Health Care Providers' Practices of The WHO Protocol for Infection Prevention and Control of Covid-19 in Different Outpatient Settings

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Abstract

Background: *Health care providers are insecure to COVID-19 risk due to open exposure and working at different outpatient clinics.* ***Aim:*** *To assess health care providers' practices of the WHO protocol for infection prevention and control of COVID-19 in different outpatient settings.* ***Design:*** *A descriptive exploratory research design was utilized for this study.* ***Settings:*** *The present study was conducted at the African Center of Woman's Health, Alexandria and at the Medical Research Institute, Alexandria University.* ***Subjects:*** *A convenience sample of 40 health care providers in the above-mentioned settings was included in the study, 26 in African Center and 14 in Medical Research Institute.* ***Tools:*** *Two tools were used for the data collection: Tool (I): Health Care Providers' socio-demographic & clinical data, Tool (II): WHO protocol for infection prevention and Control Practices regarding covid19: Observational Checklist.* ***Results:*** *All health care providers had unsatisfactory overall level of practice. Mean ±SD of nurses' practice was higher than physicians' practice (190.4±14.13 and, 165.9±14.34 respectively), with a statistical of significant difference between them (X^2= NA).* ***Conclusion:*** *The majority of health care providers had unsatisfactory level of overall practice regarding WHO protocol for infection prevention and control of covid-19 in different outpatient clinics.* ***Recommendations:*** *In-service education program for health care providers to update their knowledge and practices concerning WHO protocol, modify and repair the infrastructure of health care facilities according to WHO protocol, and repetition of the study on large prospect sampling.*

Keywords:

Health Care Providers' Practices, WHO Protocol, Infection Prevention and control, Covid-19, Different Outpatient Settings.

Introduction

COVID-19 Pandemic, originated and started from Wuhan, China, in December 2019 and was found in the field hospitals with severe chest infection of unknown cause, it has destroyed the global community, as it negatively affects respiratory tract and all sides of human lives (Li et al., 2020). A growing and increasing number of cases have been documented in Egypt, as the ministry of health reported 284,128 confirmed cases and deaths' number have reported 16,507 by July 2021 in Egypt (WHO, 2021).

Coronaviruses are a surrounded positive sense RNA virus with rivet like projections on its surface giving it a crown like aspect under the electron microscope; wherefore the name coronavirus. Infection is transmitted through vast droplets produced during coughing and sneezing by transverse patients but can also occur without any symptoms appears of the people and before start of symptoms. (Zou et al., 2020). Airborne transmission is variant from droplet transmission as it

refers to the exist of microbes within droplet nuclei , which is contained of particles of 5mm in diameter and it can still in the air for long periods of the time; and it can be transmitted to others over distances more than one meter (WHO, 2020b).

The clinical features of COVID-19 are diverse, they extend without any symptoms appears state to acute respiratory distress syndrome and multi organ dysfunction. The universal clinical features contain: fever (not in all), cough, sore throat, headache, fatigue, myalgia and breathlessness. Conjunctivitis has also been described (Huang et al., 2020).

In Egypt, Health care providers are facing the greatest difficulties in dealing with the outbreak. Rapid decision making has been the key to suitable diagnoses, isolation, and successful treatment of cases. (Tsamakis et al., 2020). Therefore, practice of infection prevention and control (IPC) protocols is critical to decrease health care providers' insecure to this fatal virus. Practicing while following the WHO protocols is facilitated by training health care providers to IPC, providing of materials and regular auditing of IPC practices (WHO, 2020a).

Aims of the Study:

To assess health care providers' practices of the WHO protocol for infection prevention and control of COVID-19 in different outpatient settings.

Research question

What are the health care providers' practices toward WHO protocol for infection prevention and control of COVID-19 virus in different outpatient settings?

Materials and Method

Materials

Design: A descriptive exploratory research design was utilized for this study.

Settings: The present study was conducted at the African Center of Woman's Health, Alexandria and at the Medical Research Institute, Alexandria University, The African center of woman's health, composed of 8 clinics, and receives from 15 to 20 clients per day. The Medical Research Institute, composed of 7 clinics, and receives from 20 to 25 clients per day.

Subjects: A convenience sample of 40 health care providers in the above mentioned settings were included in the study, 26 in African Center and 14 in Medical Research Institute. Assuming the effect size of health care providers' practice toward WHO protocol for infection prevention and control to covid19 virus is 0.5, using alpha error of 0.05 and sample size of 40. The achieved power is 86.9%. Power analysis was calculated using G-power. Minimum sample size was 35 health care providers.

Tool: Two tools were used for the data collection.

Tool (I): Health Care Providers' sociodemographic & clinical data: This tool was developed by the researcher based on the literature review (Arshad et al., 2020a, 2020b; Wang et al., 2020). It was divided into two parts as follows:

Part (I): Health care providers' socio-demographic data:

This part incorporated health care providers' age, gender, level of education, marital status, occupation residence area, and training on job, training of all programs of IPC.

Part (II): Health Care Providers' clinical data: It included: family history, medical and surgical history of chronic diseases, history of smoking, causes of previous hospitalization, present complaints, time of starting treatment, prescribed medication, and date finishing treatment, history of covid19 virus infection, history of influenza, severity, discovery, medication received, type and doses of vaccination received, history of fever, cough, diarrhea.

Tool (II): World Health Organization protocol for infection prevention and Control Practices regarding covid19: Observational Checklist.

This tool used to assess infection prevention and control practices of health care providers for covid-19 and adopted from WHO protocol (2020). It was divided into 8 parts including:

1. Hand Hygiene: (Six Items)

2. Respiratory Hygiene: (Two Items)
3. Use Of Personal Protective Equipment (masks, face shields, gloves, aprons) : (Six Items)
4. Environmental Cleaning And Disinfection: (Five Items)
5. Isolation or designated waiting area: (Four Items)
6. Screening of clients, and others entering the facility: (Eleven Items)
7. Wastes Management: (Five Items)
8. Environmental Infrastructure: (Five Items)

Scoring System:

Health care providers ' practices were checked and scored as follows:

- Done correctly and completely "2".
- Done incorrectly or not done"1".

Total health care providers' practice scores were calculated, then converted into mean percent score and were classified as:

- One hundred percentage were considered satisfactory level of practices.
- Less than One hundred percentage were considered unsatisfactory level of practices.

Method

- Approval from the Research Ethics Committee, Faculty of Nursing, Alexandria University was obtained before starting the study.
- An official permission was obtained from responsible authorities of Faculty of Nursing, Alexandria University to the selected setting to collect the data after explaining the aim of the study.
- An official permission was obtained from the African Center and Medical Research Institute director and head of different outpatient setting after explanation of the study aim.
- Tool I was developed by the researcher after reviewing the related literature. The developed tool was translated into Arabic language.
- Tool II was adopted by the researcher according to WHO protocol for infection prevention and control to covid19 virus and it was used in English language.
- Tool I was tested for content validity by 5 experts three in the field of Medical Surgical Nursing, one from infection control committee of the African Center for Women Health and one from Medical Research Institute.
- Tool II was tested for reliability using appropriate statistical test (Cronbach's Alpha 0. 958).
- A pilot study was carried out on 10% of health care providers to test the feasibility and applicability of all tools and the necessary modifications were carried out. Those health care providers were excluded from the actual study sample. Modifications of the Jury were done as following: not applicable (NA) for procedures which should not be done by physician but done by nurses only.
- Tool I was used to collect data related to socio-demographic data and professional data.
- Assessment of health care providers' practices were carried out using tool (II).
- Every health care providers were observed individually for their practice using tool II via concealed observation technique. In august 2022, the observations were carried out throughout the work time for approximately 20-30 minutes to collect the needed data for three times during morning shift (beginning, middle, end of the shift) at three different shifts in the outpatient clinics. (Data were collected and statistically analyzed to identify health care providers' practices toward WHO Protocol for infection Prevention and Control to Covid-19 Virus at different outpatient settings).

Ethical considerations

Written informed consent from the head nurse was obtained, after explanation of the study aim. Confidentiality of the collected data was maintained.

Statistical Analysis

The collected data were coded and entered in special format to be suitable for computer feeding. Following data entry, checking and verification process were carried out in order to avoid any errors. Data were analyzed using the statistical package for social science SPSS (version

20). The following statistical analysis measures were used: **Descriptive statistical measures,** included: numbers, percentages, and averages (Minimum, Maximum, Arithmetic mean (X), Standard deviation (SD). **Statistical analysis tests,** included: Chi square, student T test (Kotz et al., 2006; Kirkpatrick & Feeney, 2013) Regression analysis.

Results

Table (1) Distribution of health care providers according to their socio-demographic data and clinical data (n=40):

The current study found **in socio-demographic data,** that the majority of health care providers in the African center were females**,** aged 25 to less than 35 years old, married, had associate degree, Physicians, and had less than 5 years of experience (73.1%, 46.2%, 73.1%, 34.6%, 57.7%, and 38.5%) respectively. The majority of them in the medical institute were females, aged more than 45 years old, married, had diploma degree (78.6%, 42.9%, 64.3%, and 35.7%) respectively. Also, half of them in the medical institute were nurses, and had more than 10 years of experience. In addition, all health care providers in the African center received training related to infection control compared to 71.4% of them in the medical institute. **In clinical data,** the table illustrates that few of health care providers in both African center and medical institute were cigarettes smokers (23.1%, and 7.1%) respectively. Also, the table show that the majority of health care providers in both African center and health institute clinics had history of covid-19 (92.3%, and 92,9%) respectively. In addition, all health care providers in both settings received covid-19 vaccine.

Table (2) Distribution of health care providers according to their mean percent score regarding WHO protocol of infection prevention and control practices for covid-19 (n=40):

The table show that all health care providers in both African center and medical institute had unsatisfactory level of practice regarding the use of personal protective equipment, isolation, screening of clients, and environmental infrastructure, while the majority of them in both settings had unsatisfactory level of practice related to hand hygiene (88.5% and 92.9%) respectively. The majority of health care providers in the African center had satisfactory level of practice related to respiratory hygiene (92.3%), compared to 28.% of those in the medical institute who had unsatisfactory level of practice. The table also illustrates that all health care providers had unsatisfactory overall practice of infection prevention and control regarding COVID-19.

Table (3): Relationships between the studied health care providers overall practice of infection prevention and control regarding COVID-19 to their socio-demographic characteristics and clinical data (n=40):

This table revealed that there was a statistical significant difference between different score of health care providers overall practice of infection prevention and control in related to **gender, level of education, occupation, place of clinic, Years of experience,** and **history of cough** (t= 6.540, P= 0.015*, F= 6.481, P= 0.001*, t= 29.112, P= 0.000*, t= 14.124, P= 0.001*, F= 3.859, P= 0.030*, and t= 4.517, P= 0.040*) respectively .

Discussion

Health care providers are at the frontline in prevention, and control of corona virus infection toward patients, other health care providers and the general community who are at risk of infection. Minimizing insecure of health care providers to the COVID is the optimum choice for protecting frontline health care providers from COVID-19 infection, and this is best accomplished through their implementation of the WHO protocols.

Regarding age, the results of the current study showed that the health care providers between the ages of twenty-five and less than thirty-five years old had higher total practice mean scores than those between the ages of forty-five and older because they were more likely to follow infection prevention and control program guidelines when they were younger and engage in more intense

physical activity. In this regard, Salwa et al. (2022) found that a health care provider's age was adversely correlated with the proper usage of gloves, with less obligation toward those between the ages of thirty and forty-nine and fifty or older than toward those under thirty years (Salwa et al., 2022).

In relation to gender, it was noted that males had statistical significant lower total practice mean scores than females. The previous study found that female health care providers were more likely than male health care providers to be required to practice hand hygiene (1·90 [1·45–2·50], p<0·0001) in a study of a similar nature (Salwa et al., 2022).

As regards level of education, the present study results showed that health care providers' level of practice was significantly influenced by their level of education. These results illustrated that health care providers with an associate's or diploma had better practice ratings than those with a higher degree. This may be explained by the fact that health care providers with less education typically perform long shifts as bedside nurses. This finding was at odds with that of Moursy and Sharaf (2017), who discovered that nurses with bachelor's degrees practiced with a mean percent score that was much higher than those with diploma degrees.

In relation to years of experience, the present study also discovered that the degree of practice of the health care providers was not influenced by the number of years of experience. This may attributed that newly graduates have fresh knowledge and information, and more active at work. Similar findings were reported byMbachu et al. (2020), who found that, the practice of the health care providers was not influenced by years of experience in South- Eastern Nigerian state. Contrary to these findings, Yang et al. (2021) and Latif et al. (2022) discovered a favorable link between the practice of the health care providers and their years of experience.

In relation to receiving previous training of infection prevention and control, the current study findings revealed that there were no statistical significant difference between HCP practice of infection prevention & control and their prior training. This may be due to a lack of supplies in infection prevention and control, as well as ineffective management of medical and nursing staff. Contrary to these findings, the World Health Organization [WHO] (2020c), found that participation in workshops about infection control training for all age groups and categories of health care providers as well as ongoing training in infection prevention and control programs resulted in higher performance levels and greater satisfaction due to the obligation to follow infection prevention and control guidelines (World Health Organization [WHO], 2020a).

Regarding Cigarettes smoking, the current study findings revealed that the majority of health care providers were non cigarette smokers. In this context, Sallam et al. (2020) documented that smoking and the presence of chronic illnesses were linked with high risk of COVID-19 As regards history of covid-19, the current study's findings revealed that the majority of health care providers had history of covid-19 in the last 18 months. Several studies of similar findings were reported by Colavita et al. (2020), Xu et al. (2020), Lim (2021).

Concerning vaccinations, the current study findings showed that all health care providers in both settings received vaccinations twice or three times. This is indicative of both Egypt's proactive efforts to protect health care providers' health and compliance with the strategic national health plan for the prevention and control of the covid-19 infection.

In addition, the current study found that nurses had high levels of satisfactory performance than physicians with a statistical significant difference between them. This could be attributed to the nature of the work of the nurses which implies the close contact with their patients. So, they may adhere more to infection control practices than physicians.

Also, it was observed that all health care providers in the African center group had satisfactory level of practice regarding environmental cleaning, while the majority

of them had satisfactory level of practice related to respiratory hygiene, and few of them had satisfactory level of practice related to waste management. On the other hand, few of health care providers in the medical institute group had satisfactory level of practice related to respiratory hygiene. In the same line Tien et al. (2021), reported that all health care providers in their study had satisfactory level of practice related to respiratory hygiene, while few of them had satisfactory level of practice related to waste management. On the other hand Asemahagn (2020), documented that the majority of health care providers had satisfactory level of practice related to waste management.

In addition, the current study findings showed that female health care providers had statistically significant higher total practice than males. Similarly, Sulistyawati et al. (2021) documented that, females had statistically significant higher total practice related to infection prevention and control of Covid-19 than males in Indonesia. On the contrary, Srivastava et al. (2020) reported that male health care providers had statistically significant higher total practice related to infection prevention and control of Covid-19 than females in Saudi Arabia.

Also, the current study's findings, showed the history of cough was significantly correlated with practice of infection control. Similar results were reported by Gómez-Ochoa et al. (2021), who found that seropositive individuals experienced a wide-range of symptoms. The prevalence of seropositive health care providers with no symptoms (n = 7) or mild symptoms (n = 5) (i.e. fever and cough) was low but not zero at our institution.

Obligation of infection prevention and control precautions remains more challenge in many countries containing Egypt. Lack of compliance increases health care providers and patients' risk of developing health care-related infections (Akagbo et al., 2017). In this regard, the present study results showed that all health care providers in both settings had unsatisfactory overall level of practice related to infection prevention and control of covid-19. In the same line, Saqlain et al. (2020) found that the majority of their health care providers in the Pakistan had unsatisfactory overall level of practice related to infection prevention and control of covid-19. Contrarily, the findings reported by Wong et al. (2021) that the majority of health care providers had satisfactory overall level of practice related to infection prevention and control of covid-19.

Conclusion

In conclusion, the results of the present study illustrated that all health care providers had unsatisfactory overall level of practice regarding WHO protocol for infection prevention and control of covid-19 in different outpatient settings. Statistical significant relationships were detected between health care providers' sex, level of education, occupation, clinical settings, and their overall practices level.

Recommendations

From the results of the present study, the following recommendations are derived &forwarded:

- Inservice education program for health care providers to update their knowledge and practices concerning WHO protocol for infection prevention and control to covid-19.
- An update of guideline about WHO protocol for infection prevention and control to covid-19.
- Modify and repair the infrastructure of health care facilities according to WHO protocol of infection control.
- Policies and infection prevention and control procedures should be reviewed and updated to ensure rigid implementation and compliance to WHO protocol of infection control.
- Repetition of the study on large possibility sampling.

Table (1): Distribution of health care providers according to their socio-demographic data and clinical data (n=40):

Socio demographic data	African Center group (n=26)		Medical Institute group (n=14)		Total N= (40)	
	No.	%	No.	%	No.	%
Gender						
Male	7	26.9	3	21.4	10	25.0
Female	19	73.1	11	78.6	30	75.0
Age						
25<35	12	46.2	5	35.7	17	42.5
35<45	8	30.8	3	21.4	11	27.5
≥45	6	23.1	6	42.9	12	30.0
Marital status						
Single	6	23.1	4	28.6	10	25.0
Married	19	73.1	9	64.3	28	70.0
Divorced	1	3.8	1	7.1	2	5.0
Level of education						
Diploma degree	1	3.8	5	35.7	6	15.0
Associate degree	9	34.6	2	14.3	11	27.5
Bachelor degree	2	7.7	4	28.6	5	15.0
Master degree	6	23.1	3	21.4	9	22.5
Doctorate degree	8	30.8	0	0.0	8	20.0
Occupation						
Nurse	11	42.3	7	50.0	18	45.0
Physician	15	57.7	7	50.0	22	55.0
Years of experience						
< 5	10	38.5	3	21.4	13	32.5
5-	8	30.8	4	28.6	12	30.0
≥10	8	30.8	7	50.0	15	37.5
Previous training on infection control measures						
No	0	0.0	4	28.6	4	10.0
Yes	26	100.0	10	71.4	36	90.0
Smoking cigarettes						
No	20	76.9	13	92.9	33	82.5
Yes	6	23.1	1	7.1	7	17.5
History of covid-19 during last 18 month						
No	2	7.7	1	7.1	3	7.5
Yes	24	92.3	13	92.9	37	92.5
Receive covid-19 vaccines						
No	0	0.0	0	0.0	0	0.0
Yes #	26	100.0	14	100.0	40	100.0

Multiple responses were allowed

Table (2): Distribution of health care providers according to their mean percent score regarding WHO protocol of infection prevention and control practices for covid-19 (n=40):

Items	Health care providers' practices								Mean observations				Test of significance
	African Center group (n=26)				Medical Institute group (n=14)				Total (N= 40)				
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
A. Hand Hygiene	23	88.5	3	11.5	13	92.9	1	7.1	36	90.0	4	10.0	X^2= 0.195 P= 0.658
Mean ±SD	46.46±2.453				44.50±2.682				45.77±2.675				t= 2.334 P= 0.025*
B. Respiratory hygiene	2	7.7	24	92.3	10	71.4	4	28.6	12	30.0	28	70.0	X^2= 17.03 P= 0.000*
Mean ±SD	7.920±0.272				6.570±1.399				7.450±1.061				t= 4.805 P= 0.000*
C. Use of PPE	26	100.0	0	0.0	14	100.0	0	0.0	40	100.0	0	0.0	X^2= NA
Mean ±SD	70.62±8.377				65.79±6.079				68.92±7.921				t= 1.900 P= 0.065
D. Environmental cleaning #	0	0.0	11	100.0	7	100.0	0	0.0	7	38.9	11	61.1	X^2= NA
Mean ±SD	10.00±0.000				6.000±0.000				6.650±0.483				t= 9.233 P= 0.000*
E. Isolation	26	100.0	0	0.0	14	100.0	0	0.0	40	100.0	0	0.0	X^2= NA
Mean ±SD	7.000±0.000				6.000±0.000				6.650±0.483				t= 9.233 P= 0.000*
F. Screening of the clients	26	100.0	0	0.0	14	100.0	0	0.0	40	100.0	0	0.0	X^2= NA
Mean ±SD	27.92±1.230				20.93±0.267				25.48±3.523				t= 20.88 P= 0.000*
G. Waste management #	6	54.5	5	45.5	7	100.0	0	0.0	13	72.2	5	27.8	X^2= 4.406 P= 0.036*
Mean ±SD	19.45±0.522				14.14±0.378				17.39±2.704				t= 33.53 P= 0.000*
H. Environment infrastructure	26	100.0	0	0.0	14	100.0	0	0.0	40	100.0	0	0.0	X^2= NA
Mean ±SD	11.62±0.637				10.00±0.000				11.05±0.932				t= 9.458 P= 0.000*
Total Practice	26	100.0	0	0.0	14	100.0	0	0.0	40	100.0	0	0.0	X^2= NA
Mean ±SD	201.00±10.04				173.90±8.589				191.50±16.13				t= 8.544 P= 0.000*

X^2= Chi Square test **X^{2a}** = comparison between nurses in the two clinics **X^{2b}** = comparison between physicians in the two settings * Significant p at ≤0.05

Not applicable for the physicians, so in the medical institute n=7, and the African center n= 11 NA = Not applicable

Table (3): Relationships between the studied health care providers overall practice of infection prevention and control regarding COVID-19 and their socio-demographic characteristics and clinical data (n=40):

Items	Total Practice	Test of Significance
	Mean ±SD	
Sex		
Male	164.70±17.32	t= 6.540
Female	181.03±17.54	P= 0.015*
Level of education		
Diploma degree	180.33±11.89	F= 6.481 P= 0.001*
Associate degree	195.00±13.24	
Bachelor degree	164.67±20.30	
Master degree	168.22±17.80	
Doctorate degree	168.62±10.49	
Occupation		
Nurse	190.39±14.13	t= 29.112
Physician	165.95±14.34	P= 0.000*
Place of clinic		
African center	184.00±16.39	t= 14.124
Medical institute	163.85±15.72	P= 0.001*
Years of experience		
< 5	187.61±21.86	F= 3.859 P= 0.030*
5-	169.08±19.41	
≥10	174.00±9.971	
Previous training		
No	165.25±14.17	t= 1.776
Yes	178.25±18.83	P= 0.191
History of cough		
No	167.18±19.66	t= 4.517
Yes	180.65±17.23	P= 0.040*

t= Student t test F= ANOVA test * Significant p at ≤0.

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