease. Many of these studies are done during the initial phase of the pandemic which was a different scenario compared to current time. After more than one year affected by COVID-19, it creates another opportunity to explore the KAP among HCWs, specifically nurses, and investigate the associated factors affecting them at a different point of time. In Malaysia, there was an ongoing study in Hospital Universiti Sains Malaysia (HUSM), investigating the KAP among the nurses in 2020. So, for this study we are assessing the KAP towards COVID-19 among the nurses in two different hospitals. One study site will be the Hospital Raja Perempuan Zainab II (HRPZ II), which is a COVID-19 gazetted hospital, and another site is in HUSM. We will be using the validated online questionnaire to collect the data. In addition, this study will analyse the data collected from both hospitals to search for significant differences in the KAP level. These online questionnaires will be distributed via WhatsApp and Telegram to the selected subjects. The data from this study can contribute to relevant training and policies in prioritizing protection and avoiding occupational exposure.

CHAPTER 2 STUDY PROTOCOL

2.1 INTRODUCTION

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Based on the multifarious studies on knowledge, attitude and practice (KAP), we can conclude that a person's behaviour towards certain things can be influenced by the individual's KAP. There are a few KAP research targeting HCWs with regards to COVID-19 pandemic in many parts of the countries affected by the disease. Many of these studies are done during the initial phase of the pandemic which was a different scenario compared to current time. After more than one year affected by COVID-19, it creates another opportunity to explore the KAP among HCWs, specifically nurses, and investigate the associated factors affecting them at a different point of time. In Malaysia, there was an ongoing study in Hospital Universiti Sains Malaysia (HUSM), investigating the KAP among the nurses in 2020. So, for this study we are assessing the KAP towards COVID-19 among the nurses in two different hospitals. One study site will be the Hospital Raja Perempuan Zainab II (HRPZ II), which is a COVID-19 gazetted hospital, and another site is in HUSM. We will be using the validated online questionnaire to collect the data. In addition, this study will analyse the data collected from both hospitals to search for significant differences in the KAP level. These online questionnaires will be distributed via WhatsApp and Telegram to the selected subjects. The data from this study can contribute to relevant training and policies in prioritizing protection and avoiding occupational exposure.

2.2 LITERATURE REVIEW

Since COVID-19 appeared there are many studies being done about the disease including research using KAP questionnaire. From a quick journal search in PubMed database there are more than 200 articles written about the KAP of COVID-19 that was done using myriad of population who are affected by the COVID-19 in multiple countries around the world. Out of these 200 studies, there are only about a little bit over 70 studies of KAP COVID-19 targeting the healthcare workers around the world. From the literature search, we also observed paucity of literature on KAP among HCWs toward the COVID-19 pandemic in Malaysia. Even less, studies which took nurses as their participants. Since nurses are also playing a big part of the team fighting the pandemic, it is a wise decision to do a KAP towards COVID -19 to them making it possible to assess their ability and preparedness to stop the transmission of the virus and fight this pandemic.

Overall conclusion from the KAP studies among HCWs shows that HCWs has a good knowledge, attitude and practice regarding the COVID-19. As shown in a study among nurses in Northern Ethiopia, 74% of the participants had good KAP which is almost the same level with other studies in China and Iran but more than the study in Saudi Arabia which might be due to the time of the study and study population difference (Tadesse *et al.*, 2020). A study in Zhejiang, China during the early phase of the pandemic shows that nurses working in isolation ward had higher score than nurses working in emergency and general ward (Wen *et al.*, 2020). Obviously, those working in the isolation ward have the most exposure to the COVID-19 situations compare to other departments, so they will have better KAP regarding the disease. The study in China also shows that the working experience affected the score but in other studies the working experience does not change the KAP score significantly which can be caused

by the difference in timing of the study where the study in China was done very early and others are quite late in the pandemic (Almohammed *et al.*, 2021; Tadesse *et al.*, 2020; Wen *et al.*, 2020).

Since all HCWs have a good medical foundation in their training and better access to reliable information sources, their ability to understand the materials regarding diseases are better than lay person. For example, in April 2021 there was a meta-analysis done on 57 studies of the KAP regarding dengue fever in Malaysia which reveal a poor mean score among the community residents and patients yet a good KAP scores was achieved in all the HCWs population (Guad *et al.*, 2021). However, according to a meta-analysis about KAP in COVID-19 in 2021, which analysed 84 KAP studies in general population from 45 countries all over the world, it shows that the estimated overall correct answers for KAP are at the same level as most HCWs which are 75% and more (Siddiquea *et al.*, 2021). The reason for the comparable level of knowledge might be because the information regarding COVID-19 is disseminated rigorously by each country to curb the pandemic. Consequently, it gives the general public in those researches sufficient knowledge to answer the questions as well as the HCWs. These can be true when we see the knowledge score in the COVID-19 meta-analysis is significantly lower among the general public who has lower education level, poorer income and rural residence where access to information is limited due to lack of appropriate facilities (Siddiquea *et al.*, 2021).

It is logical to say that with good knowledge it will foster a positive attitude which then translates into a good practice. As what Giao *et al.* and Bhagavathula *et al.* reported that the majority of HCWs with good knowledge have a positive attitude towards COVID-19 (Bhagavathula *et al.*, 2020; Huynh *et al.*, 2020). Interestingly, in Giao *et al.* and Saqlain *et al.* found that attitude did not differ significantly with age,

gender, or working experience (Huynh *et al.*, 2020; Saqlain *et al.*, 2020). While a study in North Ethiopia shows a significant difference of attitude between age group, education level and professions probably due to the level of connectivity to internet and social media (Tadesse *et al.*, 2020).

However, a KAP research in a tertiary hospital in Nepal shows that having better knowledge of COVID-19 did not correlate with the attitude towards the disease. In addition, better knowledge also was not linked to a good practice score. It was the attitude of the HCWs that determined a good practice in their study (Limbu *et al.*, 2020). These patterns of relationships were also seen in another study done in multiple public hospitals in Uganda (Olum *et al.*, 2020). Sieving through the study of KAP in HCWs towards COVID-19 the attitude remained to be positive in the countries all over the world. Therefore, we would assume HCWs who has good attitudes are the group of people who will follow dutifully the infection prevention and control (IPC) guidelines. In addition, they also have already seen first-hand the severity of the infection and how fast it can be transmitted without practicing proper IPC steps. However, a Cochrane review outlined startling 26 barriers that can affect the HCWs adherence to IPC guidelines (Houghton *et al.*, 2020). With that many factors, they will present a huge challenge to ensure the people within the establishment are able to follow the guideline even when they are not being observed. HCWs disregarding the guideline can be due to a simple miscommunication or a more complicated reason such as making an ethically sound decision. For example, in a very busy department, the HCWs might argue should they wear the personal protective equipment first or resuscitate a dying patient first. Therefore, these findings obtained from a KAP research are important for the creation of training module that can fill the gaps in KAP in order to ensure the best practice among HCWs at work as well as being in the communities.

2.3 PROBLEM STATEMENT & STUDY RATIONALE

- a) To assess the level of KAP for COVID-19 among the nurses who directly or indirectly in contact with the COVID-19 patient. There are limited amounts of studies that focused specifically within the nurse population. Even though the HCWs are the groups of people who deals closely with the COVID-19 pandemic, but studies had shown that there are still gaps in the HCW's KAP regarding COVID-19.
- b) To compare the level of KAP between the COVID-19 gazetted hospital against non-COVID-19 gazetted hospital. To our knowledge there are no studies in Malaysia that assess KAP among nurses in gazetted COVID-19 hospital. There was a study in HUSM which was a non-COVID-19 gazetted hospital done in 2020. The data collection for the research was done during the initial phase of the COVID-19 pandemic. Since then, the knowledge, treatment and standard operating procedures regarding the COVID-19 pandemic has changed radically. This is a chance for our study to analyse the KAP towards COVID-19 in a different time period and situation.
- c) To create awareness and preparing the nurses with proper educational campaign to broaden their depth of KAP on COVID-19 after this study.

2.4 OBJECTIVE

2.4.1 General Objectives

To evaluate the knowledge, attitude & practice towards COVID-19 among nurses in COVID-19 gazetted hospital (HRPZ II) against non-COVID-19 gazetted hospital (HUSM).

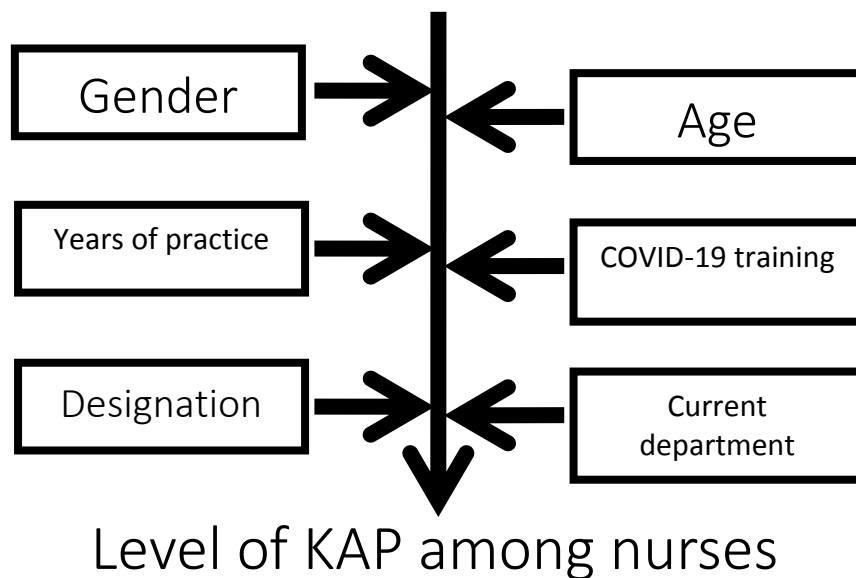
2.4.2 Specific Objectives:

- a) To determine the percentage score of knowledge, attitude, and practice towards COVID-19 among nurses in HRPZ II and in HUSM.
- b) To determine the associated factors that predicts good KAP among the nurses both in HRPZ II and in HUSM.
- c) To analyse the significant differences of knowledge, attitude, and practice level among the nurses in COVID-19 gazetted hospital (HRPZ II) against non-COVID-19 gazetted hospital (HUSM)

2.5 CONCEPTUAL FRAMEWORK

The conceptual framework above consists of six independent variables and one dependent variable. The independent variables are age, gender, designation, total working experience, current working department and any prior training on COVID-19. The Dependent variable is level of knowledge, attitude and practice on COVID-19.

Figure 1: Conceptual framework



2.6 RESEARCH METHODOLOGY

2.6.1 Research design

This study was designed as a cross sectional study which defined as the study of a particular phenomenon (or phenomena) at a particular time which used to describe the knowledge, attitude and practice of the nurses in hospitals.

2.6.2 Study area: Hospital Raja Perempuan Zainab II (HRPZ II) and Hospital Universiti Sains Malaysia (HUSM) in the selected departments.

2.6.3 Study population: All nurses working at HRPZ II and HUSM from 6 selected departments.

2.6.4 Subject criteria

Inclusion criteria: Registered qualified nurses working in HRPZ II and in HUSM

Exclusion Criteria: Non consented nurses working in HRPZ II and in HUSM

2.6.5 Sample size estimation

1. To determine the percentage score of knowledge, attitudes and practices among nurses.

The sample size (n) was calculated using single proportion formula:

$$n = \frac{1.96^2 \times P(1 - P)}{\Delta^2}$$

Where, P = expected proportion taken from *M. Zhang et al* base on the proportion of HCWs with knowledge score is 89% (in decimal is 0.89)(Zhang *et al.*, 2020)

Δ = desired precision, 0.05

The formula gives the sample size of 151

2. To determine the associated factors for knowledge, attitudes and practices on COVID-19 among nurses in HRPZ II and in HUSM, the sample size was calculated using Ps software 3.12 by using two independent proportion formula as shown in the figure 1 below.

Where,

Power of the study = 80%, $\alpha=0.05$,

P0: Proportion of exposure in controls based on *N.Tamang et al.* result showing knowledge score of HCWs without COVID-19 training (*Tamang et al.*, 2020).

P1: Estimated Proportion of HCWs with COVID-19 training that will get good knowledge score based on similar research (*Tamang et al.*, 2020).

Ratio between the group, M (ratio P0:P1) =1

Therefore n=136

Therefore, the sample size calculated is 300, including an allowance of an additional 10% possibility of missing or incomplete data. As shown in the table below, the sample size for other associated factors yielded lesser number of sample size. Since 300 are the largest sample size calculated, so it will be the sample size for this study.

Table 1: Determining sample size based on associated factors

Factors	P0*	P1	M	n	$n \times 2 + 10\%$	Literature
Years of Practice	0.35	0.55	1	96	212	Kamate <i>et al</i> , 2020
Working Department	0.65	0.85	1	72	158	Kamate <i>et al</i> , 2020
COVID-19 Training	0.71	0.85	1	136	300	<i>N. Tamang et al</i> , 2020

Figure 2: Calculation of sample size with Ps software 3.12 by using two independent proportion formula (dichotomous)

Survival	t-test	Regression 1	Regression 2	Dichotomous	Mantel-Haenszel	Log
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[Studies that are analyzed by chi-square or Fisher's exact test](#)

Output

[What do you want to know?](#)

[Case sample size for uncorrected chi-squared test](#)

Design

[Matched or Independent?](#)

[Case control?](#)

[How is the alternative hypothesis expressed?](#)

[Uncorrected chi-square or Fisher's exact test?](#)

Input

α p_0

$power$ p_1

m

Description

We are planning a study of independent cases and controls with 1 control(s) per case. Prior data indicate that the failure rate among controls is 0.71. If the true failure rate for experimental subjects is 0.85, we will need to study 136 experimental subjects and 136 control subjects to be able to reject the null hypothesis that the failure rates for experimental and control subjects are equal with probability (power) 0.8. The Type I error probability associated with this test of this null hypothesis is 0.05. We will use an uncorrected chi-squared statistic to evaluate this null hypothesis.

2.6.6 Sampling method and subject recruitment

Participants will be enrolled in the study using systematic sampling. The sample size of 300 will be divided proportionately between HUSM and HRPZ II base on the number of nurses working in each hospital. The department that will be involved in this study are the Emergency department, Medical department, Anaesthesiology department, Obstetrics and Gynaecology department, Surgery department, and Orthopaedic department. These departments are selected because they have a big number of nurses working within the department. The total number of the subjects will be divided proportionately to number of nurses working in the departments involved. The name lists of the nurses working in the selected departments will be obtained from the HRPZ II and HUSM administration office. The first subject will be chosen from the name list. Then the total numbers of nurses in the department will be divided with the allocated number of subjects to serve as the constant difference between any two consecutive numbers in the progression. The selected nurses will be recruited via Whatsapp and be given the questionnaire web link.

2.6.7 Research tool

Questionnaires are formulated written set of questions to which respondents tick their answer, within the options given. The questionnaire used for this study has been designed from a previous study done among dentist across the globe (Kamate *et al.*, 2020). The study was approved Institutional Ethics Committee of the Institute of Dental Sciences (IDS) in Bareilly, India (No. IEC/57/2019). A pilot study was done on 25 dentists to validate the questionnaire and its Cronbach's alpha (α) was found to be 0.79 (Kamate *et al.*, 2020).

This questionnaire is also reviewed by HUSM Emergency physician to ensure it is relevant to the study. Permission for the use of the questionnaire for this study had been obtained from the original authors. An email was sent to the author of the study requesting for permission to use the questionnaire. The author has given the authority and permission to use the questionnaire was granted. The structured questionnaire consists of four sections and for each question there will be instructions how to answer the questions:

- First Section: This section is on sociodemographic data of the selected subject
- Second Section: 11 Questions on assessing knowledge regarding COVID-19
 - Each question is designed as multiple choices questions. One mark given to correct answers and zero mark for wrong answer.
- Third Section: 6 Questions on assessing attitudes regarding COVID-19
 - Each question can be answered by either yes, no, or don't know. Yes was the correct answer to some questions and no for others. One mark given to correct answers and zero mark for wrong answer.
- Fourth Section: 7 Questions on assessing practices regarding COVID-19
 - Each question is designed as multiple choices questions. One mark given to correct answers and zero mark for wrong answer.

2.6.8 Operational definition

1. COVID-19 gazetted hospital: Hospital Raja Perempuan Zainab II
2. Non-COVID-19 gazetted hospital: Hospital Universiti Sains Malaysia
3. Nurses: Nurses including staff nurses, Sisters & Matron

4. Knowledge is accordingly the concepts and information that the nurses have regarding COVID-19. Based on Park Textbook of Preventive and Social Medicine, knowledge is an acquired characteristic of an individual. There are 3 major components: a cognitive or knowledge element, an effective or feeling element, and a tendency of action.
 - Good Knowledge: When the respondents answer $\geq 75\%$ correct statement of knowledge
 - Poor Knowledge: When the respondents answer $< 75\%$ correct statement of knowledge
5. Attitude is the perception and internal feeling the nurses possess towards COVID-19 which may be positive or negative
 - Positive Attitude: When the respondents agree on $\geq 75\%$ of the statements of attitude.
 - Negative Attitude: When the respondents agree on $< 75\%$ of the statements of attitude.
6. Practice is the activities of the nurses towards preventing COVID-19 transmission.
 - Good practice- when the respondents agree on $\geq 72\%$ of the statement of practice.
 - Poor practice- when the respondents agree on $< 72\%$ of the respondent of practice.

2.7 DATA COLLECTION METHOD

An online questionnaire website link will be given to the selected nurses in both hospitals. The systematic sampling method determined the selection of the participants. Questionnaire will be forwarded via WhatsApp and Telegram.

Upon clicking the link, the first page assures the privacy of the data, the participants are informed of the study objective and stated the study participation are purely voluntary. The nurses who consented to participate in the study (inclusion criteria) will be implied when they click the 'I agree' button to answer the questionnaire, and they have complete freedom to either answer the questionnaire or decline it.

In order to make sure the participants answer the questions honestly and did not look for the answer from other resources or copy from other participants, each section of the questionnaire will be timed. The duration to answer each section is set according to the number of questions the participants need to answer. The timer will be displayed on the screen to let the participants know how much time left for this section. The participants should not wait until the timer ends. They can voluntarily move to the next section when the finish answering the questions. When the time ends the participants will be directed to the next section. The answers will still be recorded even though the participants did not manage to answer within the allocated time. The total duration to answer the questionnaire will be about 5 minutes. There are 4 sections:

- First Section: This section is on sociodemographic data of the selected subject. This section will not be timed and the participants can fill in the blanks at their own pace.
- Second Section: 11 Questions on assessing knowledge regarding COVID-19. This section will be timed for 2 minutes.

- Third Section: 6 Questions on assessing attitudes regarding COVID-19. This section will be timed for 1 minute.
- Fourth Section: 7 Questions on assessing practices regarding COVID-19. This section will be timed for 1 minute

In addition, the systematic sampling also can prevent the participants from copying answers from other participants. The participants will be contacted personally by the principal investigator to enrol them in the study. Using this method, the participants are less likely to know who the other participants are recruited for this study. Therefore, they will need to answer the questions within their own capabilities.

After a sufficient sample of participants acquired from both hospitals, the data collected from HRPZ II will be analysed and compared with the data that was collected in HUSM. Only the Principal investigator had access to the data and no personal details such as name, contact details or workplace information will be disclosed upon answering the questionnaire.

2.8 DATA ANALYSIS

Analysis for first objective:

All statistical analysis was performed using the SPSS software version 27 (SPSS Inc, Chicago, IL, USA). Numerical variables were reported in mean $\pm$ standard deviation unless mentioned otherwise and categorical variables were reported as frequency (percentage).

Analysis for second objective

Analysis for second objective was performed using multiple linear regression model. Multiple linear regression is used to estimate the relationship between two or more independent variables and one dependent variable. For this study, the independent variables are referring to the demographic factors which are age, gender, designation, years of practice, current working department, Continuous Medical Education (CME), practical session and simulation/drill. To conduct multiple linear regression several assumptions, need to be considered which are:

- Size of the error in our prediction doesn't change significantly across the values of the independent variable.
- Independence of observations: the observations in the dataset were collected using statistically valid sampling methods, and there are no hidden relationships among variables. If two independent variables are too highly correlated ($R^2 > \sim 0.6$), then only one of them should be used in the regression model.
- Normal distribution data and the line of best fit through the data points is a straight line, rather than a curve or some sort of grouping factor.

Analysis for third objective

Analysis for third objective was performed using Chi-square test of independence. The chi-square test for independence procedure tabulates a variable into categories and computes a chi-square statistic. This test compares the observed and expected frequencies in each category. Use non-numerical categorical variables (ordinal or nominal levels of measurement).

2.9 DUMMY TABLES

Table 2: Characteristic of respondents

Variable	Total Nurses N (%)	HRPZ n (%)	HUSM n (%)
<i>Age</i>			
< 31 years			
31-40 years			
41-50 years			
> 51 years			
<i>Gender</i>			
Male			
Female			
<i>Designation</i>			
Matron			
Sister			
Staff Nurse			
<i>Years of Practice</i>			
0-5 years			
6-10 years			
11-15 years			
> 15 years			
<i>Current Working Department</i>			
Emergency & Trauma			
Medical			
Anesthesiology			
Obstetrics & Gynecology			
Surgery			
Orthopedic			
<i>Covid-19 Training</i>			
Continuous Medical Education (CME)			
Practical Session			
Simulation / Drill			
Others			

Table 3: Level of KAP & Percentage Score among Nurses towards COVID-19

	Level	Total Nurses Frequency (%)	HRPZ Frequency (%)	HUSM Frequency (%)
Knowledge	Good			
	Poor			
Attitude	Positive			
	Negative			
Practice	Good			
	Poor			
Total		100%	100%	100%

Table 4: Associated factors for good knowledge toward COVID-19 among nurses using multiple linear regression.

Variable	Unstandardized B	Standardized Beta	T	P-value
Age				
Gender				
Designation				
Years of Practice				
Current Working Department				
Continuous Medical Education (CME)				
Practical Session				
Simulation/Drill				

**p < .05 (significant at the 0.05 level, 2-tailed)*

Table 5: Associated factors for positive attitude toward COVID-19 among nurses using multiple linear regression.

Variable	Unstandardized B	Standardized Beta	T	P-value
Age				
Gender				
Designation				
Years of Practice				
Current Working Department				
Continuous Medical Education (CME)				
Practical Session				
Simulation/Drill				

**p < .05 (significant at the 0.05 level, 2-tailed)*

Table 6: Associated factors for good practice toward COVID-19 among nurses using multiple linear regression.

Variable	Unstandardized B	Standardized Beta	T	P-value
Age				
Gender				
Designation				
Years of Practice				
Current Working Department				
Continuous Medical Education (CME)				
Practical Session				
Simulation/Drill				

**p < .05 (significant at the 0.05 level, 2-tailed)*

Table 7: Comparison of mean KAP score between HUSM and HRPZ II

	HRPZ	HUSM	Pearson Chi-Square	P-value
Knowledge				
Attitude				
Practice				

Note.: P-value are produced by Chi-square for independence

2.10 ETHICAL CONSIDERATION

Subject vulnerability

By participation to this study, it will not affect the participant's job. The participants are free to decline to answer any of the questions that they feel uncomfortable. They also may voluntarily withdraw from the study and different respondents will be approached. No other risk is foreseen throughout the study.

Information obtained from this study will help to evaluate the mean of knowledge, attitudes & practices on COVID-19 among nurses in HRPZ II and HUSM. This analysis will provide more insight regarding the preparedness and adherence level to the guidelines in preventing the COVID-19 transmission in the hospital.

Privacy and Confidentiality

All the information obtained in this study will be kept and handled in a confidential manner. When publishing or presenting the study results, the participants identity will not be revealed. Individuals involved in this study, qualified monitors, auditors, and governmental or regulatory authorities may inspect the study data, where appropriate and necessary. There will not be any phone numbers, identification card or personal information will be revealed in this study. The period of data collection will be ongoing for 4 months from the date the link is distributed to each hospital. After four months, the link will be disabled and no other personnel except the researchers will be able to access it.

Data storage

The data obtained from the participants' responses will be recorded in the questionnaire's website. The data collected will be recorded in another separate offline document after being retrieved from the questionnaire's website and all data in the website's cloud storage will be destroyed. Once the study is terminated, the link to the website will be removed from the World Wide Web.

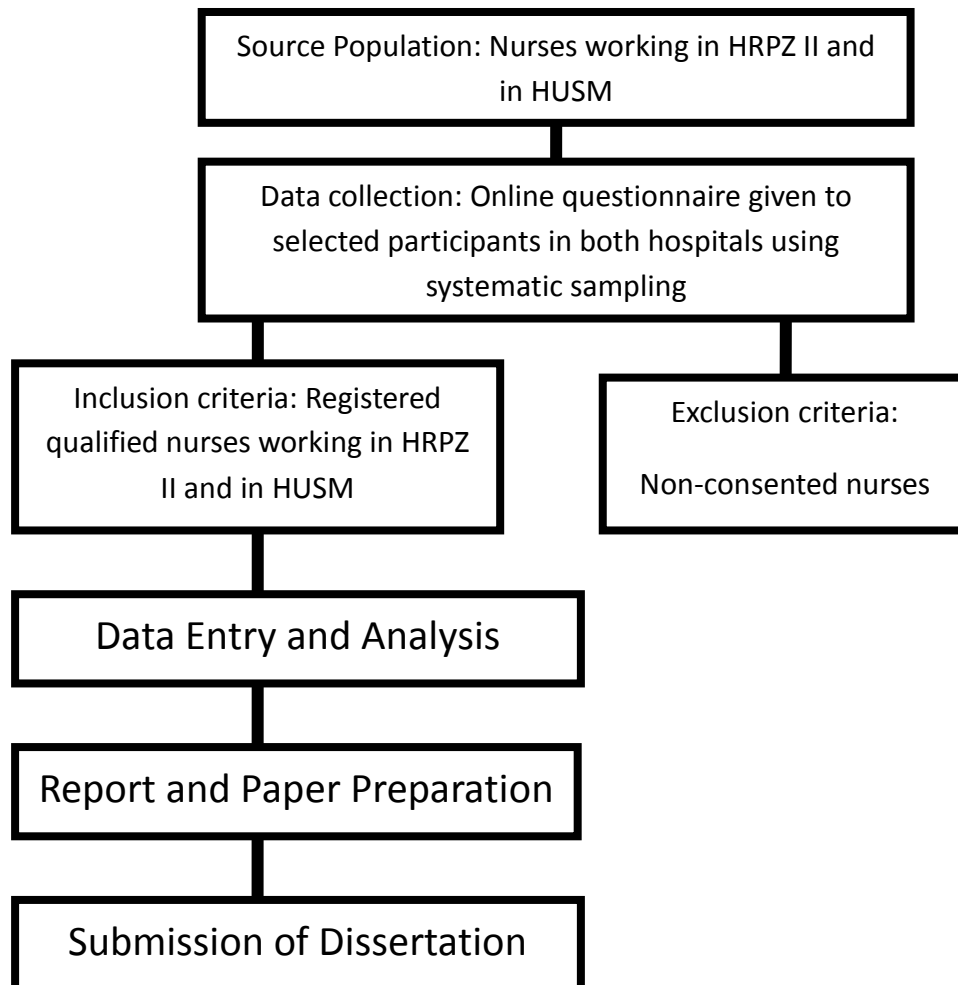
Conflict of interest

I hereby declare that there is absence of conflict of interest in this study. I received no payment or benefits from any individuals, companies, or department by conducting this study.

Termination of study

The study will be terminated once the sample size of the participants is reached. The link to the online questionnaire will be removed to avoid additional or unnecessary respond from unselected participants.

2.11 STUDY FLOWCHART



2.12 GANTT CHART OF RESEARCH ACTIVITIES

	2021			2022								
	O	N	D	J	F	M	A	M	J	J	A	S
Data collection												
Data entry and analysis												
Research writing												
Submission of draft												

Research Milestone

Data Collection October 2021

Data entry and analysis January 2022

Research writing May 2022

Research Submission/Publication September 2022

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doi:10.1016/J.JHIN.2020.04.012

CHAPTER 3: MANUSCRIPT

TITLE PAGE

Title: KNOWLEDGE ATTITUDE AND PRACTICE (KAP) AMONG NURSES TOWARDS COVID-19: A COMPARISON IN COVID-19 GAZETTED HOSPITAL AGAINST NON-COVID-19 GAZETTED HOSPITAL

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ABSTRACT

Numerous studies have been conducted on knowledge, attitudes, and practices (KAP) related to the viral outbreak, but only a small proportion included nurses as a study population. Therefore, this study aims to investigate the KAP related to COVID-19 among nurses in a COVID-19 gazetted hospital and a non-COVID-19 gazetted hospital. A cross-sectional survey was conducted between 1st October 2021 and 31st January 2022, among 300 nurses proportionally distributed between both hospitals, with systematic selection within six key departments. A validated timed online questionnaire in English consisting of 4 main sections with 30 questions on sociodemographic, and KAP related to COVID-19 was distributed via WhatsApp and Telegram. The study found that 91.3% had good knowledge, 97.7% had a positive attitude, and 88.3% had good practices related to COVID-19. However, there is no significant difference in knowledge, attitudes, and practices between nurses in the COVID-19 gazetted hospital and nurses in the non-COVID-19 gazetted hospital. Despite the high percentage of good knowledge and attitudes, the practices related to COVID-19 still need to be improved. Therefore, the focus should not only be about theoretical knowledge but also on improving the training, and strictly enforcing a proper standard of procedure.

Key words: COVID-19, knowledge, attitude, practice, nurses

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by a newly discovered coronavirus, SARS-CoV-2. It has affected the world since 2020, causing a pandemic that damages the socioeconomic status and health facilities of affected nations. Within six months, more than 15 million people were infected, and the death toll from this pandemic rose to more than 4.6 million who died from severe acute respiratory syndrome¹. Unfortunately, Malaysia was not spared the devastating effects of the virus. By September 2021, more than 2 million people had tested positive for COVID-19, and a total of 22,000 had died as a result².

Furthermore, the Malaysian Ministry of Health estimated that 9,000 HCWs had become infected with COVID-19 by August 2021³. The initial spread of infection to HCWs was caused by lack of and low standards for personal protective equipment (PPE)⁴. After fighting the COVID-19 for many months, lack of training in donning and doffing of PPE, improper disposal, and lack of negative air pressure in COVID-19 wards become major causes of infection and mortality among HCWs, even though high-quality PPE is readily available⁵.

Guidelines and trainings were developed, however HCWs adherence to infection prevention and control (IPC) guidelines varies according to their knowledge and attitude⁶. In hospitals where IPC guidelines are poorly adhered to, occupational accidents and nosocomial infection rates may increase, rendering COVID-19 transmission control guidelines ineffective⁷. COVID-19 infections among HCWs present a more complicated situation because they pose a risk to the country's healthcare system. For example, in March 2020, 47 HCWs (including doctors, nurses, and medical assistants) in Malaysia tested positive for COVID-19 after attending a wedding in Bangi, Selangor. They then infected their colleagues when they returned to their healthcare facilities. Since these HCWs had to be treated and quarantined for 14 days, the Malaysian Ministry of Health was forced to deploy HCWs from other unaffected hospitals to compensate for the sudden staff shortage⁸.

Numerous studies of knowledge, attitudes, and practices (KAP) have led researchers to conclude that a person's behaviour toward certain things can be influenced by their KAP. A quick search of the PubMed database revealed that more than 200 studies addressed the KAP of COVID-19, conducted on different populations in different countries. Only slightly more than 70 of these studies involved HCWs from around the world and their KAP related to COVID-19. Our observation of the available literature revealed a paucity of information on the KAP of HCWs in relation to the COVID-19 outbreak in Malaysia. Studies that recruited nurses as subjects are even rarer. Because nurses are an integral part of the response to the

pandemic, it is prudent to investigate their KAP related to COVID-19 to determine how well-equipped they are to contain the spread of the virus.

Many of these studies were conducted at the beginning of the pandemic, which was very different from the current situation. More than a year after the initial outbreak of COVID-19, the information, treatment, and standard operating procedures related to COVID-19 have changed dramatically. Thus, we now have a new opportunity to explore KAP among HCWs, especially nurses, and to investigate the factors that have a continuing impact on them.

In this study, we attempted to compare KAP related to COVID-19 among nurses working in two different hospitals: a COVID-19 gazetted hospital, HRPZ II, and a non-COVID-19 gazetted hospital, HUSM. Using a validated online questionnaire, we determined the percentage of KAP related to COVID-19 among nurses in HRPZ II and HUSM. We also explored the factors predicting good KAP among nurses in HRPZ II and HUSM and analysed the significant differences in KAP scores between the two hospitals. Links to the online survey were sent to the selected participants via messaging applications such as WhatsApp and Telegram. This study provides important information that may be used to improve protective measures in the workplace and educate workers on how to minimise their risk of exposure.

METHODOLOGY

Study design and sampling

A cross-sectional survey was conducted between 1st October 2021 and 31st January 2022 on 300 nurses proportionally distributed between HUSM and HRPZ II based on the number of registered nurses at each institution, using a systematic sampling approach. The study included the Emergency department, the Medical department, the Anaesthesiology department, the Obstetrics and Gynaecology department, the Surgery department, and the Orthopaedic department of the above hospitals. The validated questionnaire in English was adapted from the published literature and approved by the institutional ethics committee. It was distributed to the selected participants via WhatsApp and Telegram. All participants were requested to click the “I agree” button if they agreed to participate. The questionnaire consisted of 4 main sections: (1) sociodemographic (6 questions), (2) knowledge (11 questions), (3) attitude (6 questions), and (4) practice (7 questions). Each section was timed and the total time to complete the questionnaire was 5 minutes.

Statistical analysis

All statistical analyses were performed with SPSS software version 26 (SPSS Inc, Chicago, IL, USA). Unless otherwise indicated, numerical data were expressed as means and standard deviations, whereas categorical variables were expressed as frequencies (percentages). Multiple regression model was used to analyse factors predictive of good KAP among nurses in both HRPZ II and HUSM. The Chi-squared test of independence was used to analyse the differences in the KAP of nurses in the COVID-19 gazetted hospital (HRPZ II) and the non-COVID-19 gazetted hospital (HUSM). The statistical significance level was set at P -value < 0.05 .

RESULT

Sociodemographic of Respondents

The response rate for the questionnaire was 100%. Majority of the participants are female nurses (96.7%) and only 10 were male (3.3%). A total of 224 respondents (74.7%) were 40 years old and below and only 16 respondents (5.3%) who were older than 50 years old. Most of the respondents were Staff Nurses (83.7%), followed by 35 respondents (11.7%) who were Sister and 14 respondents (15.0%) who were Matron. In terms of years of practice (experience), many participants worked more than 6 years. For the type of COVID-19 training, Continuous Medical Education (CME) participation was the most common type of training underwent by the participants.

The Percentage Score of Knowledge, Attitudes and Practice among Nurses

The percentage of nurses with good knowledge related to COVID-19 was 91.3% (N=274 respondents). The percentage of nurses having a positive attitude towards COVID-19 was 97.7% (N=293 respondents). The percentage of good practice related to COVID-19 among nurses was 88.3% (N=265 respondents).

Table 1: Percentage Score of KAP Related to COVID-19 among Nurses

	Level	Total Nurses N = 300 (%)	HRPZ II N = 163	HUSM N = 137
Knowledge	Good	274 (91.3%)	152 (93.3%)	122 (89.1%)
	Poor	26 (8.7%)	11 (6.7%)	15 (10.9%)
Attitude	Positive	293 (97.7%)	159 (97.5%)	134 (97.8%)
	Negative	7 (2.3%)	4 (2.5%)	3 (2.2%)
Practice	Good	265 (88.3%)	146 (89.6%)	119 (86.9%)
	Poor	35 (11.7%)	17 (10.4%)	18 (13.1%)
Total		100%	100%	100%

Factors Predicting Good Knowledge, Attitudes, and Practice among Nurses in HRPZ II and HUSM

Six factors were investigated in this study using multiple regression model, namely age, gender, designation, years of practice, current work department, and type of COVID-19 training. Table 2, 3 and 4 show the results of the association between KAP and all factors.

Factors Associated with Good Knowledge of Nurses in HRPZ II and HUSM

The association between knowledge and years of practice among nurses showed a p-value below the significance level ($p = 0.04$). Meanwhile, there was no association between good knowledge with age, gender, designation, current work department, and type of training among the nurses.

Table 2: Factors Predicting Good Knowledge among Nurses

Variable	Unstandardized B	Standardized Beta	T	P-value
Age	-0.55	-0.05	-0.57	0.57
Gender	-0.13	0.00	-0.05	0.96
Designation	-1.77	-0.11	-1.62	0.11
Years of Practice	1.38	0.18	2.09	0.04
Current Working Department	-0.02	0.00	-0.07	0.94
Continuous Medical Education (CME)	0.98	0.05	0.90	0.37
Practical Session	-0.52	-0.03	-0.51	0.61
Simulation/Drill	0.29	0.01	0.21	0.83

* $p < .05$ (significant at the 0.05 level, 2-tailed)

Factors Associated with Good Attitude among Nurses in HRPZ II and HUSM

There was a relationship between good attitude with younger age but there was no association of good attitude with designation of nurses, years of practice, current work department, gender and type of training among the participants.

Table 3: Factors Predicting Good Attitude among Nurses

Variable	Unstandardized B	Standardized Beta	T	P-value
Age	1.06	-0.25	-2.66	0.01
Gender	2.88	0.04	0.61	0.54
Designation	1.20	0.06	0.93	0.35
Years of Practice	0.72	0.02	0.19	0.85
Current Working Department	0.35	0.04	0.68	0.50
Continuous Medical Education (CME)	1.20	0.01	0.22	0.82
Practical Session	1.13	0.03	0.52	0.61
Simulation/Drill	1.48	0.01	0.12	0.91

* $p < .05$ (significant at the 0.05 level, 2-tailed)

Factors Associated with Good Practice among Nurses in HRPZ II and HUSM

There were two predictors Continuous Medical Education (CME) ($\beta = 3.68$, $p = 0.00$) and practical session ($\beta = 2.79$, $p = 0.01$) show a significant value, indicating that the variable predicts respondents' practice towards COVID-19 among nurses in HRPZ II and in HUSM. The multiple regression model also shows increasing CME and practical session will increase the respondents' practice.

Table 4: Factors Predicting Good Practice among Nurses

Variable	Unstandardized B	Standardized Beta	T	P-value
Age	2.05	0.13	1.38	0.17
Gender	-1.89	-0.03	-0.47	0.64
Designation	-0.73	-0.03	-0.43	0.67
Years of Practice	-0.08	-0.01	-0.08	0.94
Current Working Department	0.35	0.04	0.71	0.48
Continuous Medical Education (CME)	6.20	0.21	3.68	0.00
Practical Session	4.43	0.17	2.79	0.01
Simulation/Drill	2.08	0.06	1.00	0.32

* $p < .05$ (significant at the 0.05 level, 2-tailed)

Difference in Knowledge, Attitudes, and Practice between Nurses in HRPZ II and HUSM

Table 5 shows a cross-tabulation of good KAP among nurses in HRPZ II and HUSM which clearly shows there was no significant difference in KAP between nurses in the COVID-19 gazette hospital (HRPZ II) and the non-COVID-19 gazette hospital (HUSM).

Table 5: Difference in KAP between Nurses in HRPZ II and HUSM

	HRPZ II	HUSM	Pearson Chi-Square	P-value
Knowledge	152	122	1.659	0.198
Attitudes	159	134	0.023	0.880
Practice	146	119	0.530	0.467

DISCUSSION

Our study showed that 274 respondents (91.3%) had a good knowledge about COVID-19. This percentage was higher than the two KAP studies done among nurses in early phase of COVID-19 of year 2020 in Northern Ethiopia which were 74% and 84.7%^{9,10}. A similar trend was also found in Jeddah, where only 71.9% of nurses had a good level of knowledge, after almost one year of exposure to the pandemic¹¹. In countries with limited information dissemination, knowledge levels were even lower, as in Nigeria, where only 56.9% of nurses had good knowledge¹². The meta-analysis study showed a lower knowledge level among participants with lower education level, poorer income and rural residence of limited access to information¹³. Studies conducted in China, a country earliest and heavily affected by COVID-19 also showed a lower score than our study. In Henan, Mianyang and Zhejiang provinces the knowledge scores among nurses were 80%, 77.8% and 77.1% respectively¹⁴⁻¹⁶. The reasons were due to not enough training about the disease and the study was done at the early phase of pandemic¹⁴⁻¹⁶.

The percentage score of good attitudes in our study was very good, with 97.7% of participants achieving good attitude score. Since most KAP studies among nurses were conducted in the early phase of the pandemic, the percentage scores for good attitudes are lower than in our study. One study unfortunately showed a low score for good attitude of only 17.12 %¹⁷. The low score was significantly associated with lack of PPE, fear of death, and avoidance of common places¹⁷. These factors are the recurring factors found in other early COVID-19 KAP studies among HCWs. KAP studies of other diseases such as MERS-COV have shown that good attitude scores will improve when the study population has more information and more resources for managing the disease¹⁸. In addition, Giao *et al.* and Bhagavathula *et al.* observed that the majority of HCWs with adequate knowledge had a positive attitude toward COVID-19^{19,20}. Interestingly, Giao *et al.* and Saqlain *et al.* found that attitudes did not differ significantly by age, gender, or professional experience^{19,21}.

The percentage for good practice in our study was 88.3%. This is almost the same level as in other earlier studies²²⁻²⁴. Despite being exposed to this disease for a long time, the practice score has not changed significantly compared to the results of the earlier KAP studies. As the pandemic progressed, the rules for self-protection from COVID-19 were no longer demanding or stringent. In addition, since the development of the COVID-19 vaccine, the severity of the disease and the mortality rates have declined. These factors contribute in part to the fact that the practice score was not as high as expected. The lower score for good practice was also observed in the KAP studies among HCWs for other diseases such as dengue fever and tuberculosis, even though these diseases have been around longer than COVID-19. It can be postulated that the repetitive exposure to the same disease would result in less apathetic to the practices.

Among the independent variables included in this study, age, years of practice, CME and practical sessions were the factors that predicted good KAP scores. This observation is consistent with the study from Nepal whom age 50 years and above had higher proportion of good KAP scores²⁵. Those who had been in the profession longer were also observed to have achieved good KAP scores. In some studies, even nurses who had 5 years or more of work

experience were found to have good KAP scores²⁵. It is logical to assume that a person's ability to deal with patients improves with increasing work experience. It is probably also safe to assert that more work experience leads to better patient care, stronger preventive practice, and a better understanding of COVID-19²⁶. According to Kieft et al., nurses are more inclined to practice critically and provide quality patient care because of their work experience²⁷. This could mean that work experience can develop strong nursing practice and influence awareness, attitudes, perceptions, and preventive behaviours²⁶.

We consistently find that training is part of the strategy to close the gaps in KAP from COVID-19, and it emerges as a significant factor associated with good practice scores in this study. Especially in nurses who attended the CME and practical session. Similarly, the study in Nepal found that those who received face-to-face and online training had better overall practice scores than those who did not²⁵.

Surprisingly, work department was not a significant factor in good KAP scores. This is consistent with a Nigerian study that found that work department was not a significant factor in good attitude and practice scores¹⁷. In contrast, most early KAP studies on COVID-19 found that nurses working in isolation wards or emergency departments were associated with good KAP scores^{16,28}.

From the results of this study, we can see that the majority of nurses in both hospitals had good KAP scores since COVID-19 has become a worldwide issue that has been ongoing for some time. However, there was no significant difference in KAP level between the two hospitals.

Limitations

This study has several limitations. First, because this was a cross-sectional study, only data at the time of the survey were considered and no changes over time were considered. In addition, no open-ended questions were asked on the standardised survey form. As a result, little information was available beyond binary yes/no or multiple-choice responses. Some participants may have provided socially desirable responses that were more consistent with government recommendations than with their actual opinions. This is especially true for the practice component, which included self-reported information that may not be consistent with the actual practice of the participants. Despite the randomization in selecting the participants, there were no blinding process to eliminate information bias.

CONCLUSION

According to this study, most nurses had a good knowledge and attitudes toward COVID-19, with no significant differences between the two hospitals. Although they had more knowledge and positive attitudes toward COVID-19, their practice needs to be refined. To improve working practices throughout COVID-19 pandemic response, the focus should not only be about theoretical knowledge but also improving training, and strictly enforcing a proper standard of procedure.

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CHAPTER 4 APPENDIX

Appendix A: Questionnaire form

Section 1: Sociodemographic

No	Questions
1	Age:
2	Gender: a) Male b) Female
3	Designation: a) Staff Nurse b) Sister c) Matron
4	Years of Practice: years
5	Current Working Department a) Emergency Department b) Medical Department c) Anaesthesiology department d) Obstetrics and Gynaecology department

	e) Surgery department f) Orthopaedic department
6	What types of COVID-19 training you have done? a) None b) Continuous Medical Education (CME) c) Practical session d) Simulation / Drill e) Others

Section 2: Knowledge

No	Questions
1	Have you heard of coronavirus? a) Yes b) No c) Maybe
1.1	If yes, what was the primary source of information? a) Newspaper b) Television c) Internet d) Social Media Sites (Facebook,WhatsApp, etc) e) Others (Pamphlets, through peers, etc) f) All the above
2	What is the name of the disease that caused novel coronavirus outbreak? a) Novel corona b) CDC-19 c) COVID-19

	d) I don't know
3	Where was the first case of COVID-19 first identified? a) Wuwei b) Xining c) Wuhan d) Dingxi e) Don't Know
4	COVID-19 affects a) Upper respiratory tract b) Lower Respiratory tract c) Circulatory System d) Don't Know
5	2019-nCoV is transmitted from a) Animal to person b) Person to person c) Plant to person d) All of the above e) Don't Know f) None of the above
6	What are the signs and symptoms of 2019-nCoV? a) Fever and Cough b) Heart attack c) Stomach ache d) Pneumoniae e) Breathing Difficulty f) All of the above
7	Is there a vaccine available for the COVID-19 outbreak? a) Yes b) No c) Maybe
8	COVID-19 can spread mainly via a) Leafy Vegetables

	b) Undercooked meat products c) Pets d) Respiratory droplets e) Common cold f) All of the above g) Don't Know
9	Can wearing face mask protect you from COVID-19? a) Yes b) No
9.1	If Yes, who should be wearing it? a) Infected person b) Healthy person c) Both
10	What is the method used for diagnosing COVID-19? a) Viral RNA Detection b) Viral antigen Detection c) RT-PCR d) Don't Know
11	Is COVID-19 Fatal? a) Yes b) No c) Don't Know

Section 3: Attitude

1	Are you avoiding non vegetarian food due to corona virus outbreak a) Yes b) No
2	Is it possible for nurses to spread awareness about corona virus? a) Yes b) No
3	Do you think corona virus can become a pandemic? a) Yes

	b) No
4	Do you think hand hygiene and PPE can be effective in preventing infection? a) Yes b) No c) Don't know
5	Do you think that the COVID-19 is a risk to your health? a) Yes b) No c) Maybe
6	Do you think that the COVID-19 is a risk to your patient health? a) Yes b) No c) Maybe

Section 4: Practice

1	Are your working colleagues sensitised about WHO preventive measures COVID-19 a) Yes b) No
2	Have you added travel history in history taking of the patient? a) Yes b) No
3	Have you ever discussed the risk of COVID-19 with your patients? a) Yes b) No
4	Does it have any effect on your social life? a) Yes b) No
5	Have you ever discussed COVID19 preventable measures with your patients? a) Yes b) No

6	How can you educate and spread awareness about corona virus? a) Verbally b) Visual aids c) Audio-visual aids d) Not sure e) None f) All the above
7	What are the preventable measures against COVID-19 outbreak? a) Avoid contact with infected patients b) Always or very often wearing surgical mask while contacting the patient c) Always or very often wearing N95 mask while contacting patient d) Using eyes protection (goggles or face shield) e) Hand Washing with soap after patient examination f) All of the above g) Don't know

Appendix B: Ethical Approval Letter

12th December 2021

Dr. Mohd Hatif Kamil
Department of Emergency Medicine
School of Medical Sciences
Universiti Sains Malaysia
16150 Kubang Kerian, Kelantan.

JEPeM Code : USM/JEPeM/COVID19-52

Protocol Title : Knowledge Attitude and Practice (KAP) Among Nurses Towards Covid-19: A Comparison in Covid-19 Gazetted Hospital Against Non-Covid-19 Gazetted Hospital.

Dear Dr.,

We wish to inform you that your study protocol has been reviewed and is hereby granted approval for implementation by the Jawatankuasa Etika Penyelidikan Manusia Universiti Sains Malaysia (JEPeM-USM). Your study has been assigned study protocol code **USM/JEPeM/COVID19-52**, which should be used for all communications to JEPeM-USM in relation to this study. This ethical approval is valid from **12th December 2021** until **11th December 2022**.

Study Site: Hospital Universiti Sains Malaysia and Hospital Raja Perempuan Zainab II (HRPZ II), Kota Bharu, Kelantan.

The following researchers are also involved in this study:

1. Dr. Normalinda Yaacob

The following documents have been approved for use in the study.

1. Research Proposal

In addition to the abovementioned documents, the following technical documents were included in the review on which this approval was based:

1. Participant Information Sheet and Consent Form (English version)
2. Questionnaire

The list of JEPeM-USM members present during the full board meeting reviewing your protocol is attached.

While the study is in progress, we request you to submit to us the following documents:

1. Application for renewal of ethical approval 60 days before the expiration date of this approval through submission of **JEPeM-USM FORM 3(B) 2019: Continuing Review Application Form**.
2. Any changes in the protocol, especially those that may adversely affect the safety of the participants during the conduct of the trial including changes in personnel, must be submitted or reported using **JEPeM-USM FORM 3(A) 2019: Study Protocol Amendment Submission Form**.
3. Revisions in the informed consent form using the **JEPeM-USM FORM 3(A) 2019: Study Protocol Amendment Submission Form**.
4. Reports of adverse events including from other study sites (national, international) using the **JEPeM-USM FORM 3(G) 2019: Adverse Events Report**.
5. Notice of early termination of the study and reasons for such using **JEPeM-USM FORM 3(E) 2019**.
6. Any event which may have ethical significance.

Appendix C: Raw Data in Softcopy (CD)