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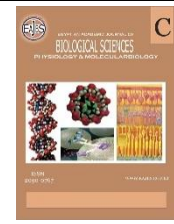
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## Adherence of Nursing Students to COVID-19 Preventive Measures, Yemen: A Descriptive Study

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### ABSTRACT

**Background:** The adherence of healthcare workers to precautions of COVID-19 is a fundamental and essential element for the safety of workers and patients, this study aimed to assess nursing students' adherence to COVID-19 preventive measures in Yemen.

**Methods:** This is a descriptive cross-sectional study; it was conducted among nursing students in Yemen during the COVID-19 crisis. An online questionnaire was posted and sent to students' groups and leaders to collect data related to nursing students' adherence to the COVID-19 preventive measures during their clinical practice in the hospitals. The total included was 425. The data were analysed by the SPSS program.

**Results:** The findings of this study illustrated that nursing students' age in Yemeni universities - ranged from 18-24 years, they studied in their second year (20%), third year (42.4%) or fourth year (37.6%). It was shown that more than half (55%) of nursing students were not adherent to preventive measures for COVID-19, they never attended family events last two weeks (92%), and never kept social distancing (76.5%). The nursing students between 20 and 22 years and those previously infected with COVID-19 are significantly more adherent to the preventive measures of COVID-19. **Conclusions:** The nursing students in Yemeni universities have a low level of adherence to preventive measures of COVID-19, furthermore the students between 20 and 22 years and those previously infected with COVID-19 are significantly more adherent to the preventive measures of COVID-19.

### INTRODUCTION

At the end of 2019, a new coronavirus disease was announced by World Health Organization (WHO) as a novel coronavirus that is widely spread starting in China (Dorigatti *et al.*, 2020; Tian *et al.*, 2020). It was described as pandemic and globally spread (Silverstein *et al.*, 2020). The countries applied unique and additional preventive measures to confront the pandemic and to ensure that their population and healthcare workers are protected from COVID-19 (Alrubaiee *et al.*, 2020).

In Yemen, as a post-conflict situation, healthcare infrastructure is lacking and essential for applying preventive measures and about half of the facilities are not able to provide services during the pandemic (International Rescue Committee 2020). The nursing workforce is an essential part to ensure the sustainability of healthcare services, especially during the pandemic (Jackson *et al.* 2020), they were in the front line to confront the disease (Chersich *et al.*, 2020; Hu *et al.*, 2020).

According to WHO, the shortage of applying preventive measures make healthcare workers at a higher risk to get infected (World Health Organization 2020). Furthermore, the adherence of healthcare workers to the preventive measures is a cornerstone in the prevention and control of COVID-19 (Roy *et al.*, 2020). The situation in Yemen is worsened by a lack of infrastructure and shortage of staff and unavailability of equipment (International Rescue Committee 2020; Alrubaiee *et al.*, 2020).

The adherence of healthcare workers to precautions against COVID-19 is a fundamental and essential element to

## **MATERIALS AND METHODS**

### **Study Design and Setting of The Study:**

This is a descriptive, online survey; it was conducted among nursing students at randomly selected universities in Yemen during the COVID-19 pandemic.

### **Sampling and Sample Size:**

The study used a simple random sampling technique to select six Yemeni universities and then to select nursing students from each university. The students responded by filling out the online survey and the author collected all responses and excluded all irrelevant, ineligible, or incomplete responses. The total included nursing students was 425 students.

### **Data Collection Tool and Technique:**

The author adopted a questionnaire from previously published papers (Ahmed 2022; Almutiri *et al.*, 2020; Tran *et al.*, 2022). It was approved by three researchers and its reliability was approved by Cronbach's alpha of 0.85.

### **Scoring System:**

The questionnaire of adherence consists of 15 questions with four options (always, sometimes, rarely, and never) for

ensure the safety of healthcare workers and patients (Żółtowska *et al.*, 2021), the students' adherence to preventive measures of COVID-19 was generally investigated (Ahmed 2022; Almutiri *et al.*, 2020; Tran *et al.*, 2022; Alshameri *et al.* 1970) among medical, dental, all students or public but the level of adherence among nursing students was not fully explored. It is questionable whether nursing students take into consideration compliance with the approved preventive measure when they practice in the hospitals. Thus, this study aimed to assess nursing students' adherence to preventive measures for COVID-19 at six Yemeni universities, Yemen, 2022.

each statement. The responses of students were recorded as (always=4, sometimes=3, rarely=2 and never=1) and the overall calculated score was 60 for each student. A score of 30 out of 60 was considered adherent and less than 30 (50%) was considered non-adherent.

### **Data Analysis:**

The data were analyzed by the SPSS program, version 22. The collected data was cleaned and coded into variables. The author used descriptive and inferential analysis to get appropriate results.

## **RESULTS**

The findings of the study illustrated that nursing students' age in Yemeni universities ranged from 18-24 years, most of them between 20-22 years (57.6%) while a quarter (26.4%) were between 18-20 years. The selected governmental universities were (Taiz, Aden, Hadramout, Sanaa, Hodiedah and Dhamar) universities. The participants were second-year students (20%), third year (42.4%) and fourth year (37.6%), the academic performance of students was excellent (8.9%), very good (52.7%), good (27.7%) or pass (10.6%), Table 1.

**Table 1.** Demographic characteristics of nursing students at Yemeni universities in Yemen, 2022 n=425

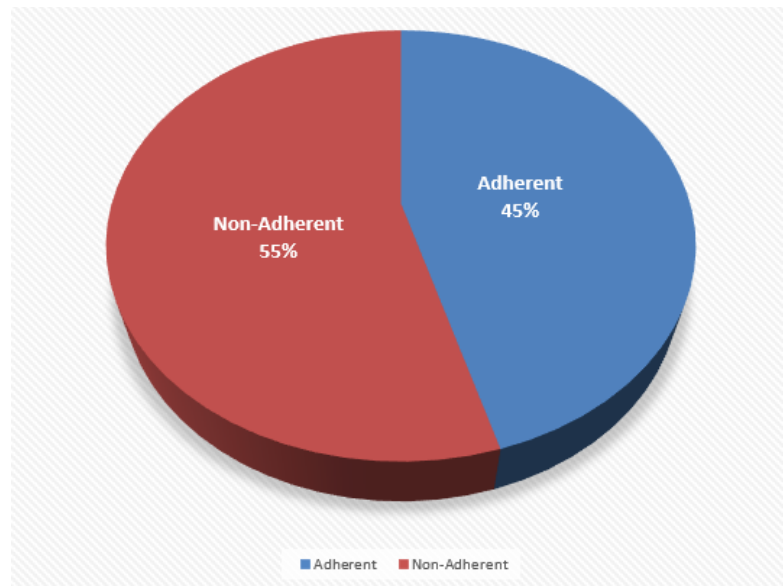
Age group	Frequencies	Percentage
18- < 20 years	112	26.4%
20 - < 22 years	245	57.6%
22 - < 24 years	68	16.0%
<b>Academic Performance</b>		
<b>Academic Years</b>		
Aden	45	10.6%
Dhamar	47	11.1%
Excellent	38	8.9%
Fourth	160	37.6%
Good	118	27.8%
Hadramout	89	20.9%
Hodiedah	58	13.6%
Pass	45	10.6%
Sanaa	119	28.0%
Second	85	20.0%
Taiz	67	15.8%
Third	180	42.4%
<b>University</b>		
Very good	224	52.7%

Table 2 shows that about 5.4% of participants had previously been infected with COVID-19, 32.2% have been vaccinated against COVID-19 and 20.2% have received training in COVID-19. Figure

1 shows that more than half (55%) of nursing students in Yemeni universities were not adherent to the preventive measures of COVID-19, while 45% are adherent to the preventive measures.

**Table 2.** Status of nursing students related to COVID-19 infection and vaccination in Yemeni universities, n= 425.

Variables		Frequency	Percentage
Previous COVID-19 infection	Yes	23	5.4%
	No	402	94.6%
Got vaccinated against COVID-19	Yes	137	32.2%
	No	288	67.8%
Did you receive any training course related to COVID-19	Yes	86	20.2%
	No	339	79.8%



**Fig. 1.** The overall adherence of nursing students to preventive measures of COVID-19 in Yemen, n=425.

Table 3 shows the details of adherence of nursing students in Yemeni universities towards preventive measures for COVID-19. Nursing students showed that they were always covering their mouth and nose while coughing or sneezing (65.4%), using antiseptics solutions (55.1%), avoiding

hanging or kissing (50.4%) and avoiding touching their nose, mouth, or eyes with their fingers (43.8%). It was also shown that they never attended family events last week (92%), and never kept social distancing (76.5%).

**Table 3.** Details of nursing students' adherence to COVID-19 preventive measures in Yemeni universities, n=425

Statements	Always Freq. (%)	Sometimes Freq. (%)	Rarely Freq. (%)	Never Freq. (%)
Are you washing your hands frequently with soap and water for 20 s at least?	167 (39.3%)	123 (28.3%)	98 (23.1%)	37 (8.7%)
Are you using antiseptics?	234 (55.1%)	165 (38.8%)	23 (5.4%)	3 (0.7%)
Are you avoiding the eyes, nose, and mouth touching with your fingers or hands?	186 (43.8%)	145 (34.1%)	66 (15.5%)	28 (6.6%)
Are you covering your mouth and nose with a tissue (or elbow) while coughing or sneezing?	278 (65.4%)	126 (29.6%)	21 (4.9%)	0 (0%)
Are you wearing a face mask outside the house?	134 (31.5%)	211 (49.6%)	76 (17.9%)	4 (0.9%)
Are you disinfecting surfaces and objects in places where you are present?	67 (15.8%)	86 (20.2%)	187 (44%)	85 (20%)
Are you avoiding crowded places (like malls and markets)?	53 (12.5%)	125 (29.4%)	196 (46.1%)	51 (12%)
Are you avoiding hands shaking with others?	23 (5.4%)	68 (16%)	89 (20.9%)	245 (57.6%)
Are you avoiding people hugging or kissing?	214 (50.4%)	132 (31.1%)	30 (7.1%)	49 (11.5%)
Are you keeping a distance between you and others (at least 1 m)?	21 (4.9%)	45 (10.6%)	34 (8%)	325 (76.5%)
Are you avoiding relatives' meeting?	5 (1.2%)	78 (18.4%)	56 (13.2%)	286 (67.3%)
Are you avoiding friends' meetings?	42 (9.9%)	57 (13.4%)	138 (32.5%)	188 (44.2%)
Are you staying at home and do not leave except for necessity?	35 (8.2%)	38 (8.9%)	184 (43.3%)	168 (39.5%)
During the past two weeks: Have you attended any family event (such as marriage, for example)?	34 (8%)	0 (0%)	0 (0%)	391 (92%)
During the past two weeks: Have you attended any event for your friends (such as marriage, for example)?	12 (2.8%)	0 (0%)	0 (0%)	413 (97.2%)

The age of nursing students was significantly correlated with the level of adherence, students who are between 22-24 years old are more compliance with preventive measures of COVID-19 by 73.5% compared to the other two age groups 18-20 years (41.1%) and 20-22 years (38.8%) with

p-value less than 0.05. another significant factor encountered is previous infection with COVID-19 where those who previously got infected more adherent to the preventive measures of COVID-19 (60.5%) compared to those who were not previously infected (41%) with a p-value less than 0.05, **Table 4.**

**Table 4.** Correlation between nursing students' demographic characteristics and level of adherence to COVID-19 preventive measures in Yemeni universities, n=425

Age group	Adherent 191 (45%) Freq. (%)	Non-adherent 234 (55%) Freq. (%)	P-value
18- < 20 years	46 (41.1%)	66 (58.9%)	0.04*
20 - < 22 years	95 (38.8%)	150 (61.2%)	
22 - < 24 years	50 (73.5%)	18 (26.5%)	
<b>University</b>			
Taiz	34 (50.7%)	33 (49.3%)	0.15
Aden	20 (44.4%)	25 (55.6%)	
Hadramout	42 (47.2%)	47 (52.8%)	
Sanaa	52 (43.7%)	67 (56.3%)	
Hodiedah	22 (37.9%)	36 (62.1%)	
Dhamar	21 (44.7%)	26 (55.3%)	
<b>Academic Years</b>			
Second	39 (45.9%)	46 (54.1%)	0.09
Third	87 (48.3%)	93 (51.7%)	
Fourth	65 (40.6)	95 (59.4%)	
<b>Academic Performance</b>			
Excellent	17 (44.7%)	21 (55.3%)	0.08
Very good	110 (49.1%)	114 (50.9%)	
Good	49 (41.5%)	69 (58.5%)	
Pass	15 (33.3%)	20 (44.4%)	
<b>Previous training course</b>			
Yes	11 (47.8%)	12 (52.2%)	0.21
No	180 (44.8%)	222 (55.2%)	
<b>Previous COVID-19 infection</b>			
Yes	52 (60.5%)	34 (39.5%)	0.03*
No	139 (41%)	200 (59%)	

## DISCUSSION

The study showed that 45% of nursing students are adherent to COVID-19 preventive measures at Yemeni universities. Investigating nursing students' adherence to the protective precaution of COVID-19 showed that they covered their mouth and nose while coughing or sneezing, are using antiseptics solutions, are avoiding hanging, or kissing and did not touch their nose, mouth, or eyes with their figures. It was also shown that they avoid attending family events and do not keep a social distance. The

low level of compliance to preventive measures despite their medical backgrounds may be due to the influence of their communities or maybe long-term disease situations. Our findings showed a higher level of adherence to preventive measures for COVID-19 compared to other studies conducted on medical students in Egypt (28.1%) (Ahmed 2022), and lower than studies conducted on the general public (49%) in Jeddah (Almutiri *et al.*, 2020) and on dental students in Vietnam where most of the dental students adhere to preventive

measures of COVID-19 (Tran *et al.*, 2022) and another study from Egypt showed higher adherence level by 92% among medical students (Soltan *et al.*, 2020). So our findings are in the same line with fewer studies and fewer than other studies, that is could be justified by these studies conducted during the peak of the pandemic.

It was also shown that few numbers of nursing students had previously been infected with COVID-19 by 5.5% lower than what was shown in a study on male medical students in Egypt where 18.8% of students get infected last year (Ahmed 2022), the reason for that the screening test for COVID-19 in Yemen is low compare to Egypt, and about a third of nursing students in Yemen have been vaccinated against COVID-19 compared to 75.9% vaccinated dental healthcare workers in Vietnam (Tran *et al.*, 2022).

The age of students (20 and 22) years and those previously infected with COVID-19 are significantly more adherent to the preventive measures of COVID-19 compared to other students. Our findings are contradicting findings from the study in Egypt among medical students which showed no significant correlation between demographic characteristics (age, residence, and family income) of medical students and level of adherence (Ahmed 2022).

However, this is the first study that investigated nursing students' compliance with preventive measures of COVID-19, it has some limitations including that it was conducted in the second year of the pandemic which may decrease the adherence level among students, which could be appropriate because many countries remove all restrictions and curfew, another limitation is the study conducted only among nursing students while other medical and health students are in the same campus of faculties, nursing students are essential sectors for healthcare settings and other studies should be conducted to investigate other medical and health students.

#### **Conclusion:**

The nursing students in Yemeni

universities have a low level of adherence to preventive measures for COVID-19, furthermore, the students between 20 and 22 years and those previously infected with COVID-19 are significantly more adherent to the preventive measures of COVID-19.

#### **List of Abbreviations**

COVID-19: Coronavirus disease 2019  
SPSS: Statistical Package for Social Sciences

WHO: World Health Organization

#### **REFERENCES**

- Ahmed HM (2022) Adherence to COVID-19 preventive measures among male medical students, Egypt. *Journal of the Egyptian Public Health Association*, 97 (1):1-8
- Almutiri TM, Alzhrani WH, Alraddadi R (2020) Adherence to COVID-19 preventive measures and its predictors among the population of Jeddah City 2020. *International Journal of Medicine in Developing Countries*, 20 (16):3-4
- Alrubaiee GG, Al-Qalah TAH, Al-Aawar MSA (2020) Knowledge, attitudes, anxiety, and preventive behaviours towards COVID-19 among health care providers in Yemen: an online cross-sectional survey. *BMC Public Health*, 20 (1):1-11
- Alshameri FA, Atawi SJ, Ahmed WA, Ali AA, Gomaa SM, Albanghali MA (1970) Stress, Anxiety, and Depression among University Students in Saudi Arabia During COVID 19 Pandemic: A Cross-Sectional Study. *Majmaah Journal of Health Sciences*, 9 (3):65-65
- Chersich MF, Gray G, Fairlie L, Eichbaum Q, Mayhew S, Allwood B, English R, Scorgie F, Luchters S, Simpson G (2020) COVID-19 in Africa: care and protection for frontline healthcare workers. *Globalization and health*, 16 (1):1-6
- Dorigatti I, Okell L, Cori A, Imai N, Baguelin M, Bhatia S, Boonyasiri A, Cucunubá Z, Cuomo-Dannenburg G, FitzJohn R (2020) Report 4: severity



- of 2019-novel coronavirus (nCoV). Imperial College London, London
- Hu D, Kong Y, Li W, Han Q, Zhang X, Zhu LX, Wan SW, Liu Z, Shen Q, Yang J (2020) Frontline nurses' burnout, anxiety, depression, and fear statuses and their associated factors during the COVID-19 outbreak in Wuhan, China: A large-scale cross-sectional study. *E Clinical Medicine*, 24:100424
- International Rescue Committee (2020) COVID-19 in humanitarian crises: a double emergency. International Rescue Committee New York,
- Jackson D, Bradbury-Jones C, Baptiste D, Gelling L, Morin K, Neville S, Smith GD (2020) Life in the pandemic: Some reflections on nursing in the context of COVID-19. *Journal of clinical nursing*, 29:2041–3. 10.1111/JOCN.15257.
- Roy D, Tripathy S, Kar SK, Sharma N, Verma SK, Kaushal V (2020) Study of knowledge, attitude, anxiety & perceived mental healthcare need in Indian population during COVID-19 pandemic. *Asian journal of psychiatry*, 51:102083
- Silverstein W, Stroud L, Cleghorn G, Leis J (2020) Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet* 2020; 395: 689–97—In this Article. *Lancet*, 395:689-697
- Soltan EM, El-Zoghby SM, Salama HM (2020) Knowledge, risk perception, and preventive behaviors related to COVID-19 pandemic among undergraduate medical students in Egypt. *SN Comprehensive Clinical Medicine*, 2 (12):2568-2575
- Tian H, Li Y, Liu Y, Kraemer M, Chen B, Cai J, Li B, Xu B, Yang Q, Yang P (2020) Early evaluation of Wuhan City travel restrictions in response to the 2019 novel coronavirus outbreak. *Medrxiv*,:2020.2001. 2030.20019844
- Tran TT, Vo TV, Hoang TD, Hoang MV, Tran NTQ, Colebunders R (2022) Adherence to COVID-19 preventive measures among dental care workers in Vietnam: an online cross-sectional survey. *International Journal of Environmental Research and Public Health*, 19 (1):481
- World Health Organization (2020) Shortage of personal protective equipment endangering health workers worldwide. *Newsroom*,3:2020
- Żółtowska B, Barańska I, Szczerbińska K, Różańska A, Mydel K, Sydor W, Heczko PB, Jachowicz E, Wójkowska-Mach J (2021) Preparedness of Health Care Workers and Medical Students in University Hospital in Krakow for COVID-19 Pandemic within the CRACoV Project. *Journal of Clinical Medicine*, 10 (16):3487