Infection Prevention and Control Practices among Primary Healthcare Nurses Regarding COVID-19 in Saudi Arabia

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Abstract

Background: Healthcare providers, particularly nurses, are at risk of infection as part of the COVID-19 epidemic chain since they assist in the disease's containment. By recognising the risk factors for infection and implementing suitable measures to reduce these risks, all reasonable efforts should be taken to control the spread of infection to them. The major aim of the present study was to determine the level of infection prevention and control practises used by primary healthcare nurses in Saudi Arabia during the COVID-19 pandemic.

Materials and Methods: This study used a quantitative cross-sectional design to examine 198 healthcare professionals and community health nurses who worked in primary health facilities in southwest Riyadh and were randomly recruited. In this study, a self-administered questionnaire was employed to collect data. Demographic information, sources of COVID-19 information, and COVID-19 infection prevention and control measures were all included of the questionnaire. SPSS software was used to perform descriptive and inferential statistical methods. In order to recruit subjects, the researcher followed ethical guidelines.

Results: The study shows that social media is the most prevalent source of information about COVID-19, followed by seniors and other co-workers. Furthermore, 94.5% of the participants wear a facemask, and 32.8% wash their hands with running water and handwashing liquid. Participants' age, income, and work experience were all found to be important factors linked with COVID-19 prevention activities.

Conclusion: Healthcare professionals' COVID-19 practises are generally recognised. Nurses and other primary care professionals should pay more attention to and make greater attempts to adhere to preventive measures such as personal protective equipment. Policymakers in primary healthcare and the Ministry of Health should monitor healthcare providers' practises regarding COVID-19 prevention measures, as well as the compliance procedure.

Keywords: Infection Prevention**,** Infection Control, Practices**,** Primary Healthcare Nurses**,** COVID-19, Pandemic.

Introduction

Globally, viral infections continue to emerge; these diseases are regarded as dangerous in the perspective of public health. In the last 12 years, epidemics such as the Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), the Middle East Respiratory Syndrome Coronavirus (MERS-CoV), and H1N1 influenza have developed [1]. Nowadays, the pandemic of new coronavirus illness (COVID-19) is regarded as a severe global threat, with 34,804,348 confirmed cases and 1,030,738 fatalities [2]. There have been 335,997 confirmed cases of COVID-19 in Saudi Arabia, with 4850 fatalities [3].

COVID-19 is extremely infectious, thus, the optimal strategy for containing the pandemic is to implement preventative measures concurrently with the development of breakthrough cures [4]. Additionally, the widespread spread of emerging and re-emerging communicable diseases is a significant risk and serious challenge for nurses and other healthcare providers due to a lack of awareness of the threat posed by these diseases, as well as limited compliance with infection prevention and control practises [5].

The fact that healthcare providers, particularly nurses, are at risk of infection is crucial because they may be able to assist in containing the outbreak. As a result, all feasible precautions must be done to prevent the transmission of infection to nurses, beginning with the identification of risk factors for infection and progressing to the implementation of suitable risk reduction measures [5]. It is widely recognised that overcrowding, the absence of isolation room facilities, and environmental pollution all contribute to disease transmission among nurses and other healthcare personnel. This, however, is likely exacerbated by some nurses' insufficient awareness of infection protection techniques [6].

Knowledge about a disease may impact nurses' knowledge, attitudes, and practises, and improper attitudes and actions may result in an increase in infection risk [7]. Understanding

nurses' knowledge, attitudes, and behaviours related to infection and preventive measures and practises may aid in predicting the results of intended behaviour. Thus, the primary objective of this study is to determine the degree of infection prevention and control techniques used by primary healthcare nurses in Saudi Arabia during the COVID-19 pandemic.

Recent research in underdeveloped nations have found a low level of compliance with appropriate infection control procedures and basic precautions. In impoverished nations, a lack of proper control methods, resources, and regulation has been noted as a large and significant issue that creates hurdles to infection management [8]. Measures and preventive standards for COVID-19 infection and prevention have been developed based on experience and knowledge gained while responding to outbreaks such as MERS-CoV or SARS-CoV [9].

According to existing data, SARS-CoV-2 is genetically identical to SARS-CoV22–24, but it has a distinct mode of transmission and other features [10, 11]. As a result, there is a critical need to improve nurses' knowledge and behaviours addressing COVID-19-specific infection prevention and control methods. This information must be accessible in order to take a significant step toward evaluation. Furthermore, current studies have not assessed nurses' knowledge and practises regarding infection prevention and control practises for COVID-19 in primary healthcare facilities in Saudi Arabia, which could result in an increase in disease transmission due to non-adherence to these measures and practises.

The major objective of this study is to determine the amount of infection prevention and control methods used by primary healthcare nurses in Saudi Arabia during the COVID-19 pandemic. Specific objectives were:

1. To identify the sources of knowledge and associated information among nurses on infection control strategies for COVID-19.

2. To examine community healthcare nurses' infection prevention and control methods during the COVID-19 pandemic.

3. To evaluate the relationship between the infection prevention practices of primary healthcare nurses and their demographic characteristics.

Methods

Study Design

This study used a quantitative cross-sectional design. This study was conducted at primary health care clinics located in southwest Riyadh. There are 25 of these facilities. The present study's population included healthcare practitioners and community health nurses who worked at the aforementioned centres. There are 800 nurses in total.

The determined sample size was 207 healthcare providers. The researcher recruited study participants from primary healthcare centres using a straightforward sampling strategy. The current study included male and female healthcare practitioners with at least one year of experience and who worked in all areas of primary healthcare facilities during the COVID-19 epidemic. Healthcare providers that are unwilling to participate in the present study have been eliminated. In this study, 198 out of 207 participants (95.6%) answered the survey questionnaire. This response rate is regarded to be outstanding, as the researcher actively urged study respondents to participate.

Research Instrument

Data were collected from community health nurses using a questionnaire that was adapted from other researchers [12_14]. The questionnaire's first section asked for demographic information such as gender, age, the name of the primary healthcare centre, and level of

education. The second section comprised sources of knowledge on COVID-19; respondents replied on a scale of 1 least used (1), occasionally (2), more frequently (3), and most used (4). The third section had six items pertaining to nurses' infection prevention and control methods with reference to COVID-19, and respondents replied on a scale of yes (2), occasionally (1), and no (0). Permission to use the questionnaire has been requested from the author and is awaited.

In order to get feedback on the questions and make sure the questionnaire was reliable, a pilot study with 30 healthcare practitioners was done. For Face and content validity, the questionnaire was reviewed and confirmed to be adequate by a panel of professional nurses with expertise and understanding of research methodologies. The questionnaire was reviewed and confirmed to be adequate by a panel of professional nurses with expertise and understanding of research methodologies. For Instrument reliability, Cronbach's coefficient alpha was used to determine reliability coefficients for the majority of uses.

Data Analysis

Demographic data, such as age, gender, experience, and educational level, were maintained as categories and numerical variables. The demographics were coded numerically in the questionnaire. To address the study topics and analyse the connection between demographic data and nurses' knowledge, attitude, and practise, inferential statistics such as the independent sample t test and one-way ANOVA were utilised. Significance level was set at $p<0.05$ value indicating a significant connection.

Results

Participants' Demographic

Table 1 depicted the distribution of study participants by gender, age group, marital status, and income level. According to the table, more than half (57.6%) of the present study's participants were male, while 42.4% were female. Additionally, more than half (50.4%) of research participants were between ages of 30 and 39, and 40.4% are under the age of 30. In terms of marital status, more over half (61.6%) of the survey participants were married, while 35.9% were single. Additionally, 81.8% of research participants earned above 10,000 SAR, while 12.6% earn between 5,000 and 10,000 SAR.

Table 1: Sample Distribution according to the Participants' Demographics.

Variables	Number	Percentage (%)
Gender		
Male	114	57.6
Female	84	42.4
Age Groups		
<30 years	80	40.4
30 – 39 years	100	50.5
40 – 49 years	14	7.1
50 years or more	4	2.0
Marital Status		
Married	122	61.6
Single	71	35.9
Divorced	5	2.5
Income		
<5000 SAR	11	5.6
5000 - <10000	25	12.6
≥10000	162	81.8
Job Category		
Nurses	62	31.3
Others	136	68.7
Years of Experience		
0 – 5 years	85	42.9
6 – 10	36	18.2
>10 years	77	38.9

The distribution of study participants by educational level and years of experience is shown in Table 1. According to the data, more than half (74.0%) of the participants in this survey hold a diploma (less than a bachelor's degree), whereas 26.0% hold a bachelor's degree or higher. Additionally, 47.0% of study participants had fewer than five years of experience, while 53.0% had more than five years.

Source of Information Regarding COVID-19

Table 2 summarised the sources of knowledge on COVID-19 prevention methods. Social media was the most often cited source (69.25%), followed by seniors and other co-workers (61.25%). Newspapers and magazines were the least often cited sources (44.75%).

Table 2: Mean, SD and Percentage of Participants' Source of Information regarding COVID-19.

Source	Mean	SD	%
Social Media	2.77	0.98	69.25
Seniors & Other Colleagues	2.45	0.95	61.25
Seminars & workshops	2.30	0.99	57.50
Radio & television	2.15	0.99	53.75
Posters & Pamphlets	2.11	0.94	52.75
Newspapers & Magazines	1.79	1.00	44.75

Preventive Practices Measures in COVID-19 Pandemic

Table 3 summarised the mean and SD of each participant's practises. The chart indicated that 94.5% wore a facemask in crowds, 92.5% discarded used tissues, and 92.5% covered their noses and mouths with tissues while sneezing or coughing. Additionally, 91.0% of participants washed their hands constantly with soap or hand sanitizer. 82.0% of them, on the other hand, taught their patients about the illness.

Table 3: Frequency, Mean, and Percentage of Participants' Preventive Practices Measures in COVID-19 Pandemic.

Participants' Practices	No (%)	Sometimes (%)	Yes (%)
Do you educate your patient about the disease?	11 (5.6)	49 (24.7)	**138 (69.7)**
Do you use facemask in crowds?	3 (1.5)	14 (7.1)	**181 (91.4)**
Do you avoid touching your eyes, nose or mouth as far as you can?	9 (4.5)	38 (19.2)	**151 (76.3)**
Do you throw the used tissue in the trash?	4 (2.0)	21 (10.6)	**173 (87.4)**
Do you cover your nose and mouth with a tissue during sneezing or coughing?	0 (0.0)	28 (14.1)	**170 (85.9)**
Do you use soap or hand sanitizer to wash your hands continuously?	2 (1.0)	30 (15.2)	**166 (83.8)**

The techniques adopted by participants to wash their hands on duty were visualized in Fig 1. According to the data, 32.8% cleansed their hands with running water and handwashing liquid, 29.8% used alcohol hand rub, 14.1% used running water and a skin disinfectant, and 13.1% used running water and bar soap.

Figure 1: Methods which are Used by the Participants when Washing their Hands on Duty.

Circumstances of Wearing a Medical Utility

The results showed that 65.2% of the participants wore medical utilities during prescribing drugs, 20.0% of them wore medical utilities when using the computer, desk, or patient-care equipment in the ward, while 11.6% wore medical utilities when making clinical rounds.

Circumstances of Washing Hands on Duty

The results displayed that 98.5% of the participants washed their hands before meals, 94.9% of them washed their hands before performing invasive bedside procedures, 92.9% of them

washed their hands between two different procedures on different patients, while 90.4% washed their hands before and after examining patients.

Personal Protective Equipment

Figure 2 showed the percentage of wearing personal protective equipment among study participants. About 77.9% of the participants wore a mask, 62.88% of them wore a surgical mask, 60.48% wore gloves, while 42.17% wore a gown.

Figure 2: Personal Protective Equipment

Table 4 demonstrated a significant difference in the mean score of participants' behaviours for COVID-19 preventative measures by age group ($p<0.01$). The post hoc test with Tukey test revealed a difference in mean level of practises between those aged 30–39 years and those aged less than 30 years, with those aged 30–39 years having a significantly higher mean level of practises than those aged less than 30 years. On the other hand, there is no statistically significant variation in the mean score of participants' practises regarding COVID-19 preventative measures by gender or married status ($p>0.05$).

The table demonstrates a significant difference in the mean score of participants' practises for COVID-19 preventative interventions by income level ($p<0.01$). The post hoc Tukey test revealed a difference between those with incomes below 5000 SAR and those with incomes between 5000 and 100,000 SAR, with those with incomes between 5000 and 100,000 SAR having a substantially greater mean level of practises than those with incomes below 5000 SAR.

The table demonstrates a statistically significant difference in the mean score of participants' behaviours for COVID-19 preventative measures based on their job experience ($p<0.01$). The post hoc Tukey test revealed that there is a difference between those with 0–5 years of experience and those with >10 years of experience, with those with >10 years of experience

having a considerably higher mean level of practises than those with 0–5 years of experience. On the other hand, there is no statistically significant variation in the mean score of participants' behaviours regarding COVID-19 preventative measures by job type (p>0.05).

Table 4: Differences in the Participants Practices about Preventive Measures about COVID-19 with regard to their Demographics.

Preventive Measures	**N**	**Mean**	**SD**	**t/f statistics (df)**	**p value[1]**
Gender					
Male	114	1.77	0.30	-1.465 (196)	0.145[a]
Female	84	1.83	0.24		
Age groups					
<30 years	80	1.72	0.31	3.952 (3, 194)	0.009[b]
30 – 39 years	100	1.85	0.19		
40 – 49 years	14	1.83	0.39		
50 years or more	4	1.62	0.43		
Marital status					
Married	122	1.82	0.27	2.845 (2, 195)	0.059 [b]
Single	71	1.74	0.28		
Divorced	5	1.96	0.07		
Income					
<5000 SAR	11	1.56	0.41	4.672 (2, 195)	0.010a
5000- <10000 SAR	25	1.78	0.30		
≥10000	162	1.81	0.25		
Work experience					
0 – 5 years	85	1.72	0.30	9.387 (2, 195)	0.000a
6 – 10 years	36	1.74	0.28		
> 10 years	77	1.90	0.20		
Job category					
Nurses	62	1.85	0.25	3.590 (2, 196)	0.060b
Others	136	1.77	0.28		

[a] Independent sample *t* test, [b] One-Way ANOVA

Differences in Wearing Gloves

Table 5 revealed that there was a significant difference in the mean score of participant practises concerning wearing gloves based on gender (p<0.01). Wearing gloves had a considerably higher mean score among female participants than among male participants. A significant difference existed between the mean scores of participants' practises related to

wearing gloves, and this difference is related to their age groups. A post hoc Tukey test revealed a significant difference in the mean level of glove wearing between people under the age of 30 and those 30 to 39 years old, with the latter group having a considerably greater degree of glove wearing than the former. Wearing gloves, on the other hand, did not differ significantly in the mean score depending on marital status ($p>0.05$).

With relation to the practise of wearing gloves, Table 5 demonstrated a significant variation in the mean score of participants depending on their income ($p<0.01$). A post hoc Tukey test revealed a significant difference in the mean level of glove wearing between people with an income of less than 5000 SAR and those with an income of more than 10,000 SAR, with the other group having a considerably higher mean level. However, the mean score for wearing gloves did not change significantly based on participant experience or job group ($p>0.05$).

Differences in Using Mask

When it comes to mask use behaviours, men and women have significantly different mean scores ($p<0.01$), as seen in Table 5. Female participants' mean score for mask use was substantially greater than male participants. Additionally, there was no statistically significant variation in the mean score of participants' habits regarding the use of masks based on their age group ($p>0.05$) or marital status ($p>0.05$).

With regard to their earnings, there was a significant difference in the mean score for participants' behaviours of using masks ($p<0.001$). According to the results of a post-hoc Tukey test, there was a significant difference between those with incomes under 5000 SAR and those with incomes of 10,000 SAR or more in terms of the mean level of mask use. However, the mean score of utilising masks does not change significantly based on participant experience or job category ($p>0.05$).

Differences in Using N95 Respirator

The mean score of individuals who practised using a N95 respirator was significantly different depending on their age group ($p<0.001$). One-way ANOVA revealed that individuals 30-39 years of age had considerably greater mean values of N95 respirator use than those 30-39 years of age, with the other group having significantly lower mean values of N95 respirator use. However, the mean score of participants' behaviours of using a N95 respirator did not change significantly based on gender or marital status ($p>0.05$).

Wearing a N95 respirator differed significantly from using a standard respirator in terms of participant experience ($p<0.01$). A post hoc Tukey test revealed a difference between those with 6-10 years of experience and those with more than 10 years of experience, with those with more than 10 years of experience using N95 respirators had a considerably higher mean value than those with 6-10 years of experience. In addition, the mean score of participants differed greatly depending on their job category when it comes to wearing a N95 respirator ($p<0.001$). The average rate of N95 respirator use among nurses was much greater than that of other healthcare personnel. However, the mean score of individuals who used the N95 respirator did not change significantly depending on their income ($p>0.05$).

Differences in Using Surgical Mask

On the basis of gender, age group, or marital status, there were no significant differences in the mean scores' participants have regarding using surgical masks ($p>0.05$) (Table 5). A comparison of participant habits for wearing a surgical mask and their income showed a significant difference in the mean score ($p<0.05$). The difference between those with an income of less than 5000 SAR and those with an income of more than 100,000 SAR was shown by a post hoc Tukey test, which revealed that those with an income of more than 100,000 SAR had a substantially greater mean level of surgical mask use than those with an

income of less than 5000 SAR. The mean score of participants' practises on using a surgical mask did not change significantly depending on their level of expertise or job type ($p>0.05$).

Differences in Wearing Goggles

The results demonstrated that there were no gender, age, or marital status effects on the average score of participants' goggles using practises ($p>0.05$). A comparison of participant behaviours regarding the use of goggles and their income showed a significant difference in the mean score ($p<0.01$). The post hoc Tukey test revealed a difference between those with those with an income of less than 5000 SAR and those with an income of more than 10,000 SAR, with those with an income of more than 10,000 SAR having a substantially greater mean scores of goggles use than those with an income of less than 5000 SAR. The mean score of participants' practises on wearing goggles did not change significantly based on their prior experience or job type ($p>0.05$).

Differences in Wearing Apron

No significant differences were found among participants in terms of gender, age, or marital status when it came to the mean score for practising apron use ($p>0.05$). With reference to their income, participants' behaviours of wearing an apron reveal a significant difference in the mean score (p0.01). A post hoc Tukey test revealed a significant difference in the mean level of apron use between those with incomes under 5000 SAR and those with incomes above 10000, with those with income over 10000 having considerably higher mean rates. The mean score of participants' behaviours concerning wearing an apron does not change significantly depending on their level of expertise or job type ($p>0.05$).

Differences in Wearing Gown

A comparison of participant practises concerning wearing gown indicated a significant difference in mean scores across age groups ($p<0.01$). A post hoc Tukey test revealed a

significant difference in the mean level of apron use between those under 30 and those 30-39 years old, with those 30-39 years old had a considerably higher mean level. A look at the results indicated that there was no significant difference in the mean score between men and women when it comes to how often they wear gowns.

A significant difference between participants' mean scores on gown practises and their income was seen in the table 5 ($p<0.01$). One-way ANOVA revealed that there was a significant difference between people with incomes under 5000 SAR and those with incomes over 10000 SAR in that those who earned more than 10000 SAR had a considerably higher mean of gown use.

And the mean score for participants differed greatly when it comes to their experience with gown ($p<0.01$). Tukey's post-hoc analysis revealed a significant difference between those with experience ranging from 0 to 5 years and those with experience of more than 10 years (those who have experienced 10 years had a greater mean level of gown use than those with experience of 0 to 5 years). To make matters more interesting, the mean score of participants varied markedly depending on the job type ($p<0.01$). The average of gown use among nurses seemed to be much greater than that among other healthcare personnel.

Table 5: Differences in the Participants Practices about Personal Protective Equipment with regard to their Demographics

	Gloves					Mask					N95 Respirator					Surgical Mask				
Demographics	**N**	**Mean**	**SD**	**t/f (df)**	**p[1]**	**N**	**Mean**	**SD**	**t/f (df)**	**p**	**N**	**Mean**	**SD**	**t/f (df)**	**p**	**N**	**Mean**	**SD**	**t/f (df)**	**p**
Gender																				
Male	114	2.17	1.43	-2.989 (196)	0.003[a]	114	2.94	1.43	-2.163 (196)	0.032a	114	1.18	1.06	-0.414 (196)	0.679[a]	114	2.35	1.55	-1.688 (196)	0.093[a]
Female	84	2.75	1.19			84	3.34	1.03			84	1.25	1.14			84	2.72	1.44		
Age Groups																				
<30 years	80	2.20	1.30	5.497 (3, 194)	0.001[b]	80	3.07	1.29	2.547 (3, 194)	0.057[b]	80	0.81	0.81	7.785 (3, 194)	0.000[b]	80	2.28	1.51	2.488 (3, 194)	0.062[b]
30 – 39 years	100	2.75	1.27			100	3.28	1.15			100	1.50	1.16			100	2.79	1.42		
40 – 49 years	14	1.64	1.69			14	2.42	1.74			14	1.64	1.39			14	1.92	1.81		
50 years or more	4	1.25	1.25			4	2.25	2.06			4	0.50	0.57			4	2.25	2.06		
Marital Status																				
Married	122	2.35	1.36	1.034 (2, 195)	0.357[b]	122	3.09	1.36	0.067 (2, 195)	0.936[b]	122	1.25	1.11	0.372 (2, 195)	0.690[b]	122	2.48	1.57	0.286 (2, 195)	0.752[b]
Single	71	2.47	1.37			71	3.15	1.19			71	1.12	1.10			71	2.53	1.43		
Divorced	5	3.20	1.09			5	3.20	1.09			5	1.40	0.54			5	3.00	1.41		
Income																				
<5000 SAR	11	1.09	1.37	5.972 (2, 195)	0.003[a]	11	1.63	1.43	8.212 (2, 195)	0.000[a]	11	1.00	0.63	2.297 (2, 195)	0.103[a]	11	1.36	1.43	3.508 (2, 195)	0.032[a]
5000- <10000 SAR	25	2.64	1.11			25	3.20	1.00			25	1.64	1.25			25	2.48	1.19		
≥10000	162	2.47	1.35			162	3.20	1.26			162	1.16	1.09			162	2.59	1.54		
Work Experience																				
<30 years	85	2.41	1.29	0.243 (2, 195)	0.784[a]	85	3.08	1.23	1.798 (2, 195)	0.168[a]	85	0.88	0.89	7.091 (2, 195)	0.001[a]	85	2.41	1.50	0.462 (2, 195)	0.631[a]
30 – 39 years	36	2.55	1.27			36	3.47	0.99			36	1.44	1.10			36	2.69	1.41		
40 – 49 years	77	2.36	1.48			77	2.98	1.44			77	1.46	1.22			77	2.54	1.58		
Job Category																				
Nurses	62	2.67	1.26	1.810 (196)	0.072[b]	62	3.19	1.22	0.569 (196)	0.570[b]	62	1.66	1.18	4.020 (196)	0.000[b]	62	2.67	1.39	1.016 (196)	0.311[b]
Others	136	2.30	1.39			136	3.08	1.32			136	1.00	0.99			136	2.44	1.56		

[1] significant, $p < 0.05$, [a] One-Way ANOVA, [b] Independent sample *t* test

Continue

	Goggles Mask					Apron					Gown				
Demographics	**N**	**Mean**	**SD**	**t/f (df)**	**p[1]**	**N**	**Mean**	**SD**	**t/f (df)**	**p**	**N**	**Mean**	**SD**	**t/f (df)**	**p**
Gender															
Male	114	1.06	1.09	-1.085	0.279[a]	114	1.05	1.08	-0.042	0.966[a]	114	1.60	1.31	-1.017 (196)	0.310[a]
Female	84	1.25	1.35	(196)		84	1.05	1.19	(196)		84	1.79	1.31		
Age Groups															
<30 years	80	0.88	1.04			80	0.88	1.04			80	1.37	1.24		
30 – 39 years	100	1.31	1.27			100	1.17	1.128			100	1.97	1.30		
40 – 49 years	14	1.50	1.45	2.425 (3, 194)	0.067[b]	14	1.35	1.54	1.595 (3, 194)	0.192[b]	14	1.71	1.43	3.889 (3, 194)	0.010[b]
50 years or more	4	0.75	0.95			4	0.50	1.00			4	0.75	0.95		
Marital Status															
Married	122	1.18	1.17			122	1.02	1.10			122	1.6557	1.27		
Single	71	1.05	1.30	0.351 (2, 195)	0.704[b]	71	1.08	1.20	0.298 (2, 195)	0.742[b]	71	1.7183	1.40	0.298 (2, 195)	0.742[b]
Divorced	5	1.40	0.54			5	1.40	0.54			5	2.0000	1.22		
Income															
<5000 SAR	11	0.90	1.04			11	1.27	0.90			11	1.09	1.04		
5000- <10000 SAR	25	1.88	1.36	5.656 (2, 195)	0.004[a]	25	1.72	1.24	5.633 (2, 195)	0.004[a]	25	2.68	1.10	9.633 (2, 195)	0.000[a]
≥10000	162	1.04	1.16			162	0.93	1.09			162	1.57	1.29		
Work Experience															
<30 years	85	0.92	1.14			85	0.91	1.11			85	1.37	1.28		
30 – 39 years	36	1.16	1.10	2.659 (2, 195)	0.073[a]	36	1.19	1.14	1.132 (2, 195)	0.324[a]	36	2.27	1.27	6.439 (2, 195)	0.002[a]
40 – 49 years	77	1.36	1.29			77	1.14	1.14			77	1.75	1.27		
Job Category															
Nurses	62	1.3226	1.23			62	1.27	1.14			62	2.06	1.19		
Others	136	1.0588	1.19	1.427 (196)	0.155[b]	136	0.95	1.11	1.846 (196)	0.066[b]	136	1.51	1.33	2.775 (196)	0.006[b]

[1] significant, $p < 0.05$, [a] One-Way ANOVA, [b] Independent sample *t* test

Discussion

Source of Information regarding COVID-19

The survey found that social media was the most prevalent source of knowledge on COVID-19, followed by colleagues and seniors, while newspapers and periodicals were the least common. As Saqlaina et al. [12] found, the media is the primary source of knowledge on COVID-19 in the United States. On the other hand, the findings of Saqlaina et al. [12] suggested that the World Health Organization and Centres for Disease Control were the most prevalent sources of information for the general public, while the television was the source of information for the general population.

It also was consistent with the findings of Wang et al. [15], who found that COVID-19 was widely disseminated over the internet and social media. Many individuals, including nurses and other healthcare practitioners, regard media sources like Facebook and WhatsApp to be the primary sources for information. This might be a contributing factor in the current study's findings. Other types of social media, such as Facebook and Twitter, were deemed more convenient than reading newspapers and magazines when it comes to learning about pandemic diseases.

Participants' Practices about Preventive Measures about COVID-19

According to the findings of the present study, 94.5% of participants used facemasks while in large groups, and 92.5% of them tossed the used tissues in the garbage after using them. In addition, 91.0% of the participants washed their hands with soap or hand sanitizer on a daily basis. While 82.0% of them educated their patients on the condition, preventive measures were practised 89.5% of the time, which is regarded excellent. Health care professionals in the research by Saqlaina et al. [12] were found to have outstanding COVID-19 practises.

Another research in Uganda, by Olum et al. [13], found that only 23% to 28% of healthcare practitioners had a solid understanding of COVID-19 infection and preventive control techniques. As Zhang and colleagues [16] found that 90.7% of health care professionals adhered to correct infection and preventive control procedures for COVID-19, the current findings were likewise in line with their findings. According to Saqlain et al. [12], hand washing with soap was the most common good habit (96.10%), and it was found that 95.4% and 85.7% of healthcare providers washed their hands constantly, respectively, although the current results are not comparable [17, 18].

According to Nour et al. [17], 95.4% and 85.7% of nurses and healthcare professionals used to wash their hands continually. However, in the research of which the findings were identical, different results were found. Deressa et al. [18] found that the most common practise among healthcare workers was to use facemasks. These findings are similar with the current findings. Face masks have been shown to be the most commonly used technique of preventing infection among healthcare workers and nurses, based on the results of the present study. Because of this, they were more likely to employ this strategy. While 82.0% of them educate their patients on the condition. This suggests that the staff at this hospital were just not doing enough health education to avoid COVID-19 on a daily basis. The findings of Saqlain et al. [12] suggested that 95.4% of participants educate their patients about the condition, which is not consistent with this study's findings.

Personal Protective Equipment

According to current findings, 77.9% of participants used a mask; 62.8 % of those used surgical masks; 60.4% wore gloves; and 42% wore gowns. These findings were in line with the findings presented above, which showed that the most effective technique entailed the use of a facemask. According to Oladele et al. [20], 20.6% of nurses used facemasks, which would be significantly lower than this study's findings. Most recommendations for infection

prevention and control encouraged the use of surgical masks and N95 respirators for all aerosol-transmitted operations by health care workers, hence the participants in this research were more likely to use facemasks on a regular basis [5].

Personal safety equipment, such as face masks and gowns, were in insufficient supply, according to the present findings. The high number of COVID-19 cases might be a factor in this, as they limit the supply of personal protective equipment for healthcare workers, particularly nurses.

Demographic factors and nurses' practises regarding COVID-19

It turned that the mean score of participants' preventative measures for COVID-19 varied considerably by age group, with those aged 30 to 39 having a much higher mean level of practises than those aged under 30. With regard to gender and marital status, there was no significant variation in the mean score of participants' practises regarding COVID-19 preventative measures.

There was a substantial correlation between age and COVID-19 preventative measures, with the 31-39-year-old age group being a key determinant for excellent practise for COVID-19, according to Saqlain et al. [12]. In the current study, healthcare practitioners between the ages of 30 and 39 had a considerably higher mean level of practises. Health care practitioners in this age group were characterised by a high level of activity and attention to preventative measures. Furthermore, the bulk of participants in this study were healthcare practitioners between the ages of 30 and 39. So it might have a considerable impact on the average degree of practises for each individual.

According to Saqlain et al. [12], there was no significant correlation between gender and behaviours related to COVID-19 preventative measures when looking at participants' gender and their preventive measures. Both male and female nurses utilised the same COVID-19

preventive measures and procedures, which may explain why there was no significant correlation between gender and nursing practises.

This study found that COVID-19 preventative measures practises differed considerably among participants based on their income, with those earning between 5,000 and 10,000 SAR having a significantly greater mean level of practise than those earning below 5,000. Those in this income bracket were more likely to stick around because they were more satisfied than those in lower-income groups.

There was also a significant difference in the mean score of participants' COVID-19 preventive measures practises based on their work experience, with those with more than ten years of experience having a significantly higher mean level of practises than those with less than five years of experience. Similarly, Saqlain et al. [12] found that experience and behaviours related to COVID-19 prevention were linked. Compared to healthcare professionals with less than 10 years of experience, healthcare providers with more than 10 years of experience were more knowledgeable and aware of COVID-19 prevention measures, leading to greater adherence to COVID-19 prevention procedures. Healthcare practitioners with fewer than 5 years of experience, on the other hand, require further training in preventative measures.

Study participants' habits regarding COVID-19's preventative measures did not change significantly based on their job classification. However, this study's findings were not in line with those of Saqlain et al. [12], who found a correlation between job category and behaviours related to COVID-19 prevention. As a result, just 31.3% of participants were nurses, while 68.7% were other healthcare workers; this indicated that the two professions were not interchangeable.

Conclusion

Healthcare practitioners' overall procedures involving COVID-19 were acceptable, according to the findings of the research. With running water and hand-washing liquid, one third of healthcare providers washed their hands; with an alcohol hand rubs, less than a third of them do so. The age, income, and number of years of experience of healthcare practitioners were all linked to their COVID-19 practises. Nurses and other healthcare workers in primary care should be aware of these implications.

Preventive measures, such as wearing personal protective equipment (PPE), should be a higher priority for primary care nurses and other healthcare personnel. Those who adhere to these preventative measures should serve as role models for patients and the general public. Personal protective equipment, comprising gloves, apron, gown, and mask, should be utilised by healthcare personnel. In addition, nurses and other healthcare professionals should familiarise themselves with COVID-19 practises. They need to put this new information into practise on a regular basis.

Implications For Health Policy and Primary Healthcare

COVID-19's preventative measures should be monitored by health officials in primary care and the ministry of health, and the process of compliance should be monitored in-service. In order to raise the knowledge of healthcare practitioners regarding these behaviours, educational and training methods must be used. There should be a greater focus on healthcare practitioners with less than six years of experience. Those who earn less than 5,000 SAR should also be considered. Nurses and other healthcare workers should be encouraged to use personal protection equipment by policymakers. Personal protection equipment for nurses and other healthcare workers should be provided to primary healthcare facilities by the ministry of health.

Limitations

Nurses and other healthcare professionals had been the focus of this research. In this study, there were no distinct categories of healthcare professionals, which makes it impossible to compare the results to other groups. In addition, the number of nurses in this study is quite low when compared to that of other types of healthcare professionals. Although this study used a self-reported questionnaire to collect data, alternative approaches may have been more accurate in determining the amount of practise of participants.

Author contribution

Ayat Mohammad Zammar (AM): Conducted the literature search and wrote the paper.

Sami Abdul Rahman Al-Hamidi (SA): Editing of writing.

Ethical approval

Ethical Approval has been taken from King Saud University

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Guarantor

Ayat Mohammad Zammar

Sami Abdul Rahman Al-Hamidi

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request

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CRediT authorship contribution statement

Ayat Mohammad Zammar: Data curation, Formal analysis, Software, Writing - original draft, Writing - review & editing.

Sami Abdul Rahman Al-Hamidi: Editing of the paper.

Declaration of competing interest

No conflicts of interest.

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