

Impact of Frequency of COVID-19 Pandemic Infection among the Medical Staff in Health Centers in Makkah Al-Mokarramah, Saudi Arabia 2022

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Abstract:

Background

During frequency pandemics, medical staff in health centers may be prone to higher levels of infection than those of the general population, also burnout is the impact on the medical staff in health centers COVID-19 pandemic. With the novel coronavirus pandemic, the impact on the medical staff in health care cannot be overlooked. However, studies on the infection status of the medical staff are still lacking. It is imperative to ensure the safety of the medical staff not only to safeguard continuous patient care but also to ensure they do not transmit the virus, therefore evaluation of infection rates in these groups are indicated among medical staff in health centers COVID-19 pandemic frontline, who were working with the COVID-10 infected patients directly. In late December 2019, China reported an outbreak of viral pneumonia in Wuhan, Hubei Province, China, which spread rapidly to other areas. The novel coronavirus disease 2019 caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a global concern and has become a significant health problem on medical staff in health centers since the number of infected cases and affected countries has escalated rapidly.

Aim of the study: To Impact of frequency of COVID-19 pandemic infection among the medical

staff in health centers in Makkah Al-Mokarramah, Saudi Arabia2022.

Method: Cross sectional study, was conducted among Saudi Arabia medical staff in health centers in Makkah . The questionnaire collected socio-demographic characteristics, assessment the impact frequency of COVID-19 pandemic infection COVID-19. Our total participants were(300).

Results: regarding the age majority of the study groups were in the age range of (35 - 45) years were (42.0%), gender most of the respondents were female (66.0%), the nationality most of the respondents were Saudi (80.0 %), marital status many of the respondents were married (49.0 %), the Occupation many of the respondents were nurse (49.0 %) while Technician were (20.0%), the History of comorbidities, the majority of the respondents had Diabetes mellitus were (48.0%).

Conclusion: With the ongoing COVID-19 outbreak and the increasing number of infected cases, ensuring the safety of medical staff is essential to end the pandemic, medical staff in health are among the highest groups at risk of infection during the COVID-19 pandemic therefore, impact the frequency of COVID-19 pandemic infection among the medical staff in health care and associated is necessary to improve and adjust protective measures of these vulnerable, yet highly essential group.

Keywords: Impact, frequency, COVID-19, infection, medical staff, health centers , Makkah , Saudi Arabia .

Introduction

Amongst the highest health-care workers at the risk of exposure to the disease are the medical staff. Previous experiences of a similar disease, the severe acute respiratory syndrome (SARS), have left behind a distressing toll on the medical staff providers. During the SARS outbreak in 2002, WHO confirmed 8098 cases and 774 (9.6%) deaths of which medical staff accounted for 1707 (21%) cases(1) .

the medical staff in health centers, defined as those handling any job in a healthcare setting, are at the frontline of risk of infection as COVID-19 pandemic is easily transmitted through airborne droplets and direct contact with contaminated surfaces (3)

The Spread of Coronavirus Disease 2019 (COVID-19) has prompted the lamentable loss of numerous human living, also as the burden of enormous financial and social disturbance across the world (4). Alongside defensive measures, for example, social separating and isolate, a viable immunization will be the best system for moderating the spread of COVID-19 and advancing positive clinical and financial results (5)

During epidemics and pandemics, a hole in information about the emerging infection can cause

tumult and frenzy among medical staff. Circulating the appropriate data can direct society through such occasions as well as increase epidemic preparedness that might occur in the future. (6) Furthermore, negative attitudes and practices towards new infectious diseases can aggravate epidemics which may eventually result in pandemics(7) In particular, frontline medical staff are vulnerable to infection and spread the virus to their colleagues or family members. Since January 24, 2020, China has sent more than 30,000 medical staff to provide medical support to Hubei Province. To date, more than 3000 medical personnel across the country have been infected with COVID-19(8). But placed extra- stress and burden on medical staff and subject them to various forms of physical and mental fatigue and exhaustion. Numerous studies, both international and local attempt to study the impact of frequency of COVID-19 pandemic infection of among medical staff, but there was not any nationwide study conducted in Saudi Arabia. (9) A matter of fact, the prevalence of infection among medical staff exceeds 10% in Saudi Arabia (10). leading to further loss of capacity for primary health care to respond, COVID-19 became largely a COVID-19 pandemic (11)

The COVID-19-related oral symptoms were attributed to the high expression of angiotensin-converting enzyme 2 (ACE2) receptors in the tongue's epithelial cells, ducal and gingival mucosa (12). A lack of independent studies on vaccines' safety may adversely impact the vaccine uptake, which has to be accelerated in the next few months in order to escape this viscous circle of the virus and its variants to protect medical staff from COVID-19 infection(13), the spread of COVID-19 presents serious risks globally and in Saudi Arabia, which has reported 393 377 cases and 6704 deaths as of 06 April 2021.(14) Saudi Arabia has exceptional circumstances as it is a hub for millions of foreign workers and pilgrims from across the globe. (15) In response to the pandemic and to combat the spread of the disease, the government took swift action and closed the two holy mosques, suspended travel to the country, closed most businesses and limited individuals' movement. Further, the government created a national narrative to encourage citizens to adhere to the emergency measures established in response to the pandemic.(16) The Kingdom of Saudi Arabia took the deadly coronavirus outbreak seriously, even before the Ministry of Health announced the first confirmed COVID-19 case; for example, it announced the temporary suspension of entry to Makkah and Madinah in February 2020.(17)

2. Literature review:

Study reported that nearly 600,000 medical staff, the incidence rate of COVID-19 was 9527 per 100,000 (10%) medical staff during the study period (18). Medical staff cases accounted for 16% of all COVID-19 cases in Saudi Arabia (19)

Singapore reported 41% of 238 probable SARS cases in Singapore occurred in medical staff (20). With the ongoing pandemic of the COVID-19, occupational contact of medical staff is therefore among the most vital concerns which need to be addressed comprehensively and decisively.(21) It is imperative to ensure the safety of medical staff not only to safeguard continuous patient care but also to ensure they do not transmit the virus. Reports have said that until 5th June 2020, at least 90,000 medical staff has been infected by COVID-19 and more than 260 nurses have lost their lives to the pandemic (22)

Behavioral and cultural characteristics could also play a role in the incidence of COVID-19 among medical staff. (23)For instance, smoking is considered as a significant contributor to the severity of COVID-19. The smoking rate in many countries like China, Italy, and the US is much higher in medical staff. Similar medical staff specific trends also present in Saudi Arabia show men are more likely to smoke than women, where 16% of smokers are men as compared to 2% of women (24).

Studs in Malaysian report that Generally, the 1.03% period prevalence of COVID-19 among Malaysian medical staff in 2020 was low compared with the global medical staff prevalence estimates during the early pandemic. A report based on pooled data indicated that the 2020 prevalence of COVID-19 among medical staff might have been as high as 51.7% (25) while another study on the global burden of the COVID-19 pandemic among medical staff found that the median prevalence was 10.04% (21). More recently, the prevalence of COVID-19 among medical staff did appear to be trending lower, with one study reporting a 2021 prevalence of only 11% based on pooled data (24)

Study conducted in Iran reported lower frequency of COVID-19 pandemic infection the medical staff and noncompliance with wearing masks in medical staff [23] In a study that investigated Chinese medical staff knowledge, attitudes, and practices (KAPs) towardCOVID-19 (25), results affirmed that medical staff are more likely to engage in health risk behaviors. Most of the infected medical staff were non-Saudi (55%). This is due to the number of non-Saudi health care workers in Saudi Arabia whereby the year 2019 has accounted for more than half of the total medical staff force (52%) (19). A recent study in Southeast Asian region reported COVID-19 infection of 150,000 medical staff globally by early May, most likely underestimated due to a lack of official data in most countries(26).

Currently, data on infection rates of medical staff, which is critical to improving infection control and prevention measures, are limited – particularly from the Southeast Asian region, where most data is only available online (20).

Rationale

During outbreak of 2019 novel coronavirus disease (COVID-19), a viral respiratory illness caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) and designated by the World Health Organization (WHO) as a pandemic, was reported on countries globally also high prevalent of COVID-19 pandemic infection among the medical staff in health centers. Medical staff are at risk of infection through their occupational exposure and inadequate use of personal protective equipment. Medical staff could also potentially spread the infection to both patients they are handling and the community at or around their household if they become ill. At least 150,000 medical staff were reported to be infected with SARS-CoV-2 worldwide and 1400 had died in the pandemic up until early May 2020 . Based on the healthcare profile in 2019, although the information on COVID-19 cases in medical staff was available through online media, the full extent of the COVID-19 burden among the medical staff workforce is underreported, especially during the first months of the pandemic.

Aim of the Study

To assessment the Knowledge, Attitude and Practice toward COVID-19 among the Population attending primary healthcare centers in Makkah Al-Mukarramah Saudi Arabia 2022.

Objectives:

To assessment the Knowledge, Attitude and Practice toward COVID-19 among the Population attending primary healthcare centers in Makkah Al-Mukarramah Saudi Arabia 2022

SUBJECTS AND METHODS

Study design:

This cross-sectional survey has been conducted among Population in the city of Makkah Al-Mukarramah. The study carried for 25 days, from the 1st till the 25 th of February 2022, among Saudi Population attend to the PHC centers in Makkah, participants aged between 18 and 20 years and <60, the study investigators will share the survey link in social media (Twitter, Whats App, Telegram channel) and through emails to their primary contacts

Study setting / study area:

Study participants have been recruited on Makkah Al-mukarramh including PHC centers under supervision of Directorate of Health Affairs of Makkah Al-Mukarramah in Saudi Arabia. The study has been carried out in the city of Makkah Al-Mokarramah, Makkah is the holiest spot on Earth. It is the birthplace of the Prophet Mohammad and the principal place of the pilgrims to perform

Umrah and Hajj. The most important cities in Saudi Arabian . It is the holy city for all Muslims, and is located in the western region. It is located in the western area in Kingdom of Saudi Arabia .Contains a population around 2.578 million.

Study population:

The study has been conducted among Population in the PHC centers in the Makkah Al-Mokarramah at Saudi Arabia. Including Al-Ka'akya, Al-Adl, Al-Zahir primary healthcare centers.

Selection criteria:

Inclusion Criteria :

- All Saudi people who are more than 20 years of age. A study participant has been recruited from Makkah Al-Mukarramah.

Exclusion criteria:

- Saudi younger than 18 years
- Participants who did not consent to participate in the study, and/or did not answer the questions of the study.
- Patients with language barriers.
- Saudi younger than 18 years

Study Sample:

The sample size has been calculated by applying Raosoft sample size calculator based on (The margin of error: 5%, Confidence level: 95%, and the response distribution was considered to be 20%) accordingly the Sample size is 300 of adult Saudi Population attending in PHC and adding 10 more to decrease margin of error. After adding 5% oversampling, the minimum calculated sample has been 300. Computer generated simple random sampling technique was used to select the study participants.

Sampling technique:

Systematic random sampling technique is adopted. By using systematic sampling random as dividing the total population by the required sample size; (300)

Data collection methods:

The self-administered questionnaire is designed based on previous studies and frameworks to assess

the Knowledge, Attitude and Practice toward COVID-19 among the Population attending primary healthcare centers.

The questionnaire was developed in English and was then translated into Arabic. The questions were first pre-tested and were revised and finalized after it was pilot tested. Before completing the survey, participants were required to indicate their consent using a forced response question followed by the survey questionnaires. The survey is estimated to take 5 min to complete.

To collect the information, a set of questions were constructed and developed.

The questionnaire consisted of two main sections; the first section focuses on Socio demographic and background information such as age, education level, outcome and gender of the participants.

Knowledge toward COVID-19 among the Population attending primary healthcare centers .Attitude and Practice toward COVID-19 among the Population attending primary healthcare.

Practice toward COVID-19 among the Population attending primary healthcare centers

Pilot study

Was carried out at the questions were first pre-tested and were revised and finalized after it was pilot tested. Before completing the survey, participants were required to indicate their consent using a forced response question followed by the survey questionnaires. This study has been conducted and all suggestions taken into consideration.

Data analysis

The Statistical Package for Social Sciences (SPSS) software version 24.0 has been used for data entry and analysis. Descriptive statistics (e.g., number, percentage) and analytic statistics using test for the association and the difference between two categorical variables were applied. A p-value \leq 0.05 has been considered statistically significant.

Ethical consideration:

- Permission from family medicine program was obtained.
- Permission from the regional Research and Ethical Committee was be given to conduct our study.
- All the subjects has been participate voluntarily in the study.
- Privacy of information and confidentiality has been maintained.
- Full explanation about the study and its purpose was carried out to obtain their participation.

Budget: Self-funded

Result**Table 1 . Socio-demographic characteristics of the studied population(n=300)**

		%
Age		
<35	84	28
35-45	126	42
>45	90	30
Gender		
Female	198	66
Male	102	34
Nationality		
Non-Saudi	60	20
Saudi	240	80
Marital status		
Single	72	24
Married	147	49
Widowed	36	12
Divorced	45	15
Occupation		
Technician	60	20
Nurse	147	49
Pharmacist	48	16
Physician	45	15
History of comorbidities		
Smoker	111	37
Hypertension	102	34
Diabetes mellitus	144	48
Lung disease	66	22
Specialty sectors and risk of infection		
High	216	72
Standard	84	28
Years of experience in clinic		

Under 1 year	78	26
1 - 5 years	102	34
6 - 10 years	57	19
11 - 15 years	33	11
< 20 years 262 7.250	30	10

Table 1 shows regarding the age majority of the study groups were in the age range of (35 - 45) years were (42.0%), regarding the gender most of the respondents were female (66.0%) while male were (34.0%), regarding the nationality most of the respondents were Saudi (80.0 %) while Non-Saudi were (20.0%), regarding the Marital status many of the respondents were Married (49.0 %) while Single were (24.0%), regarding the Occupation many of the respondents were nurse (49.0 %) while Technician were (20.0%). Regarding the History of comorbidities, the majority of the respondents had Diabetes mellitus were (48.0%), while Smoker were (37.0%) followed by Hypertension were (34.0%). Regarding the Specialty sectors and risk of infection the majority of them were (72.0%) while Standard were (28.0%), regarding the Years of experience in clinic the majority of them 1 - 5 years were (72.0%) while Under 1 year were (26.0%)

Table 2 Description of Frequency of COVID-19 pandemic infection among the medical staff in health centres

	N	%
appearance of Symptomatic at during working		
Yes	234	78
No	66	22
Number of times the medical staff was infected by COVID-19 during working		
Non	78	26
Once	135	45
More than one	87	29
Do you infected by COVID-19 over last few weeks		
Yes	111	37
No	189	63
Changed after Covid-19 starting		
Yes	225	75

No	75	25
If yes, the change was around:		
More	133	59.1
Less	76	33.8
I don't know	16	7.11
How much time do you spend work per day after infected and treatment by Covid-19		
Less than 1 hour	18	6
1 - 2 hour	57	19
3 - 5 hour	66	22
More than 5	159	53
COVID-19 positive cases that respondents have come in close contact with		
Patients within the working centre	30	10
Patients within the working unit	99	33
Colleagues within the working unit	171	57
Frequency of snacks between meals (chips, chocolate, sweets)		
Never	36	12
Always	111	37
Sometimes	105	35
Rarely	48	16
Do you have a family member diagnosed with COVID-19		
Yes	33	11
No	267	89
I am at risk of being infected with COVID-19		
Yes	237	79
No	63	21
Do you have Friend diagnosed with Covid-19		
Yes	87	29
No	213	71

Table 2 shows Frequency of COVID-19 pandemic infection among the medical staff in health centres. Regarding appearance of Symptomatic at during working majority of the study groups were in answer Yes were (78.0%) while No were (22.0%), regarding the Number of times the medical

staff was infected by COVID-19 during working most of the respondents once were (45.0%) while More than one were (29.0%), regarding you infected by COVID-19 over last few weeks most of the respondents were answer No were (36.0 %) while Yes were (37.0%), regarding the Changed after Covid-19 starting most of the respondents answer Yes were (75.0 %) while No were (25.0%), regarding yes, the change was around most of the respondents More were (59.1%) while Less were (33.0%). Regarding How much time do you spend work per day after infected and treatment by Covid-19 the majority of the respondents More than 5 were (53.0%), while 3 - 5 hour were (22.0%), regarding COVID-19 positive cases that respondents have come in close contact with the majority of the respondents colleagues within the working unit were (57.0%) while Patients within the working unit were (33.0%), regarding Frequency of snacks between meals (chips, chocolate, sweets) the majority of the respondents Always were (37.0%) while Sometimes were (35.0%), regarding Do you have a family member diagnosed with COVID-19 the majority of the respondents answer No were (89.0%) while Yes were (11.0%), regarding I am at risk of being infected with COVID-19 the majority of the respondents answer Yes were (79.0%) while No were (21.0%), regarding Do you have Friend diagnosed with Covid-19 the majority of the respondents answer No were (71.0%) while Yes were (29.0%).

Table 3 Distribution Occupational features of medical staff during the COVID-19 pandemic infection.

	N	%
Infection did likely occur while working		
Yes	228	76
No	72	24
Quantity and quality rating		
Adequate	109.2	36.4
Partially adequate	190.8	63.6
Number of intensive care unit beds during COVID-19 emergency at the workplace		
Increased	68.1	22.7
With increase in dedicated staffing	231.9	77.3
Without increase in dedicated staffing	0	0
Remained unaltered	0	0
Activation of local protocols for management of COVID-19 patients		
yes	246	82

No	54	18
Deaths related to COVID-19 occurred at the workplace		
Yes	18	6
No	282	94
The source of infection		
For patients	168	56
For work colleagues	96	32
For family members	36	12
Did you report the event of infected by COVID-19		
No	126	42
Yes	174	58
Workload over last few weeks with COVID-19 patient		
Decreased	9	76
Unaltered	36	12
Slightly increased	36	12

Table 3 shows Occupational features of medical staff during the COVID-19 pandemic infection. Regarding Infection did likely occur while working majority of the study groups were in answer Yes were (76.0%) while No were (24.0%), regarding the Quantity and quality rating most of the respondents Partially adequate were (63.0%) while Adequate were (36.4%), regarding Number of intensive care unit beds during COVID-19 emergency at the workplace most of the respondents with increase in dedicated staffing were (77.3 %) while increased were (22.7%), regarding Activation of local protocols for management of COVID-19 patients most of the respondents answer Yes were (82.0 %) while No were (18.0%), regarding yes, Deaths related to COVID-19 occurred at the workplace most of the respondents answer No were (94.0%) while Yes were (6.0%). Regarding the source of infection the majority of the respondents For patients were (56.0%), while For work colleagues were (32.0%), regarding you report the event of infected by COVID-19 the majority of the respondents answer Yes were (58.0%) while No were (42.0%), regarding workload over last few weeks with COVID-19 patient the majority of the respondents decreased were (76.0%) while Unaltered and Slightly increased were (12.0%).

Figure (1) Occupational features of medical staff during the COVID-19 pandemic infection.

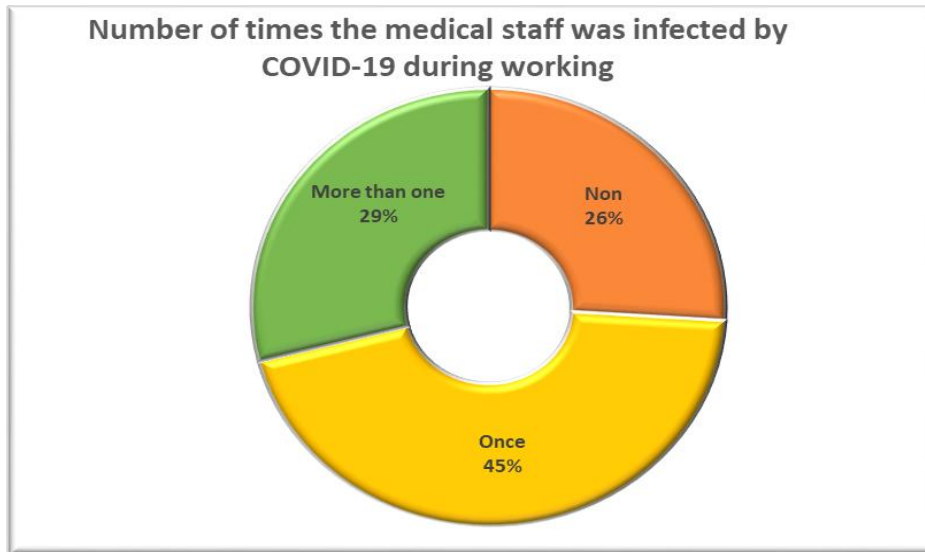


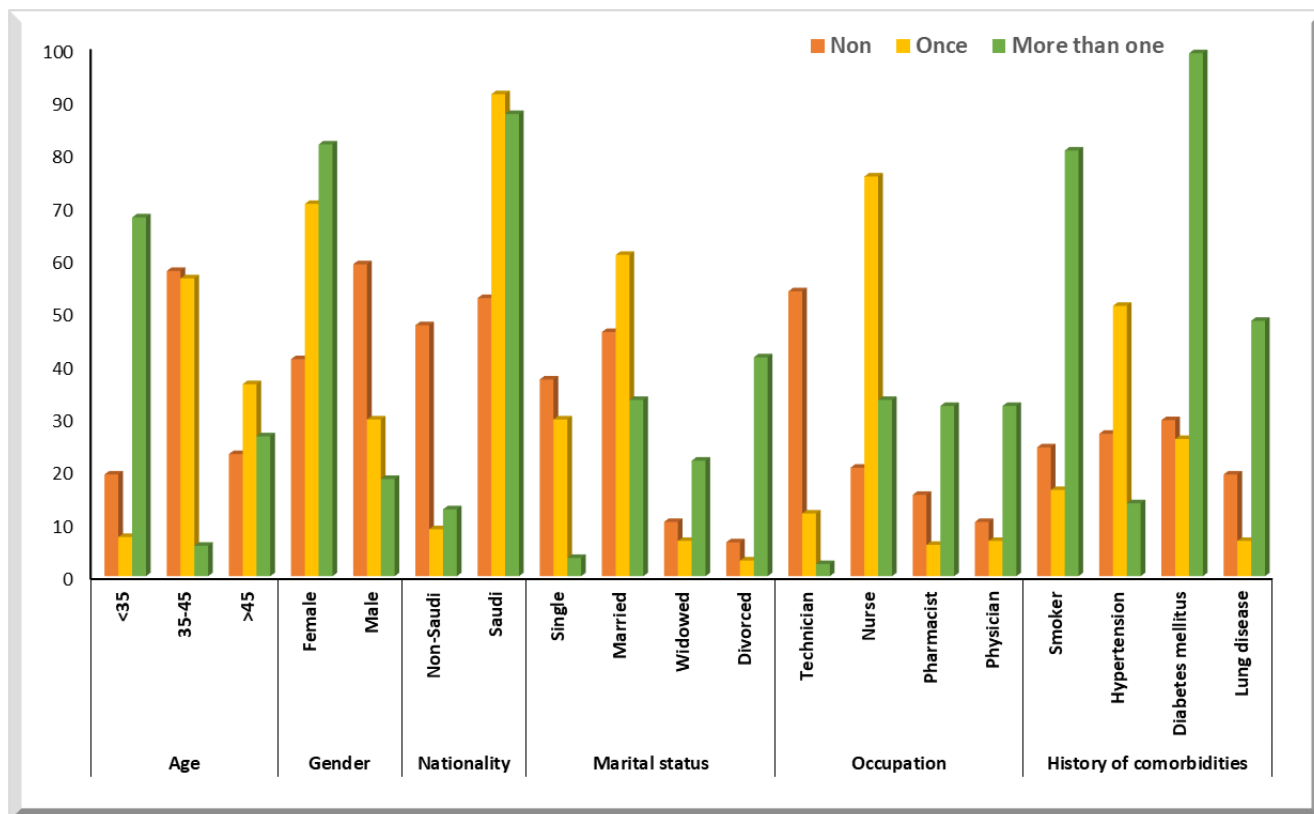
Table 4 Distribution of the relation of number of times medical staff was infected by COVID-19 during working and Socio-demographic characteristics of participated.

		Non (n=78)		Once (n=135)		More than one (n=87)		Chi-square	
		N	%	N	%	N	%	X ²	P-value
Age	<35	15	19.23	10	7.41	59	67.82	113.611	<0.001*
	35-45	45	57.69	76	56.30	5	5.75		
	>45	18	23.08	49	36.30	23	26.44		
Gender	Female	32	41.03	95	70.37	71	81.61	32.275	<0.001*
	Male	46	58.97	40	29.63	16	18.39		
Nationality	Non-Saudi	37	47.44	12	8.89	11	12.64	50.055	<0.001*
	Saudi	41	52.56	123	91.11	76	87.36		
Marital status	Single	29	37.18	40	29.63	3	3.45	98.677	<0.001*
	Married	36	46.15	82	60.74	29	33.33		
	Widowed	8	10.26	9	6.67	19	21.84		
	Divorced	5	6.41	4	2.96	36	41.38		
Occupation	Technician	42	53.85	16	11.85	2	2.30	146.863	<0.001*
	Nurse	16	20.51	102	75.56	29	33.33		
	Pharmacist	12	15.38	8	5.93	28	32.18		
	Physician	8	10.26	9	6.67	28	32.18		
History of comorbidities	Smoker	19	24.36	22	16.30	70	80.46	95.965	<0.001*
	Hypertension	21	26.92	69	51.11	12	13.79		
	Diabetes mellitus	23	29.49	35	25.93	86	98.85		
	Lung disease	15	19.23	9	6.67	42	48.28		

Table 5 show distribution of the relation of number of times medical staff was infected by COVID-

19 during working and Socio-demographic characteristics of participated. Regarding the age the most of participants in non-increase in age 35-45 were non (57.69%) in (n=78) followed by once were (56.30%) in (n=135) but more than one were (67.82%) in (n=87) while heave a significant relation were P-value <0.001 and X^2 113.611, regarding the Gender the most of participants non increase in male in non were (58.97%) in (n=78) followed by more than one were (81.61%) in (n=87) while heave a significant relation were P-value <0.001 and X^2 32.275, regarding the Nationality the most of participants non increase in Saudi in non were (52.56%) in (n=78) followed by once were (56.30%) in (n=135) were (91.11%) heave a significant relation were P-value <0.001 and X^2 50.055, regarding the Marital status the most of participants non increase in married once were (60.74%) while heave a significant relation were P-value <0.001 and X^2 98.677, regarding the Occupation the most of participants non increase in Technician in non were (53.85%) in (n=78) followed by more than one in nurse were (75.56%) in (n=87) while heave a significant relation were P-value <0.001 and X^2 146.863, regarding the History of comorbidities the most of participants increase in Diabetes mellitus in more than one in nurse were (98.85%) in (n=87) while heave a significant relation were P-value <0.001 and X^2 95.965.

Figure (2) Distribution of the relation of number of times medical staff was infected by COVID-19 during working and Socio-demographic characteristics of participated.



Discussion

The purpose of this study was to Impact of frequency of COVID-19 pandemic infection among the medical staff in health centers in Makkah Al-Mokarramah , Saudi Arabia2022.

A recent study reported COVID-19 infection 150,000 of medical staff globally by early May, most likely underestimated due to a lack of official data in most countries (27). Currently, data on infection rates of medical staff, which is critical to improving infection control and prevention measures, are limited – particularly from the Saudi Arabia, where most data is only available online (28) . The clinical spectrum of COVID-19 is reported to vary from asymptomatic or mild symptomatic infections to severe respiratory symptoms and death, with older age groups generally presenting with more severe disease and higher death rates (29). Our results shows regarding the age majority of the study groups were in the age range of (35 - 45) years were (42.0%), the gender most of the respondents were female (66.0%), regarding the nationality most of the respondents were Saudi (80.0 %) , regarding the Marital status many of the respondents were Married (49.0 %) , regarding the Occupation many of the respondents were nurse (49.0 %) . Regarding the History of comorbidities, the majority of the respondents had Diabetes mellitus were (48.0%). Regarding the Specialty sectors and risk of infection the majority of them were (72.0%) , regarding the Years of experience in clinic the majority of them 1 - 5 years were (72.0%) while Under 1 year were (26.0%)(See table 1)

Medical staff workers cases accounted for 16% of all COVID-19 cases in Saudi Arabia (23) COVID-19 among the middle age group(<35) was very high (67.82%). This high level could be relate to the differences in contact patterns in different age groups, or to the differences in the age distribution of the population, which could affect the rate in each age group (30) The present findings point out that male medical staff reported positives COVID-19 result tests more than the female medical staff. This could explain by the fact demonstrated (31) where it shows that there is an effect of sex hormones, estrogen, and testosterone, on the respond and engagement of the immune system (22) In our study reported that present findings point out that female medical staff reported positives COVID-19 result tests more than the male medical staff. This could explain by the fact demonstrated (18)

In our study Behavioral and cultural characteristics could also play a role in the incidence a significant relation of COVID-19 among males or females. For instance, smoking is considered as a significant contributor to the severity of COVID-19. The smoking rate in many countries like China, Italy, and the US is much higher in men than in women. Similar gender-specific trends also present in Saudi Arabia show men are more likely to smoke than women, where 16% of smokers are men as compared to 2% of women (21,22).Most of the infected HCWs were non-Saudi (55%).

This is due to the number of non-Saudi medical staff in Saudi Arabia whereby the year 2019 has accounted for more than half of the total health care workforce (52%) (11).

Conclusion

our study highlighting Incidence rates among COVID-19 infected medical staff in Saudi Arabia. The study finding regarding infected medical staff characteristics were relatively similar to the previous findings from other studies. Findings support governments, healthcare leaders and health policy makers to look at the best precaution to protect medical staff on the assumption of a re-rising of the pandemic. This is necessary to decrease the spread into the community, and to ensure both a healthy functioning society and healthcare system. Further clarification and intervention studies investigating COVID-19 risk factors among medical staff in Saudi Arabia are necessary to support our observational findings and help to improve our understanding of the measures needed to reduce COVID-19 transmission among medical staff, especially the kind of transmission “from medical staff to another”.

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