



Nurses' Knowledge, Trends, and Infection Control Practices toward COVID-19

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COVID-19 is caused by a viral infection and nurses are at high risk of gaining this infection while providing nursing care to patients. Therefore, it's vital to evaluate their performance in regard to COVID-19. **Research Aims:** To examine nurses' knowledge, trends, and infection control practices toward COVID-19. **Methodology:** Cross sectional research design conducted at Prince Sultan Cardiac Centre, King Fahd Specialist Hospital and Buraidah Central Hospital. The subjects were 200 nurses, through convenience sample. An online survey was conducted using Google form, which contained four parts (characteristics, knowledge, trends and practice). **Results:** The mean age of studied nurses was 31.98 (6.94) years, 95% of them were female, 54% were married and 93% of studied nurses had a BSN. Educational level and age were positive predictors in nurses' knowledge. The total knowledge, trends, experience and educational level had a positive impact on nurses' practices. The total knowledge, married nurses, age and experience were positive predictors for nurses' trends. **Conclusions:** The current study concluded that half of studied nurses had good knowledge and more than one third had an average knowledge level. In related trends, less than two thirds of studied nurses had positive trends. According to practice level, around two thirds of studied nurses had competent practices.

Keywords: *Nurses, Knowledge, Trends, Practice, Infection Control, COVID-19.*



Introduction

In late 2019 a virus apparently closely related to the SARS coronavirus began in Wuhan, China (Velavan & Meyer, 2020). Later, the virus termed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), triggered an illness well-known as COVID-19, which was similar to SARS and primary characterised by respiratory symptoms and fever. The World Health Organization in March 2020 affirmed the outbreak a pandemic (Cao, 2020; Le et al., 2020).

Coronavirus is continuing its spread over the world with nearly 80 million confirmed cases in 190 countries and more than 1.7 million deaths. As of the evening of December 26, there were 362,000 affirmed cases of COVID-19, 353,000 recovered cases and 6,168 deaths in Saudi Arabia, with a recovery rate of 97.5% (Ministry of Health – Kingdom of Saudi Arabia, 2020). The 2020 coronavirus spread in Saudi Arabia is a portion of a continuous spread over the world. The primary cause of COVID-19 in Saudi Arabia was affirmed on 2 March 2020 (Alkhamees et al., 2020).

The COVID-19 pandemic is putting medical teams over the world in an unprecedented state. The severity of the disease leads to a great psychological and mental burden on the medical team (Chirico et al., 2020). Nurses are one of the medical teams who are on the frontline in the fight against the COVID-19 pandemic while most of the other people are staying at home. As a result, thousands of nurses and other medical teams are being infected with COVID-19 worldwide while providing care to patients suffering from COVID-19, and in developing countries the condition is deteriorating with the low quality of health systems (Wang et al., 2020; Shi et al., 2020).

Therefore, adequate training workshops and improving performance are necessary to inhibit hospital-acquired infections. Investigating the nurses' knowledge, trends, and practices assist to predict the outcomes of COVID-19 (Limbu et al., 2020). Knowledge of a disease may impact nurses' trends and practices, and incorrect trends and practices can raise the risk of infection (McEachan et al., 2016).

Aims

This study aimed to examine nurses' knowledge, trends, and infection control practices toward COVID-19, through:

- Assessing nurses' knowledge about COVID-19
- Assessing nurses' trends toward COVID-19
- Assessing nurses' infection control practices toward COVID-19



Research questions:

- What is the level of nurses' knowledge, trends, and infection control practices toward COVID-19?
- Is there a relation between nurses' characteristics and their knowledge, trends, and infection control practices toward COVID-19?

Methods:

Research design: A cross sectional research design was utilised from August 2020-November 2020.

Research Setting: The study was carried out at Prince Sultan Cardiac Centre, King Fahd Specialist Hospital and Buraidah Central Hospital which is located in Buraidah, the capital of Al-Qassim Region in northcentral Saudi Arabia

Subjects: The convenience sample included the nurses who were available and worked in the abovementioned settings regardless of their age, gender, qualification, and experience. The estimated sample size was 200 nurses arranged as mentioned below, at confidence level 90%. The precision rate is 0.05 by using the equation devised by Thompson (2006) as the total number of available nurses is 740. $P=0.5$, $N=$ Total population, $Z=Z$ value "1.96", $D=$ Standard Error, $n=$ sample size.

Related to the principles and rules of social distancing and limiting the spread of COVID-19, we used an online survey using email, Facebook, WhatsApp and telegram services in different units of hospitals (Google form: https://docs.google.com/forms/d/13z3PdV19XfemUOeMzxQBPWt2TjcWt_UfY8l4xnV9XU/edit#responses) to collect the data from the subjects. Google forms permit questionnaire design, collection of data, descriptive analysis of results, and download of data through excel spreadsheet for extra analysis.

The instruments: The study instrument were designed based on literature review and previous KAPs study related to COVID-19 (Mossa-Basha et al., 2020; Park et al., 2020) and contained four parts:

Part I: Characteristics of the subjects such as age, gender, marital status, educational level, experience, workplace, practice area, source of knowledge and workshop training.

Part II: Knowledge of studied subjects on COVID-19. Questions in this part included eleven questions in a MCQ form and asked participants to choose the correct answer. These questions included concept, mode of transmission, symptoms, and complications....etc. A



correct answer scored one point, while an incorrect answer scored zero points. These scores were arranged in three categories; Good knowledge if the score was $>70\%$, Average if the score was between 50 and 70%, and low if the score was $<50\%$.

Part III: Trends of studied subjects about COVID-19. Questions in this part consisted of ten questions in the form of a Likert scale which ranged from agree, neutral and disagree. Every response scored 3, 2, 1 for positive item and vice versa for a negative item. The total score ranged from 10 to 30 and considered positive if the score ranged 18 to 30 while negative if the score was less than 18.

Part IV: Practice of studied subjects about infection control about COVID-19. Questions in this part consisted of ten questions in the form of a MCQ form and asked participants to choose the correct answer. These questions included hand hygiene, use of face mask, wearing of personal protective equipment, hand washing....etc. A correct answer scored one point while an incorrect answer scored zero points. These scores were arranged in three categories: Competent practice if the score was equal or higher than 70% and incompetent if the score was $<70\%$

Pilot Study:

The pilot study was conducted with 20 nurses who represented 10% of nurses at the previously mentioned settings in order to test the applicability of the constructed tools and the clarity of the included tools. The pilot also served to estimate the time needed for each subject to fill in the questionnaire.

A group of experts in the medical surgical and critical departments ascertained the content's validity; their opinions were elicited regarding the format, layout, consistency, accuracy, and relevancy of the tools. Reliability testing was carried out to test the reliability in terms of Cronbach's Alpha for instrument and was 0.845.

Data collected from the studied sample was revised, coded, and entered using a Personal Computer (PC). Computerised data entry and statistical analysis were fulfilled using the Statistical Package for Social Sciences (SPSS) version 24. Data as presented using descriptive statistics in the form of mean and S.D. A linear regression model is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables.

Ethical consideration:

The research ethics committee revised and approved the study. The submission of the online answer to the questionnaire was considered as consent to take part in the study.

Confidentiality of the study nurses' data was sustained throughout the study by making the nurses' data nameless and asking the nurses to afford honest answers.

Results:

Table (1) revealed that mean age of studied nurses was 31.98 (6.94) years, 95% of them were female and 54% were married. In relation to educational level, 93% of the studied nurses had a BSN. Also, it was detected that 76.5% of studied nurses worked at a specialised hospital and 25.5% of them at medical department. Regarding experience, the study showed that the mean experience was 8.61 (4.71) years. In relation to source of knowledge, 24.5% of them had knowledge from published literature and 72% of them attended workshops about COVID19.

Table (2) stated that 50% of studied nurses had good knowledge and 34% had an average knowledge level. In related trends, 61% of studied nurses had positive trends. According to practice level, 66% of studied nurses had competent practices.

Table (3) stated that high significant model detected through F test value was 92.810 with a p value of .000. The model explains 71% of the change in nurse's knowledge score detected through R2 value of 0.426. The educational level was identified as the main positive predictor of the change in nurses' knowledge score, during entering data postgraduate was 1 and diploma was 0. Additionally, age was another positive predictor, whereas gender was a negative predictor, during entering data male was 1 and female was 0. Variables excluded by the model: experience, area of practice, workplace and source of knowledge.

Table (4) stated that high significant model detected through F test value was 65.48 with p value .000. The model explains 78% of the change in nurse's practice score detected through R2 value 0.787. The total knowledge was identified as the main positive predictor of the change in nurses' practice score. Additionally, total trends and experience were other positive predictors. Practice area also had positive predictor, during entering data critical area was 1 and non-critical area was 0. Finally, educational level was identified as the least positive predictor of the change in nurses' practice score, during entering data postgraduate was 1 and diploma was 0. Variables excluded by the model: age, gender, marital status and source of knowledge.

Table (5) stated that high significant model detected through F test value was 12.30 with p value .002. The model explains 52% of the change in nurse's trends score detected through R2 value 0.521. The total knowledge was identified as the main positive predictor of the change in nurses' trends score. Also, marital status was a positive predictor, during entering data married was 1 and not married was 0. Additionally, age and experience were other positive predictors.

Discussion

For your information, our study conducted to assess the knowledge, trends, and practices of nurses towards COVID-19. In this study, most of the respondents were female and had a BSN; more than half were married and the average number of years of experience was 8.61 (4.71).

After analysing and interpreting the collected data, the current study mentioned that half of the studied nurses had good knowledge and more than one third had an average knowledge level. In related trends, less than two thirds of studied nurses had positive trends. According to practice level, around two thirds of studied nurses had competent practices. These results may be due to the fact that most of them had a BSN, more than two thirds attended workshops about COVID19 and about two thirds of them had reliable sources of information such as WHO, Ministry of health and published articles.

These results cohort with the study by Nemati et al., 2020 who reported that more than half of the studied nurses had good knowledge related definition, sources, symptoms and transmission of COVID-19. Also, Bhagavathula et al., 2020 stated that less than two thirds of the studied HCWs used social media to obtain information, and had poor knowledge of COVID-19 transmission. Al Sulayyim et al., 2020 who revealed that the results of this study verified an intermediate level of knowledge of health care workers in relation to COVID-19.

Also, this study was supported by the study performed by Halcomb et al., 2020 and Puspitasari et al., 2020 who reported that most studied subjects felt that they had satisfactory knowledge regarding COVID-19. Asemahagn, 2020 reported that around 279 (70%) health care workers had good knowledge followed by 247 (62%) with good prevention practices. In agreement with Zhou et al., 2020, who detected that the majority of studied subjects followed correct practices regarding COVID-19. This was consistent with the study by Anikwe et al., 2020 who stated that the majority presented a good preventive practice and attitude related to COVID-19. Kassie et al., 2020 stated that frequency of attitude towards COVID-19 established to be 65.7% (95%CI: 61.5, 70.1). Wahed et al., 2020 reported that a positive attitude for COVID19 was noticed among allied health professionals.

The current results also showed that educational level and age were identified as the main positive predictors of the change in nurses' knowledge score. The total knowledge, trends, experience and educational level were identified as the main positive predictors of the change in nurses' practice score. The total knowledge, married nurses, age and experience were identified as the main positive predictors of the change in nurses' trends score. These results are irregular with the study performed by Semerci et al., 2020 who detected that experience of COVID-19 was found to explain 29.1% of nurses' knowledge level and in cohort with Asemahagn, 2020 who revealed that residence, lack of PPE and workload were factors restricting prevention practices. The study by Zhou et al., 2020 reported that work experience



and job category influenced subjects' practice and attitude concerning COVID-19. This is similar to the study performed by Ferdous et al., 2020 who showed that more frequent prevention practice factors were associated with older age, female sex, higher education and positive attitudes, and Liu et al., 2020 who demonstrated that nurses' attitudes were significantly linked with their age and knowledge level.

Conclusion

To conclude our study, half of the studied nurses had good knowledge and more than one third had an average knowledge level. In related trends, less than two thirds of studied nurses had positive trends. According to practice level, around two thirds of studied nurses had competent practice. Also, educational level and age were positive predictors on nurses' knowledge. The total knowledge, trends, experience and educational level had a positive impact on nurses' practice. The total knowledge, married nurses, age and experience were positive predictors for nurses' trends.

Conflict of interest: Not present any conflict

Funding: Self-funding, without any external source.

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Tables:

Table (1) Distribution of studied nurses related their characteristics (n=200)

Items	n	%
Age		
Less than 20 years	1	0.5
From 20 - 30 years	79	39.5
From 31 - 40 years	86	43
More than 40 years	34	17
Mean SD	31.98 (6.94)	
Gender		
Male	10	5
Female	190	95
Marital status		
Single	87	43.5
Married	108	54
Divorced	3	1.5
Widowed	2	1
Educational level		
Diploma	14	7
BSN	186	93
Workplace		
Primary Healthcare Centre	9	4.5
Regional / Public Hospital	25	12.5
Specialized Hospital	153	76.5
Private Hospital	13	6.5
Area of Practice		
Emergency Department	20	10
Medical Department	51	25.5
Surgical Department	36	18
Intensive Care Unit	30	15
Operating Room	38	19
Out Patient Department	25	12.5
Experience		
Less than 5 years	53	26.5
5-10 years	74	37
11-15 years	38	19
More than 15 years	35	17.5
Mean SD	8.61 (4.71)	
Source of your knowledge about the COVID-19		
Saudi Ministry of Health	46	23
World Health Organization	36	18
Social Media/Public news	29	14.5
Health Care Professional/ Colleague	40	20
Published literature	49	24.5
Workshop about COVID-19:		
Yes	144	72
No	56	28

Table (2) Distribution of studied nurses regarding their total knowledge, practice and trends (n=200)

Items	n	%
Knowledge:		
Good	100	50
Average	68	34
Poor	32	16
Trends:		
Positive	122	61
Negative	78	39
Practice:		
Competent	112	66
Incompetent	88	44

Table (3) Best fitting multiple linear regressions model for total knowledge

	Unstandardised coefficient		Standardised coefficient	T- test	P value
	B	Std. Error			
Educational level	23.865	5.040	.405	4.736	.000
Age	2.036	.396	.131	5.141	.000
Gender	-18.455	3.041	-.313	-6.068	.000
Total practice	.587	.163	.290	3.604	.004

Dependent variables: Total knowledge

R square 0.712 Model ANOVA 92.810 p value .000**

Table (4) Best fitting multiple linear regressions model for total practice

	Unstandardised coefficient		Standardised coefficient	T- test	P value
	B	Std. Error			
Total knowledge	19.88	3.199	.892	9.887	.000
Total trends	15.07	2.103	.567	6.112	.000
Experience	3.962	0.940	.289	5.723	.001
Practice area	2.001	0.451	.215	7.021	.000
Educational level	1.879	0.210	.230	4.900	.002

Dependent variables: Total practice

R square 0.787 Model ANOVA 65.48 p value .000**

Table (5) Best fitting multiple linear regressions model for total trends

	Unstandardised coefficient		Standardised coefficient	T- test	P value
	B	Std. Error			
Total knowledge	2.897	0.475	.387	4.231	.005
Marital status	2.311	0.399	.335	3.956	.009
Age	1.975	0.140	.211	5.192	.001
Experience	1.203	0.119	.225	4.007	.006

Dependent variables: Total trends

R square 0.521 Model ANOVA 12.30 p value .002**