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Prevalence and Clinical Presentation of COVID-19 among Healthcare Workers at KAUH Jeddah, Saudi Arabia, 2020-2021

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ABSTRACT

Background: Healthcare workers are the first line of facing the COVID-19pandemic and are the most exposed population of the society to COVID-19 infection. There is variability of symptoms and signs that brought them to the clinic for COVID-19 swab.

Objectives: To evaluate the prevalence of COVID-19 among healthcare workers and their families as well as identifying the laboratory, radiologic and clinical symptoms presented by them.

Subjects and Methods: A retrospective observational study was carried out at King Abdulaziz University hospital, acute respiratory illness (KAUH-ARI) clinic in Jeddah city, Kingdom of Saudi Arabia (KSA). The study targeted healthcare workers (HCWs) and their families visiting ARI clinic for performing polymerase chain reaction (PCR) covid 19 swabs, for the first time throughout the period March 2020- March 2021.

Results: A total 0f 333 healthcare workers and/or their family members were included in the study. Females represented 61% of them. Their age ranged between 3 and 69 years (36.9±10.8 years). The prevalence of positive COVID-19 among the participants, based on PCR test was 88.3%. Non-Saudi nationals were more vulnerable than Saudi nationals to have COVID-19 (92.1% vs. 81.5%), p=0.004. As regards severity of COVID-19 symptoms, they were moderate or severe among 5.1% of the participants with positive COVID-19 PCR test. Sore throat (52.3%) was the commonest presenting symptom. Concerning radiologic findings, lung infiltration was observed in 18/76 patients (23.7%). Non-Saudi nationals were more likely to have lung infiltration in radiologic examination compared to Saudi nationals (35.9% vs. 10.8%), p=0.010.

Conclusion: COVID-19 was very prevalent among healthcare workers and their families attended ARI clinics during COVID-pandemic. However, most of infections were mild.

Keywords: COVID-19, Prevalence, Healthcare workers, Severity.

INTRODUCTION

Coronavirus disease-2019 (COVID-19) is a worldwide pandemic declared by the world health organization (WHO) as an international health crisis that started in Wuhan, China and affected all countries of the globe.[1] The pathogen is a single-stranded ribonucleic acid (RNA) virus transmitting through respiratory secretions. It belongs to the family of corona viruses and causing severe acute respiratory syndrome hence the name (SARS-Cov2).[2,3]

COVID-19 patient can present to the health facility with varieties of symptoms that can be vague and not specific for the disease from mild symptoms like (sneezing, runny nose, low grade fever, dry cough and fatigue) to more severe symptoms like (shortness of breath, high grade fever, coma).[1,2]

It can also affect multiple systems and may lead to organ failure, and in some cases, they progress rapidly to Acute Respiratory Distress Syndrome (ARDS). Older patients with multiple comorbidities like hypertension, diabetes, chronic kidney disease and heart diseases beside the immunocompromised patients like cancer patients and diabetics have higher risk of getting infected by the pathogen and increase mortality.[1]

The COVID 19 pandemic hits hard on all societies and professions as it is an unrivaled challenge for the whole world. At the front line facing this pandemic are the healthcare workers (HCWs) and providers, supporting them psychologically and socially is a critical point in the whole process of providing health care.

The exponential rise of figures of deaths and new cases put the HCWs under unbearable mental and physical pressure that may lead to the total break down and cease of the service.[5] This study aims to evaluate the prevalence of COVID-19 among HCW sand their families as well as identifying the laboratory, radiologic and clinical symptoms presented by them.

SUBJECTS AND METHODS

A retrospective observational study was carried out at King Abdulaziz University hospital, acute respiratory illness (KAUH-ARI) clinic in Jeddah city, Kingdom of Saudi Arabia (KSA). KAUH is one of the largest tertiary care and educational hospitals in Jeddah city. The study targeted healthcare workers (HCWs) and their families visiting ARI clinic for performing polymerase chain reaction (PCR) covid 19 swabs, for the first time throughout the period March 2020- March 2021. They might be asked to do COVID-19 PCR without having respiratory or other symptoms in some situations such as before traveling and before training. Those who got the swab from other clinics or emergency department and those visited the clinic just for for follow up were excluded from the study.

At confidence level of 95% and margins of errors of 5% and considering the prevalence of COVID-19 among healthcare workers and their families as 50%, the estimated sample size was 384 HCWs and their family members. A convenience non-probability sampling technique was implemented to select the required sample size.

Data were collected by ARI clinic nurses and written down by hand in ready templates. In addition, the hospital system (phoenix) was utilized to extract more information. Data includes information about demographic characteristics of HCWs (age, sex, and nationality), severity of covid illness, based on Saudi Ministry of health protocol for patient suspected of/confirmed with COVID-19 infection, based on clinical symptoms (mild, moderate, severe)[5], and laboratory and radiologic findings.

The research protocol was approved by the local Research and Ethics committee at KAUH, Jeddah, KSA. Written informed consent was obtained from all the participants prior to data collection.

Data were analyzed using Statistical Package for Social Sciences (SPSS) statistical software package version 26. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables as well as mean, range and standard deviation for quantitative variables. Chi square or Fischer exact tests were used to compare 2 or more categorical variables. Statistical significance was considered at P-value <0.05.

Table 1: Demographic and personal characteristics of healthcare workers and their families attending acute respiratory illness clinics, King Abdulaziz University hospital, Jeddah (March 2020-March 2021).

Demographic and personal characteristics		Frequency N=333	Percentage
Gender	Male	130	39.0
	Female	203	61.0
Age (years)	≤18	14	4.2
	19-30	77	23.1
	31-40	132	39.7
	41-50	72	21.6
	>50	38	11.4
	Range	3-69	
	Mean±SD	36.9±10.8	
Nationality	Saudi	119	35.7
	Non-Saudi	214	64.3

SD: Standard deviation

Table 2: Oxygen saturation percentage and temperature of the participants at presentation

		Frequency	Percentage
Oxygen saturation (n=119)	≤95%	8	6.7
	96-99%	72	60.5
	100%	39	32.8
Temperature at presentation (n=123)	≤37 ˚C	75	61.0
	37.1-38 ˚C	28	22.7
	>38 ˚C	20	16.3

Table 3: Demographic factors associated with prevalence of COVID-19 among healthcare workers/their families

		Prevalence of COVID-19 (PCR)		p-value*
		Negative N=39 N (%)	Positive N=294 N (%)	
Gender	Male (n=130)	10 (7.7)	120 (92.3)	0.068
	Female (n=203)	12 (14.3)	174 (85.7)	
Age (years)	≤18 (n=14)	1 (7.1)	13 (92.9)	0.654
	19-30 (n=77)	8 (10.4)	69 (89.6)	
	31-40 (n=132)	17 (12.9)	115 (87.1)	
	41-50 (n=72)	9 (12.5)	63 (87.5)	
	>50 (n=38)	4 (10.5)	34 (89.5)	
Nationality	Saudi (n=119)	22 (18.5)	97 (81.5)	0.004
	Non-Saudi (n=214)	17 (7.9)	197 (92.1)	

*Chi-square test

Table 4: Demographic factors associated with severity of COVID-19 infection among healthcare workers and/or their families

		Severity of COVID-19symptoms		p-value
		Mild/asymptomatic N=279 N (%)	Moderate/severe N=15 N (%)	
Gender	Male (n=120)	112 (93.3)	8 (6.7)	0.311*
	Female (n=174)	167 (96.0)	7 (4.0)	
Age (years)	≤18 (n=13)	13 (100)	0 (0.0)	0.004*
	19-30 (n=69)	69 (98.6)	1 (1.4)	
	31-40 (n=115)	110 (95.7)	5 (4.3)	
	41-50 (n=63)	59 (93.7)	4 (6.3)	
	>50 (n=34)	29 (85.3)	5 (14.7)	
Nationality	Saudi (n=97)	95 (97.9)	2 (2.1)	0.078**
	Non-Saudi (n=197)	184 (93.4)	13 (6.6)	

*Chi-square test   **Fischer exact test

Table 5: Factors associated with radiologic findings among healthcare workers and/or their families

|		Radiologic findings		p-value
		Clear N=58 N (%)	infiltration N=18 N (%)	
Gender	Male (n=36)	28 (77.8)	8 (22.2)	0.776*
	Female (n=40)	30 (75.0)	10 (25.0)	
Age (years)	≤18 (n=2)	2 (100)	0 (0.0)	0.765*
	19-30 (n=21)	17 (81.0)	4 (19.0)	
	31-40 (n=34)	24 (70.6)	10 (29.4)	
	41-50 (n=12)	9 (75.0)	3 (25.0)	
	>50 (n=7)	6 (85.7)	1 (14.3)	
Nationality	Saudi (n=37)	33 (89.2)	4 (10.8)	0.010**
	Non-Saudi (n=39)	25 (64.1)	14 (35.9)	
Severity of symptoms	Mild (n=73)	56 (76.7)	17 (23.3)	0.561**
	Moderate/severe (n=3)	2 (66.7)	1 (33.3)	

*Chi-square test   **Fischer exact test
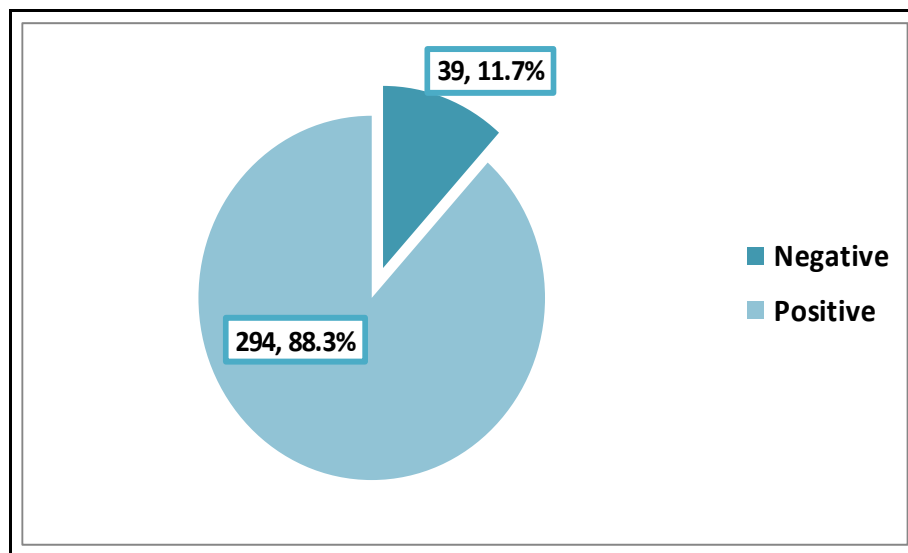
Fig 1: Prevalence of COVID-19 among healthcare workers/their families attending acute respiratory illness clinics, King Abdulaziz University hospital, Jeddah (March 2020-March 2021).

RESULTS

A total 0f 333 healthcare workers and/or their family members were included in the study. Females represented 61% of them. Their age ranged between 3 and 69 years (36.9±10.8 years). Almost two-thirds (64.3%) were non-Saudi nationals (Table 1). Among participants with available information regarding oxygen saturation, it was ≤ 95% among 6.7%. As regards body temperature at presentation, it exceeded 38 ˚C in 16.3% of the participants with available data. (Table 2)

The prevalence of positive COVID-19 among the participants, based on PCR test was 88.3% as clear from Figure 1. Non-Saudi nationals were more vulnerable than Saudi nationals to have COVID-19 (92.1% vs. 81.5%), p=0.004. Also, males were more

likely to have positive PCR test for COVID-19 compared to females (92.3% vs. 85.7%). However, this difference did not reach a critical significance level (p>0.05). (Table 3)

As regards severity of COVID-19 symptoms, they were moderate or severe among 5.1% of the participants with positive COVID-19 PCR test as illustrated in Figure 2. Moderate or severe infection was more observed among participants aged over 50 years (14.7%) compared to none of those aged 18 years or less, p=0.004. Also, non-Saudi nationals were more likely to have moderate or severe COVID-19 compared to Saudi nationals (6.6%

vs. 2.1%). However, this difference did not reach a critical significance level (p>0.05). (Table 4) Sore throat (52.3%) was the commonest presenting symptom among the participants attending ARI clinics, followed by cough (40.8%), and fever (34.5%). Almost one-fifth (21.6%) were asymptomatic. (Figure 3) Concerning radiologic findings, data were available for 76 patients; unilateral or bilateral lung infiltration was observed in 18 patients (23.7%) as seen in Figure 4. Non-Saudi nationals were more likely to have lung infiltrated in radiologic examination compared to Saudi nationals (35.9% vs. 10.8%), p=0.010. (Table 5)
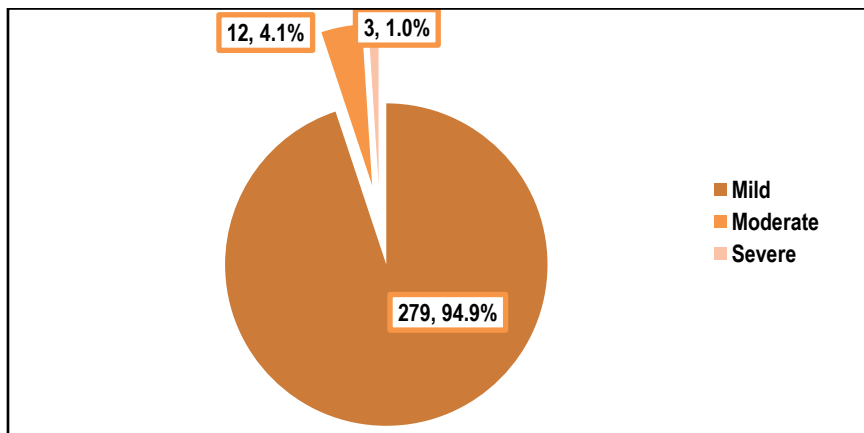

Fig 2: Severity of symptoms among COVID-19 positive healthcare workers/their families (n=294)
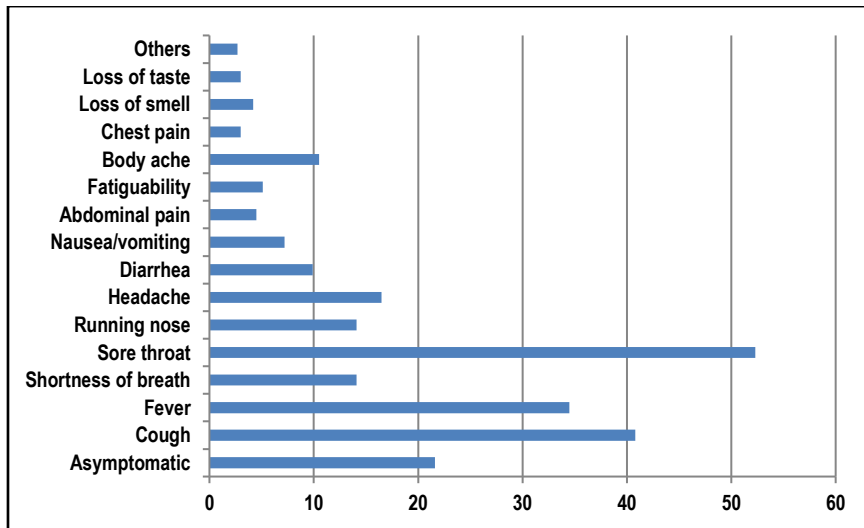

Fig 3: Presenting symptoms of healthcare workers/their families attending acute respiratory illness clinics, King Abdulaziz University hospital, Jeddah (March 2020-March 2021).
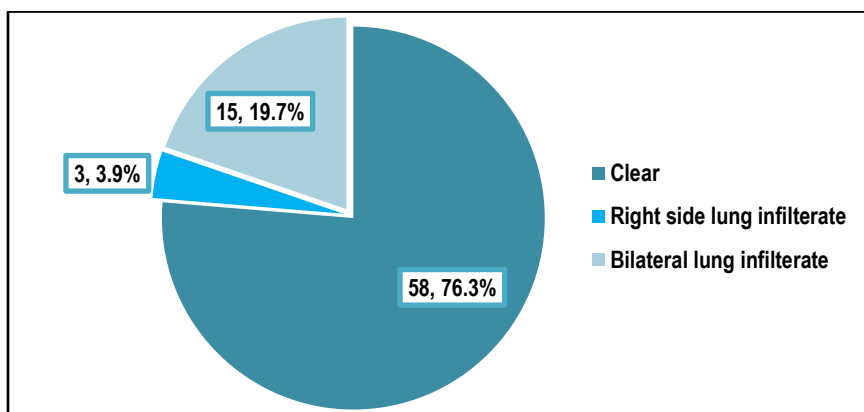

Figure 4: Radiological findings among healthcare workers/their families (n=76)

DISCUSSION

As healthcare workers are the first line of facing the pandemic and are the most exposed population of the society to COVID-19 infection and owing to the variability of symptoms and signs that brought them to the clinic for COVID- 19 swab, it would be important to identify the prevalence of getting infection among them, their common representing symptoms, severity of illness as well as radiologic findings of the disease to help decision makers to set plane for their protection in case of further disasters.

The present study revealed a high prevalence of positive COVID-19 among the healthcare workers and/or their families, based on PCR test (88.3%). This high figure is quite expected as we included only those attended ARI clinics, rather than the general population of healthcare workers/their families. Lower rates were reported in studies carried out among general population of healthcare workers.

In India, the prevalence rate of COVID-19 among HCWs of the Gastroenterology department was 32.5% using either PCR or Immunoglobulin G (IgG) sero Assay.[6] In Oman, a rRT-PCR test positivity rate of 21.2% has been reported among HCWs in a tertiary care hospital.[7] In Italy, a low rate has been reported among HCWs (13.8%).[8]

Also in Spain, a cumulative incidence rate of 16.9% has been reported among healthcare staff.[9] Comparison between these studies, including the present one is not practical as a result of difference in the characteristics of the participants and times in the conduction of studies.

In the current study, the commonest reported symptom among healthcare workers was sore throat (52.3%), followed by cough (40.8%), and fever (34.5%). In Oman, the most prominent presenting symptom was fever (44%).[7] In Italy, respiratory symptoms were present in 56.1% of cases followed by fever, anosmia, dysgeusia, exhaustion, myalgias, and enteric disorders.[8] In Spain, the most common symptoms were fever (50%) and cough (32.3%).[9] In Malaysia, the most commonly reported symptoms were fever (65.2%), sore throat (39.1%) and cough (37.0%).[10] In Pakistan, the commonest presenting symptoms of COVID-19 positive cases Fever (86.6%), cough (85.1%), fatigue (36.6%), dyspnea (24.7%), and gastrointestinal discomfort (10.3%).[11]

In accordance with others[8,12], severe forms of COVID-19 infection were more observed among older HCWs. This is expected and mostly related to decreased immunity with age in addition to more likelihood of having comorbid health problems.

Concerning severity of infection, majority of the HCWs/their families presented with mild infection (94.9%). In a similar study carried out in Spain, the majority presented of health care staff presented with mild symptoms (87.1%)[9] while in Malaysia, 52.2% of patients experienced mild symptoms.[10]

Finding that non-Saudi nationals had both more prevalent and more severe infection, could be attributed to their older age and consequently having more chronic diseases. However, in-depth investigation of this finding in warranted in further studies.

Almost one-fifth (21.6%) of the participants were asymptomatic. This is simply because, they have to attend ARI clinic before traveling and before engaging in training activities to have nasopharyngeal swab for COVID-19. In Malaysia, 13% of patients with positive COVID PCR were asymptomatic[10] while in Pakistan, 4.12% of the total patient population remained asymptomatic.[11]

The study could be of benefit for facing further disasters. However, it has few but important limitations; being a single center study which could influence the ability to generalize the findings over other healthcare facilities. Also, we could not obtain enough samples of patients underwent radiologic investigations. Finally, we did not inquire about psychological health of the healthcare workers, which proved by others to be dramatically deteriorated during the COVID-19 pandemic.[8,13]

In conclusion, COVID-19 was very prevalent among healthcare workers and their families attended ARI clinics during COVID-pandemic. However, most of infections were mild and severe forms were more likely to affect non-Saudi nationals. Also, lung infiltration was more common in this group. However, further larger scale study is recommended to have clearer profile of the situation. Also, in order to decrease the risk of COVID-19 among HCWs, there should be more stringent triaging of patients, as well as HCWs.

REFERENCES

1. Baloch S, Baloch MA, Zheng T, Pei X. The Coronavirus disease 2019 (COVID-19) pandemic. Tohoku J Exp Med. 2020 Apr;250(4):271-278. doi: 10.1620/tjem.250.271.

2. Walton M, Murray E, Christian MD. Mental health care for medical staff and affiliated healthcare workers during the COVID-19 pandemic. Eur Heart J Acute Cardiovasc Care. 2020 Apr;9(3):241-247. doi: 10.1177/ 2048872620922795.

3. Morales Viera A, Rivas Rodríguez R, Otero Aguilar P, Briones Pérez de Blanca E. Epidemiology of COVID-19 among health personnel in long-term care centers in Seville. Rev Clin Esp (Barc). 2021 Oct 20: S2254-8874 (21) 00170-3. doi: 10.1016/j.rceng.2021.06.006

4. Center of disease control and prevention (CDC)-US. Covid 19 symptoms Updated Feb. 22, 2021. Symptoms of COVID-19. https://www.cdc.gov/coronavirus/2019-ncov/index.html

5. Goenka MK, Shah BB, Goenka U, Das SS, Afzalpurkar S, Mukherjee M, et al. COVID-19 prevalence among health-care workers of Gastroenterology department: An audit from a tertiary-care hospital in India. JGH Open. 2020 Nov 9;5(1):56-63. doi: 10.1002/jgh3.12447.

6. Mahesh KG; Bhavik BS, Usha G, Sudipto SD; Shivaraj A, Mohuya M, et al. COVID-19 prevalence among health-care workers of Gastroenterology department: An audit from a tertiary-care hospital in India. JGH Open 2021 Jan; 5(1): 56-63.

7. Al Maskari Z, Al Blushi A, Khamis F, Al Tai A, Al Salmi I, Al Harthi H, et al. Characteristics of healthcare workers infected with COVID-19: A cross-sectional observational study. Int J Infect Dis. 2021Jan;102:32-36

8. Magnavita N, Tripepi G, Di Prinzio RR. Symptoms in health care workers during the COVID-19 Epidemic. A cross-sectional survey. Int J Environ Res Public Health 2020 Jul 20;17(14):5218. doi: 10.3390/ijerph17145218.

9. Morales Viera A, Rivas Rodríguez R, Otero Aguilar P, de Blanca E Briones Pérez. Epidemiology of COVID-19 among health personnel in long-term care centers in Seville. Rev Clin Esp 2021 Jul 17; PMID: 34305157

10. Tan-Loh J, Cheong BMK. A descriptive analysis of clinical characteristics of COVID-19 among healthcare workers in a district specialist hospital, Med J Malaysia 2021 Jan; 76(1):24-28.

11. Ahmad M, Beg BM, Majeed A, Areej S. Epidemiological and Clinical Characteristics of COVID-19: A Retrospective Multi-Center Study in Pakistan, Front Public Health. 2021 Apr 14; 9: 644199.

12. European Centre for Disease Prevention and Control (ECDC). Contact tracing: Public Health Management of Persons, Including Healthcare Workers, Having Had Contact with COVID-19 Cases in the European Union–Second Update, 8 April 2020; ECDC: Stockholm, Sweden, 2020; (accessed on 16 June 2020).
Available online: https://www.ecdc.europa.eu/en/COVID-19-contact-tracing-public-health-management

13. Cai, W.; Lian, B.; Song, X.; Hou, T.; Deng, G.; Li, H. A cross-sectional study on mental health among health care workers during the outbreak of Corona Virus Disease 2019. Asian J. Psychiatr. 2020, 51, 102111.