

**KNOWLEDGE ATTITUDE AND PRACTICE (KAP) OF NURSES
TOWARDS COVID-19 AND ASSOCIATED FACTORS IN
HOSPITAL UNIVERSITI SAINS MALAYSIA (HUSM)**

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LIST OF ABBREVIATIONS

KAP	Knowledge Attitude and Practice
HUSM	Hospital Universiti Sains Malaysia
COVID-19	Coronavirus Disease 2019
SAR-CoV2	Severe Acute Respiratory Syndrome Coronavirus 2
SEA	South East Asia
WHO	World Health Organization
CDC	Center for Disease Control and Prevention
HCWs	Healthcare Workers
ED	Emergency Department
SARI	Severe Acute Respiratory Disease
ARI	Acute Respiratory Illness
ILI	Influenza Like Illness
QR	Quick Responds
CT	Computer Tomography
OPD	Outpatient Department
ICU	Intensive Care Unit
IDS	Institute of Dental Science
IEC	Institutional Ethics Committee
MOH	Ministry of Health

ABSTRAK

Pengenalan

Pengetahuan sikap dan amalan (KAP) mengenai COVID-19 dikalangan jururawat adalah penting kerana mereka merupakan golongan yang kerap berhubung dengan pesakit di Hospital USM (HUSM). Objektive kajian ini adalah untuk menyelidik KAP antara jururawat yang bertugas di jabatan pesakit luar & kecemasan bersama jururawat yang bertugas di ward dan factor-faktor peramal seperti umur, pangkat, pengalaman bekerja, dan jantina di HUSM.

Kaedah

Kajian keratan rentas ini dilakukan di HUSM dikalangan 243 jururawat dari 1 Oktober 2020 sehingga 31 Disember 2020 menggunakan soal selidik secara atas talian menggunakan borang Google . Peserta di pilih secara persampelan mudahan dan persampelan bola salji. Soal selidik ini merangkumi 4 seksyen iaitu sosiodemografik, pengetahuan sikap and amalan mengenai COVID-19. Data di analisis menggunakan aplikasi Statistic Package for Social Science (SPSS) versis 22 (IBM SPSS Inc, Chicago, IL USA). Analisis regresif linear berganda dilakukan untuk mengakses factor-faktor peramal terhadap skor KAP.

Keputusan

Secara keseluruhan pengetahuan sikap dan praktis adalah baik dengan purata peratus masing-masing adalah 89.7%, 97% dan 90.1% di kalangan jururawat HUSM. Jururawat daripada wad pesakit luar telah mendapat skor purata lebih tinggi berbanding dengan jururawat dari wad pesakit dalam. Walaubagaimanapun, jumlah skor KAP tiada perbezaan purata (95% CI) di antara jururawat dan pembolehubah sosiodemografik untuk pengetahuan (p-value = 0.689), sikap (p-value 0.628) dan praktis (p-value 0.084) di antara jururawat pesakit luar dan jururawat

pesakit dalam. Interpretasi menggunakan analisis mudah regresif mudah, faktor pengetahuan, sikap dan praktis tiada kesinambungan statistic($p\text{-value} > 0.05$) di antara jururawat tersebut.

Kesimpulan

Wabak COVID-19 masih di tahap awal pada tahun 2020, namun KAP dikalangan jururawat di HUSM adalah bagus. Walaubagaimanapun, kursus dan pendedahan mengenai COVID-19 haruslah berterusan mengikut perkembangan semasa yang selaras dengan garis panduan yang disediakan oleh WHO dan Kementerian Kesihatan Malaysia.

Kata kunci

COVID-19, pandemik, pengetahuan, sikap dan praktis, jabatan kecemasan, jururawat

ABSTRACT

Introduction. Knowledge, attitude and practice (KAP) of nurses towards COVID-19 is vital because of their interaction with potentially infected COVID-19 patients. Objective of the study is to evaluate KAP among the inpatient and outpatient nurses in Hospital Universiti Sains Malaysia (HUSM) and determine any associating factors (variables) such as age, year of practice, ranking and the department they are working.

Methods. A cross-sectional study was conducted among nurses (n=243) in (HUSM) between October 1, 2020 and December 31, 2020 . The participants were recruited using both convenience and snowball sampling methods. The self-administered questionnaire consisted of four sections – sociodemographic (associated factors), knowledge, attitude, and practice on COVID-19 among the nurses. Data were analysed using Statistical Package for Social Science (SPSS) version 22 (IBM Inc, Chicago, IL, USA). Logistic regression analysis was conducted to determine the best model of predictors of KAP scores among nurses.

Results. The overall mean percentage of knowledge, attitude and practice were 89.7%, 97% and 90.1%, respectively. Based on the total KAP score there was no significant differences in knowledge ($p = 0.689$), attitude ($p = 0.628$) and practice ($p = 0.084$) between inpatient and outpatient department nurses. Using simple logistic regression ($p > 0.05$), there is no correlation between KAP and the variables among outpatient and inpatient nurses in HUSM.

Conclusions. Despite COVID-19 is an ongoing and expanding disease, at the early stage in 2020, this study has shown overall good knowledge, attitude, and practice among the nurses in HUSM. However, continues seminars and awareness should be conducted in HUSM according to the latest guidelines by WHO and Malaysian Ministry of Health (MOH).

Keywords

COVID-19, pandemic, knowledge, attitude, practice, Emergency department, Nurse

1. INTRODUCTION

Coronavirus Disease 2019 (COVID-19) an ongoing pandemic, caused by severe acute respiratory syndrome-coronavirus-2(SAR-CoV2) which has infected over 14 million confirmed cases worldwide, with nearly 610,000 death (WHO, 2020). As for 21st of July 2020, more than 8800 patients were tested positive and diagnose as COVID-19 in Malaysia with total of 123 death. Making Malaysia as the 4th highest recorded number of cases in South East Asia (SEA), (MOH,2020). As for state of Kelantan, a sum of 156 cases tested positive with total of 3 death (DOSM, 2020).

Despite World Health Organization(WHO) and Center for Disease Control and Prevention (CDC) has published the preventive measurement and control of COVID-19 for Health care workers(HCWs) (WHO, 2020) (CDC, 2019), there is lack of clarity among HCWs have slowed the controlling effort to deliver upmost care and treatment (Hoffman and Silverberg, 2018), leads to rapid infection in hospitals (Selvaraj et al., 2018) (McCloskey, B., & Heymann, D. 2020).

In HUSM itself our HCWs are categorized to Doctors, Nurses, and Medical Assistant. However, during the COVID-19 Pandemic, we had to divide the HCWs into outpatient HCWs and Inpatient HCWs.

Outpatient HCWs are those who working in Emergency Department (ED) and Outpatient Department (OPD) and they are dealing with patients who presenting with Severe Acute Respiratory Illness (SARI), Acute Respiratory Illness(ARI) and Influenza

like Illness (ILI). Whereby Inpatients HCWs are those who working inpatient ward and handling more established diagnosed patients.

In view of differences in job scope and task between Inpatients and Outpatients HCWs in HUSM, there are possibilities of gap in term KAP of COVID-19. Thus, there is a need of study in assessing KAP and their associating factors among them to combat the outbreak of COVID-19.

In this study we will be specifically assessing Knowledge, Attitude & Practice among the nurses in HUSM who are working as Inpatient nurses and outpatient nurses in HUSM with a structured online questionnaire in a survey form. Online Questionnaires will be distributed with Social Media such as WhatsApp, Telegram & Quick Respond (QR) Code by using convenient and snowball sampling among the nurses in HUSM. Data obtained from the respondents will be statistically analysed by using the SPSS software version 22 (SPSS Inc, Chicago, IL, USA).

2. LITERATURE REVIEW

Highly contagious pneumonia has flared in Wuhan, China from 12 December 2019.(Guo et al., 2020) . Then officials made statements that the novel coronavirus (COVID-19) as the causative pathogen of disease (Li et al., 2020). The novel viral pneumonia was named “Corona Virus Disease(COVID-19)” by the World health Organization (WHO).

Rapidly it has turned to the toughest challenge to combat in the modern history and having it spread in over 200 countries across globe. On 30th January 2020, the WHO as declared that COVID-19 outbreak as public health emergency of an international scale(Mahase, 2020).

Till to date, no antiviral treatment or vaccine has been recommended for COVID-19. Thus the best measurement is to control is preventive and it has become the most critical intervention (Bhagavathula et al., 2020).COVID-19 is spread by human to human transmission through droplet, feco-oral and direct contact and has incubation period of 2-14 days(Backer et al., 2020).

Human suffering from this disease clinically present with fever, cough, fatigue or myalgia, severe respiratory distress and abnormal computed tomography (CT) image findings. Sometimes patient comes with less common symptom such as headache, hemoptysis, sputum production and diarrhea (Peng et al., 2020, Huang et al., 2020).

In term of source information regarding COVID-19, HCWs rely on official government websites and Social Media. In a study conducted by (Bhagavathula et al., 2020), 30% of the participants reported they used news media and social media such as Facebook,

Twitter, WhatsApp, Youtube and Instagram to obtain information on COVID-19. Nearly 40% of the participants sometimes discuss COVID-19 related topics with family and friends.

In a similar study, the author identified significant knowledge gaps between doctors and other HCWs. For instance, 65.7% of doctors and 55.7% HCWs thought that COVID-19 originated from bats. However, participants knowledge of question related to the incubation period and mode of transmission of COVID-19 was poor (Bhagavathula et al., 2020)

Knowledge can influence the perception of the Health Care Workers (HCWs) due to their previous experience and belief (Oppenheim et al., 2019). In fact it can delay the detection and handling potential of COVID-19 patient during the pandemic period. However the level of knowledge, attitude and practice among the nurses in HUSM is still remain unclear. In this case, the COVID-19 pandemic gives an unique opportunity to investigate the level of knowledge and perception of HUSM Nurses during the global crisis (Bhagavathula et al., 2020).

In this situation, COVID-19 brings a complex epidemiological scenario. In view of the challenges, it is important to assess the knowledge and practice among health care workers on COVID-19 and their attitude towards the disease (Escalera-Antezana et al., 2020). KAP studies provide a ground level information to determine the type of approach that be required to change the misconceptions about the virus.

Assessing the KAP related to COVID-10 among the HCWs will be helpful to provide a better insight and a better clarity to address poor knowledge about the disease and

the development of preventive strategies and COVID-19 related courses (Azlan et al., 2020). SARS outbreak had given us a lesson that knowledge and attitude are associated with panic and emotion which could further complicate measures to constrain the spread of the disease(Person et al., 2004).

3. RESEARCH QUESTION

- a) What is the mean score of knowledge on COVID-19 among HUSM Nurses?
- b) What is the mean score of attitude towards COVID-19 among Nurses in HUSM?
- c) What is the mean score of practice of COVID-19 among Nurses in HUSM?
- d) What are the mean differences between Outpatient and Inpatient nurses of HUSM based on their KAP score of COVID-19?
- e) What are the associating factors that predict good knowledge, attitude and practice among Outpatient and Inpatient nurses of HUSM?

4. RATIONALE/ JUSTIFICATION OF STUDY

- a) Many Studies has Identified that HCWs still have differences of knowledge score and discrepancies in perception based on type of medical personals (Apaijitt and Wiwanitkit, 2020) (Bhagavathula et al., 2020) .

Hence this study would help us to know the level of KAP on COVID-19 among nurses in HUSM

- b) An opportunity to create awareness and preparing our HCWs with proper educational campaign to broaden their depth of KAP on COVID-19 after this study.

5. NULL HYPOTHESIS

There are no associated factors contributing towards knowledge attitude and perception of covid-19 among healthcare workers in HUSM.

6. OBJECTIVES

6.1 General Objective

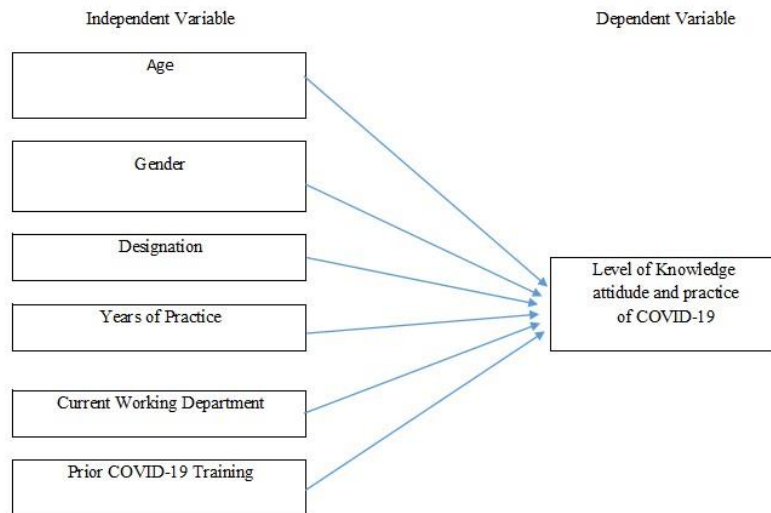
To evaluate the mean of Knowledge, Attitude & Practice on COVID-19 among Nurses in HUSM.

6.2 Specific Objective

- a) To determine the mean score of Knowledge, Attitude and Practice among Nurses
- b) To compare mean score of Knowledge, Attitude and Practice on COVID-19 among Outpatient and Inpatient Nurses in HUSM
- c) To determine the Associated Factors for Knowledge, Attitude and Practice COVID-19 among Outpatient and Inpatient Nurses in HUSM

7. CONCEPTUAL FRAMEWORK

Dependent Variable KAP among Outpatient & Inpatient Nurses



The conceptual framework above consists of six independent variables and one dependent variable. The independent variables are age, gender, designation, total working experience as HCWs, Current Working Department: ED, OPD or inpatient ward, and any prior training on COVID-19. The Dependent variable is the framework is mean of knowledge, attitude and practice on COVID-19.

8. RESEARCH METHODOLOGY

8.1. Study Design : Cross-sectional Study

8.2. Study Setting : Hospital Universiti Sains Malaysia (HUSM)

8.3. Study Population: All Nurses working in HUSM

8.4. Duration of the Study: October 2020 till January 2021 or right after getting approval
from JePeM USM

8.5. Subject Criteria:

Inclusion criteria:

-Registered Qualified Nurses Working in HUSM

Exclusion Criteria

-Nurses who in administration job in HUSM such as in Office, Bestari & Quality Unit

8.6. Sample Size Estimation:

1. To determine the mean score of Knowledge, Attitude and Practice among Nurses.

The sample size was calculated using PS software 3.1.2, one mean sample size calculation were done (single mean proportion, to show the formula and calculation) Manual Formula.

$$n = \left(z \frac{\delta}{\Delta} \right)^2$$

$$n = \left(1.96 \frac{2.5}{1.25} \right)^2$$

n = Minimum required sample size = 15

Z = value of normal distribution curve. Fixed value for single formula, z=1.96

δ = population standard deviation = 2.5

Δ = the estimated difference from population mean (it can be determined from literature or by applying the concept and formula effect size) $(0.5 \times 2.5) = 1.25$

2. To compare mean of Knowledge, Attitude and Practice on COVID-19 among Outpatient and Inpatient Nurses in HUSM.

The sample size was calculated using PS software 3.1.2, two mean sample size calculation were done. The calculated sample size of 64 participants for each group

was estimated based on alpha value of 0.05, power of 80% and standard deviation of knowledge and practice was reported as 2.5 (Kamate et al., 2020) and estimated mean different between both group were 1.25 (expert opinion) respectively. Add 20% dropout rate, 154 total sample need for all participants

$$n = 2\sigma^2/\Delta^2(Z_a + Z^b)^2$$

$$n = 2 * 2.5^2/1.25^2(1.96 + 0.84)^2$$

Add 20% drop-out, n=154

σ = standard deviation of either group

Δ = expected detectable difference between two groups

Commonly used values:

Z_a = 1.96 for α =0.05 (two-tailed)

Z^b = 0.84 for 80% power

3. To determine the Associated Factors for Knowledge, Attitude and Practice on COVID-19 among Outpatient and Inpatient Nurses in HUSM, The sample size was calculated using Ps software 3.12 by using two independent proportion formulae. The required sample sizes for this study were determined by the software (dichotomous). Conventionally, the power of the study was set at 80% with α =0.05, the ratio between the group of variables being study, m=1. The sample size was calculated, including an allowance of an additional 10% possibility of missing or incomplete data.

Formula two proportion:

$$n = p^1(1 - p^1) + \frac{p^2(1 - p^2)}{(p^1 - p^2)^2(Z_a + Z^b)^2}$$

n=required sample size

α =level of statistical significance

1- β = power of study

Commonly used values:

Z_a = 1.96 for α =0.05 (two-tailed)

Z^b = 0.84 for 80% power

By software : Example

Power and Sample Size Program: Main Window

File Edit Log Help

Survival t-test Regression 1 Regression 2 Dichotomous Mantel-Haenszel Log

Studies that are analyzed by chi-square or Fisher's exact test

Output

What do you want to know? Sample size

Case sample size for uncorrected chi-squared test 94

Design

Matched or independent? Independent

Case control? Prospective

How is the alternative hypothesis expressed? Two proportions

Uncorrected chi-square or Fisher's exact test? Uncorrected chi-square test

Input

α 0.05 p_0 0.32

power 0.8 p_1 0.52

m 1

Calculate

Graphs

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 0.32. If the true failure rate for experimental subjects is 0.52, we will need to study 94 experimental subjects and 94 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.

PS version 3.1.2

Copy to Log Exit

Summary of sample size calculation for objective 3.

Factors	P0*	P1	M	n	nx2+10%	Literature
Age	0.32	0.52	1	94	206	(Bhagavathula et al., 2020)
Gender (Female)	0.48	0.58	1	94	206	(Bhagavathula et al., 2020)
Designation	0.05	0.25	1	49	108	(Bhagavathula et al., 2020)
Years of Practice	0.35	0.55	1	96	212	(Kamate et al., 2020)
Working Department	0.65	0.85	1	72	158	(Kamate et al., 2020)
Covid Training Before	0.59	0.79	1	83	183	(Bhagavathula et al., 2020)

*Po were obtained from the literature.

Po: Proportion of exposure in controls based on literature

P1: Estimated Proportion of exposure in cases based on expert opinion

P2: Estimated Proportion of exposure in cases based on literature

Δ : Value of the standard normal distribution cutting off probability α (1.96 for $\alpha = 0.05$ (two-tailed)).

M: Ratio P0:P1 = 1:1

Hence Maximum Sample size would be **212** for this study.

8.7 Statistical analysis

Analysis for 1st Objective

All statistical analysis was performed using the SPSS software version 22 (IBM 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 2nd Objective :

Analysis for specific objective 2 were perform using Independent t test. Mean difference between two comparison group were reported and p-value <0.05 shown statistically mean difference between group.

Objective 3:

Analysis for specific objective 3 were perform using multiple logistic regression. Multiple logistic regression is the estimation relationship between dichotomous dependent variable (event- Outpatient and Inpatient Nurses) and more than one independent variables. The goals of the regression analysis is to establish a model that is best fit, parsimonious, biologically sound and statistically significant. This model to answer the research question:

The odds = the chance

The odds of an event is the ratio of the number of ways the event can occur to the number of ways the event cannot occur

Dependent variable

Label: 1= Outpatient (Front)

2= 2nd Inpatient (Back)

Univariable analysis was done to screen for important independent variables to look for variables with p-value <0.25 and / or clinically important to continue with multiple logistic regression. SPSS analyse the data based on coding 1st liner as reference group

Steps in Multiple Logistic Regression

- a) Data exploration & cleaning Numerical variable reported as mean (Standard deviation) when data normally distributed and Median (Interquartile range) when data skewed. Categorical data was reported as frequency (%).
- b) Univariable analysis (Simple Logistic Regression): P-value <0.25, that variables were included in Variable selection
- c) Variable selection (Multiple Logistic Regression)
 - Enter method: enter or remove manually the independent variable
 - Forward selection- automatically enter the important IV into model
 - Backward elimination-automatically remove unimportant IV from model

d) Checking multicollinearity and interaction

Check multicollinearity-no multicollinearity problem because small standard error.

Interaction: No interaction between to selected variables

e) Checking model assumption

Assessing the goodness of fit

i. The Hosmer-Lemeshow test

ii. Classification table

iii. ROC curve

f) Interpretation and presentation

8.8 Operational Definition

a) HCWs in HUSM:

- Emergency Department (ED) HCWs: Medical Personal who works in ED
- Outpatient Department (OPD) HCWs: Medical Personal who works in OPD
- Inpatient Ward HCWs: Medical Personal who works general wards including Intensive Care Unit (ICU).
- Nurses who are working in Emergency Department (ED) and Outpatient Department (OPD) are grouped as Outpatient Nurses in this study. They are dealing with patients who presenting with Severe Acute Respiratory Illness

(SARI), Acute Respiratory Illness (ARI) and Influenza like Illness (ILI) in Hospital USM settings.

- Nurses who are working in general ward and handling more established diagnosis patients including ICU are grouped as Inpatient Nurses_ in Hospital USM settings.
- Nurses are one of the HCWs including staff nurses, Sisters & Matron

b) Knowledge is accordingly the concepts and information that HCWs 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:

- i) a cognitive or knowledge element
- ii) an effective or feeling element
- iii) a tendency of action.

Knowledge of health behavior is considered to be beneficial, however it does not automatically mean that this behavior will automatically be followed. (Gobazie Temesgen Tegagn 2017)

-Good Knowledge: When the respondents answer $\geq 65\%$ correct statement of knowledge

-Poor Knowledge: When the respondents answer $< 65\%$ correct statement of knowledge

Where else based on the study by conducted by Kamate, et. al., the scoring point was given with maximum of 13, cut off point for median score is ≥ 8 for good knowledge (Kamate et al., 2020).

- c) Attitude is the perception and internal feeling nurses possess towards COVID-19 which may be positive or negative. Attitude is defined as relatively enduring organization of belief around subject or concept which predisposes one to respond in some preferential manner. Attitude is a way of being, a position. These are leanings or 'tendencies to'. This is an intermediate variable between the situation and subject submitted to a stimulus, that subject adopts one practice and not another. (Gobazie Temesgen Tegagn 2017).

-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.

Where else based on the study by conducted by Kamate, et. al., the scoring point was given with maximum of 6, cut off point for median score is ≥ 3 for positive attitude (Kamate et al., 2020)

- d) Practice is the activities of HCWs towards COVID-19. Practice or behavior is the observable action of an individual in response to stimulus.(Gobazie Temesgen Tegagn 2017)

-Good practice- when the respondents agree on $\geq 70\%$ of the statement of practice.

-Poor practice- when the respondents agree on $< 70\%$ of the respondent of practice.

Where else based on the study by conducted by Kamate, et. al., the scoring point was given with maximum of 7, cut off point for median score ≥ 4 for good practice (Kamate et al., 2020).

- e) Mean (average) - is the most common measure of central tendency and refers to the average value of a group of numbers. Add up all the figures, divide by the number of values, and that is the average or mean It is calculated from the formula $\Sigma X / N$. [The sum all the scores in the distribution (ΣX) divided by the total number of scores (N)]. If you subtract each value in the distribution from the mean and then sum all of these deviation scores, the result will be zero (Sykes et al., 2016)

8.9 Sampling Technique

Each study will use convenience sampling method. Convenience sampling (another terminology is availability sampling) is a specific type of non-probability sampling method that relies on data collection from population members who are conveniently available to participate in study. (Methodology, 2020)

Snowball sampling (also known as chain-referral sampling) is a non-probability (non-random) sampling method used when characteristics to be possessed by samples are rare and difficult to find. Exponential non-discriminative snowball sampling pattern will be used in this research (Methodology, 2020)

So in this study, the online questionnaire will be forwarded personally among nurses in HUSM using a combination of convenience (investigator themselves contacts Nurses to participate in the Study) and snowball sampling. The primary instrument to collect data is via online questionnaire using <https://forms.gle/3k3VUuTv5XQgEKs96>. Questionnaire will be forwarded via WhatsApp Group, Telegram and Quick Respond (QR) Code (Appendix 1) will be pasted in inpatient Ward, Emergency Department & Outpatient Department

8.10 Research Tools

Questionnaires are formulated written set of questions to which respondents tick their answer, usually within options given. The questionnaire used for this study (Appendix 1) 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 will be 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 (Appendix 1):

1st Section: This section is on sociodemographic data of Nurses in HUSM

2nd Section: 11 Questions on assessing Knowledge regarding COVID-19

3rd Section: 6 Questions on assessing Attitudes regarding COVID-19

4th Section: 7 Questions assessing Practice regarding COVID-19

9 DATA COLLECTION METHOD

As soon as approval obtained from the Ethics Committee of Hospital USM(JEPeM-USM Secretariat), the online questionnaire will be forwarded personally among nurses in HUSM using a combination of convenience (Principal Investigator will contacts Nurses to participate in the Study) and snowball sampling. The primary instrument to collect data is via online questionnaire using Google Form <https://forms.gle/3k3VUuTv5XQgEKs96> (Appendix 1).

Questionnaire will be forwarded via 3 main platforms. They are WhatsApp Groups, Telegram Groups and Quick Respond (QR) Code (Appendix 2).

For WhatsApp and Telegram platform, The principle Investigator will forward the Google Form Questionnaire link to the Matrons and Sisters of each department. The Matrons and Sisters will then forward the link via their Whatsapp/Telegram Group which consist of staff nurses. Snowball sampling is applied in this method.

QR Codes(Appendix 2) will be pasted in every wards from Ward 1Selatan till Ward 8TimurDepan also all the ICU wards in Hospital USM, Emergency Department & Outpatient Department. The QR Code is pasted at the strategic place where long table for clerking, Desktop Computers and Telephones are located. Hence the Staff nurses working in each ward can simply scan the QR Codes on the smartphone to answer the questionnaire. Convenience sampling is applied in this method.

Once the scan QR code or click the Telegram/Watsapp link. The Questionnaires will prompt in their Phone Browsers.

Upon clicking the link, the 1st page assures the privacy of the data, the nurses are informed regarding the objective of the study and stated the study participation are purely voluntary. Possible risk and benefit to the participants are also stated in the Participant Information Sheet and Consent Form (PIS and CF) in the Google form (Appendix 2). The nurses who consented to participate in the study (inclusion criteria) will be implied when they click the 'next" button to answer the design questionnaire, and nurses have complete freedom to either answer the questionnaire or decline it. To avoid same participants answering twice, their valid USM email address is required in order to fill up the google form. Upon completion of the questionnaire, the participants will get a receipt of the response to their valid USM email address once the study has been completed

Only the Principle investigator has the access to the data and no personal details such as telephone numbers, name or Identification Card numbers are required upon answering the questionnaire.

All questionnaires feedback are automatically tabulated in a excel/google spreadsheet which will be used as raw data. And then all the data will be transferred and all statistical analysis will be performed using the SPSS software version 22 (SPSS Inc, Chicago, IL, USA).

9.1 Variables

9.1.1 Independent Variable

a) Age

b) Gender

c) Designation

Corresponding to the Categories: Staff Nurse, Sister or Matron

d) Years of Practice.

Total year of practice in Health Care Facilities.

e) Current Working Department

Comprises of Emergency Department, Outpatient Department or Wards.

f) Prior COVID-19 Training

Prior training include continues medical education on COVID-19 such as practical sessions, seminar or classes.

9.1.2 Dependent Variable

Mean of Knowledge Attitude and Practice towards COVID-19

9.2 Dummy Tables

Table I: Demographic profile based on all samples

Variables	Frequency (%)	Mean (SD)
Age, Mean (SD)		
Gender		
Female		
Male		
Designation		
Staff nurse		
Sister and Matron		
Years of practice		
0-2		
2-5		
5-10		
>10		
Any COVID-19 Training before		
Yes		
No		
Current working department		
Inpatient		
Outpatient		

Table II. Result divided based on current working department

Variables	Inpatient Nurses		Outpatient Nurses	
	n (%)	Mean(SD)	n (%)	Mean(SD)
Age, Mean (SD) 21-30 31-40 41-50 50>				
Gender Male Female				
Designation Matron Sister Staff Nurse				
Years of Practice <4 years >4 years				
Current Working Department Emergency Department Outpatient Department Inpatient Ward				
Prior COVID-19 Training Yes No				

Table III: Mean and percentage of correct KAP score on COVID-19 among Nurses in HUSM

Code	Items	Percentage answered correctly (%)
K1	Have you heard of coronavirus?	
K2	If yes, what was the primary source of information?	
K3	What is the name of the disease causing novel coronavirus outbreak?	
K4	Where was the first case of COVID-19 1 st identified?	
K5	COVID-19 affects?	
K6	2019-nCoV is transmitted from?	
K7	What are the signs and symptoms of 2019-nCoV ?	
K8	Is there a vaccine available for the COVID-19 outbreak ?	
K9	COVID-19 can spread mainly via?	
K8	Can Wearing mouth mask protect you from COVID-19	
K10	If Yes, who should be wearing it?	
K12	What is the method used for diagnosing COVID-19	
K13	Is COVID-19 Fatal	
Mean percentage of knowledge score		
A1	Are you avoiding non vegetarian food due to corona virus outbreak	
A2	Is it possible for Nurses to spread awareness about corona virus?	
A3	Do you think corona virus can become a pandemic?	
A4	Do you think hand hygiene and PPE can be effective in preventing infection?	
A5	Do you think that the COVID-19 is a risk to your health?	
A6	Do you think that the COVID-19 is a risk to your patient health?	
Mean percentage of attitude score		
P1	Are your working colleagues sensitised about WHO preventive measures COVID-19?	
P2	Have you added travel history in history taking of the patient?	
P3	Have you ever discussed the risk of COVID-19 with your patients?	
P4	Does it have any effect on your social life?	
P5	Have you ever discussed COVID19 preventable measures with your patients?	
P6	How can you educate and spread awareness about coronavirus?	
P7	What are the preventable measures against COVID-19 outbreak?	
Mean percentage of practice score		