PHYSICIANS CONCERNS TOWARD COVID-19 VACCINES

By

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Abstract

Introduction: Vaccination is a successful method of controlling infectious viral diseases, which may play a major role in virus spread limitation. **Aim of Work:** To assess the concerns of Egyptian physicians towards COVID-19 vaccines and its associating factors. **Materials and Methods:** A cross-sectional study was conducted on 1026 Egyptian physicians; through a self-administered questionnaire covering socio-demographic data and physician concerns toward COVID-19 vaccine was used. **Results:** Among 1026 studied physicians (their age ranged from 25 to 57 years, with a mean of 39.46±10.17), 58.7% were male and 56.8% were from an urban residence. More than half of physicians (56.9%) worked at a secondary care level and 21.7% of them worked at a tertiary care level, 48.8% of participants were specialists and 19.3% were consultants. The mean duration of work experience was 12.94 ±7.54 and ranged from 2 – 25 years. Nearly half of the participants (49.8%) had COVID 19 disease before. Most of the studied physicians (74.9%) did not attend COVID-19 vaccine awareness campaigns. Binary logistic regression analysis showed that the significant independent predictors of high concern score were working in a COVID-19 isolation unit, work experience more than 10 years, history of COVID 19 infection, and attending vaccine awareness campaigns (odds ratio, 3.15, 2.0, 2.88 & 3.5 respectively). **Conclusion:** Healthcare workers' concern score toward COVID-19 vaccine is of prime importance as it drives them to accept or refuse to take the vaccine and HCWs were considered as a confident source of health information and advice to the public. The modifiable factor that improves vaccine concern was attending COVID-19 awareness campaigns about COVID-19 vaccine, so continuing and increasing awareness campaigns about COVID 19 vaccine is warranted.

Keywords: COVID-19 vaccine, Physician concern, Work experience years, and Isolation unit.

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and resultant coronavirus disease 2019 (COVID-19) have developed rapidly into a pandemic, which requires rapidly changing messages about public health and take immediate actions to minimize the risk of spread of the virus (Acter et al., 2020) . This global crisis has also been marked by the distribution of false information regarding the nature and spread of COVID-19, leading to public confusion and inaction (Ioannidis, 2020).

The virus affected every country across the whole world and the number of deaths continues to increase rapidly, as on January 3rd , 2021, over 83.3 million cases and over 1.8 million deaths have been reported globally (WHO, 2020). In Egypt, it was reported that the confirmed COVID-19 cases were 140,878 cases with 7,741 deaths (WHO, 2020).

Since health care workers (HCWs) assist in the management of this pandemic, the fact that they are at high risk of infection in the disease chain is a critical problem.As a result, all possible preventive measures must be taken to prevent the infection from spreading to HCWs (Sim, 2020). The World Health Organization (WHO) had listed HCWs, as a priority group for COVID-19 vaccination (WHO, 2021).

Preventive measures as social distancing and quarantine play a crucial role in virus spread limitation; it may not be sufficient to completely minimize the spread of COVID-19, herd immunity gained by infection or by vaccination will need to be experienced by the general population (Fu et al., 2020). Vaccination is the most successful method of controlling infectious viral diseases, but individual and groups who choose to postpone or reject vaccines put vaccine effectiveness at risk (Paterson et al., 2016).

There are more than 50 COVID-19 vaccine candidates in trials. WHO is collaborating with businessmen, scientists, and health organizations through the ACT Accelerator (The Access to COVID-19 Tools Accelerator) to hasten the response to this viral pandemic. When a safe, effective and economic vaccine is found, COVAX (led by World Health Organization(WHO), The Global Alliance for Vaccineand Immunization (GAVI), and Coalition For Epidemic

Preparedness Innovations(CEPI) will facilitate the ultimate access and distribution of these vaccines to protect people in all countries specially those at high risk. This should be conducted in parallel with continuing the essential public health measures to inhibit disease transmission and decrease mortality fromCOVID-19 (WHO, 2020).

Several studies revealed that the factors which are responsible for a new vaccine acceptance; included the safety and effectiveness of the vaccine. Adverse health events, misconceptions about the need for vaccination, lack of trust in the health authorities and the lack of knowledge among the general population affect negatively the vaccine acceptance (Al-Mohaithef and Padhi, 2020).

Vaccine hesitancy refers to refusal or delay in acceptance of new vaccines despite the availability of vaccination services. Vaccine hesitancy is noticed among HCWs including physicians, nurses, and assistant nurses (Neumann-Böhme et al., 2020 and Wilson et al., 2020). Misinformation leading towards vaccine hesitancy could put public health at risk in responding to the current global crisis (Killian et al., 2016).

Aim of Work

To assess the concern of Egyptian physicians towards COVID-19 vaccines and its associating factors.

Materials and Methods

Study design: It is a cross-sectional study

Place and duration of the study: This study was conducted in the Department of Public Health and Community Medicine, Faculty of Medicine, Menoufia University, Menoufia, Egypt ; during the period from 1st to 31st January 2021. **Study sample:** It is composed of1026 participants. **Study Methods:** Self- administered anonymous questionnaire was prepared by the authors. It had been distributed online as a Google form through different social networks including Facebook and e-mails.

The questionnaire consisted of two parts:

The first part: included socio-demographic data like age, sex, residence, professional degree, work of experience years, and workplace also included another two questions which asked about previous COVID-19 infection and attendance of COVID-19

vaccine awareness campaign.

The second part: included nine questions on physician concern towards the COVID-19 vaccine. All items within the second part were answered using a 1- 5-point Likert scale responses scored from 1-5 with a complete score range from 9 – 45, where: Strongly don't agree=1, Don't agree =2, To some extent =3, Agree=4 and Strongly agree=5. The points were summed for every participant and the higher the score, the higher the priority.

The validity of this questionnaire was established by a panel of experts which included two epidemiologists and two infection control experts. Questionnaire reliability was tested by a pilot study on 55 participants (who were later excluded from the study) aiming at addressing any correction or additions needed. The estimated Cronbach's alpha was 0.80.

Consent

All the participants were volunteers and the confidentiality of their data was ensured, it would be used only for research purposes. Written informed consent was obtained from all participants before answering the questionnaire.

Ethical Approval

The study was approved by the Research ethics committee, Faculty of Medicine, Menoufia University (MNF.COM, 12/2020), following the declaration of Helsinki (as revised in 2000).

Data Management

Data were analyzed by Statistical Package for Social Science (SPSS) version 23 (IBM Corp., Armonk, N.Y., USA). Quantitative data were presented as mean, standard deviation (SD), and range, while qualitative data were expressed as numbers (No.) and percentages (%). Student t-test was used for comparison between two groups having normally distributed quantitative variables and ANOVA test (F) was used for 3 or more groups. The median of physicians' concern score was calculated to classify the group into low and high-level groups which were used as an outcome variable during a binary logistic regression model to specify the independent factors that affect high physicians' vaccine concern, the danger was estimated by odds ratio alongside their 95% CI. A p value less than 0.05 was considered statistically significant.

Results

Table (1): Socio-demographic characteristics of the studied physicians.

Parameters	The studied participants No = 1026	
Age (years)		
Mean ±SD	39.46±10.17	
Range	25 – 57	
	No	**%**
Sex		
Male	602	58.7
Female	424	41.3
Residence		
Urban	583	56.8
Rural	443	43.2
Work place		
COVID -19 Isolation health facility	777	75.7
Ordinary health facility	249	24.3
Professional degree		
Resident	327	31.9
Specialist	501	48.8
Consultant	198	19.3
Work Experience /years		
Mean ±SD	12.94±7.54	
Range	2 – 25	
Experience /years		
≤10 years	657	64.0
> 10 years	369	36.0
History of COVID-19 disease		
Yes	511	49.81
NO	515	50.19
Attendance of awareness campaigns towards COVID 19 vaccine		
Yes	257	25.05
NO	769	74.95

SD = standard deviation

Table (1) showed that among 1026 studied physicians, the mean age was 39.46±10.17 ranging from 25 to 57 years, 58.7% were male physicians and 56.8% were from an urban residence, 48.8% of the participants were specialists and 19.3% were consultants. The mean work experience duration was 12.94 ±7.54 and ranged

from 2 – 25 years. Nearly half of the participants (49.8%) had COVID 19 disease before. Most of the participating physicians (74.9%) did not attend awareness campaigns towards COVID 19 vaccine.

Table (2): Response of the studied participants to questions related to physician concern towards COVID-19 vaccine.

Parameters	Strongly agree	Agree	To some extent	Do not agree	Strongly do not agree
The COVID 19 vaccine is safe	159 (15.5%)	213 (20.8%)	377 (36.7%)	160 (15.6%)	117 (11.4%)
The COVID 19 vaccine is effective	139 (13.5%)	295 (28.8%)	335 (32.7%)	217 (21.2%)	40 (3.9%)
Side effects of the vaccine is not very dangerous	166 (16.2%)	235 (22.9%)	325 (32.7%)	171 (16.7%)	129 (12.6%)
You will take the vaccine if available	116 (11.3%)	406 (39.6%)	267 (26.0%)	97 (9.5%)	140 (13.6%)
Recommending relatives and friends to take the vaccine	116 (11.3%)	426 (41.5%)	228 (22.2%)	96 (9.4%)	160 (15.6%)
Considering comics about COVID 19vaccine not true	313 (30.5%)	445 (43.4%)	200 (19.5%)	44 (4.3%)	24 (2.3%)
Comics about COVID 19 vaccine from physicians cause mess among public	413 (40.3%)	207 (20.2%)	406 (39.6%)	0 (0.0%)	0 (0.0%)
There should be more awareness campaigns about COVID 19 vaccine	370 (36.1%)	288 (28.1%)	245 (23.9%)	99 (9.6%)	24 (2.3%)
Social distance and wearing masks are not good alternative to the vaccine	256 (25.0%)	342 (33.3%)	240 (23.4%)	115 (11.2%)	73 (7.1%)

Table (2) revealed that about 36.3% of participants believed that the COVID-19 vaccine is safe and 42.3% of them assumed that it is effective, 39.1% of the participants stated that the side effects of the vaccine are not dangerous, 50.9% of them declared that they would take the vaccine if available, 52.8% will recommend relatives and friends to take the vaccine, 73.9% considered that comics about the vaccine are not true, 60.5% that comics cause mess among the public, 64.2% that

there should be more awareness campaigns towards COVID-19 vaccine and 58.3% that social distancing and wearing masks are not a good alternative to the vaccine respectively.

Table (3): Relation between concern to COVID-19 vaccine score and different socio-demographic parameters among the studied physicians.

Parameters	Physician concern to COVID-19 vaccine	Test of significance	p value
Age/ years			
≤40	31.16±4.75	6.59	**<0.001***
>40	33.07±4.47		
Sex			
Male	32.39±5.17	1.71	0.09
Female	31.51±3.66		
Residence			
Urban	32.28±5.17	1.38	0.168
Rural	31.87±4.18		
Work place			
COVID -19 Isolation health facility	32.95±4.96	3.66	**<0.001***
Ordinary health facility	31.65±4.61		
Professional degree			
Resident	31.8±5.0	3.0	0.52
Specialist	32.74±3.76		
Consultant	32.16±4.73		
Experience / years			
≤10	31.80±4.77	4.64	**<0.001***
>10	33.23±4.68		
Previous history COVID-19 disease			
Yes	33.56±4.58	9.82	**<0.001***
NO	31.01±4.35		
Attendance of awareness campaigns			
Yes	34.70±5.64	18.65	**<0.001***
NO	29.90±2.53		

The data is described as Mean± Standard Deviation   *: Statistically significant

Table (3) showed that physicians who were above 40 years, and those who were working at a COVID-19 isolation units, working as a specialist, having COVID 19 before, and attending awareness campaigns about COVID 19 vaccine had statistically significant higher mean concern score about COVID 19 vaccine than others.

Table (4): Binary logistic regression analysis for independent factors affecting physician concern towards COVID-19 vaccine

	SE	Wald X^2	p value	Odds ratio	95% CI
Age /years	0.02	1.33	0.25	1.13	0.56 – 1.55
Experience /years	0.15	2.1	**0.04***	2.0	1.3 – 7.88
Work place	0.17	2.56	**0.009***	3.15	2.1 – 11.45
History of COVID-19 infection	0.52	2.33	**0.01***	2.88	1.9 – 15.6
Attendance of awareness campaigns	0.45	2.76	**0.005***	3.5	2.2 – 14.58

SE = standard Error   X2 = Chi square   CI = Confidence interval
*: Statistically significant

Table (4) showed that binary logistic regression analysis revealed that the significant independent predictors of high concerns score were working in a COVID-19 isolation unit, experience years more than 10 years, history of COVID 19 infection, and attending vaccine awareness campaigns (odds ratio, 3.15, 2.0, 2.88 & 3.5 respectively).

Discussion

The WHO and the Centers for Disease Control and Prevention (CDC) have identified HCWs as a high-risk group for COVID-19 disease and have given the priority to HCWs to be vaccinated against the virus for their safety (CDC, 2020).The acceptance of COVID-19 vaccine in general community is triggered by acceptance and good attitude of healthcare workers towards the vaccine (El-Elimat et al., 2020).

The mean age of the studied participants was 39.46±10.17, 58.7% were male physicians and 56.8% were from an urban residence. About 48% of the participants were specialists and 19.3% were consultants. The mean work experience duration was 12.94 ±7.54. Nearly half of the participants (49.8%) had COVID 19 disease before. Most of the participating physicians (74.9%) did not attend awareness campaigns towards COVID 19 vaccine (Table 1).

The results of the present work revealed that 49.81% of the studied physicians experienced a history of COVID-19 symptoms (Table 1). Sabetian et al., 2021 detected that 5.62% of their studied group of HCWs in Iran had COVID-19 infection (PCR confirmed cases). While Stock et al, 2020 documented 19.4% COVID-19 infection among asymptomatic healthcare workers in USA (diagnosed by RT-q PCR and/or ELISA) and Alajmi et al., 2020 noted 10.6% tested positive through the electronic health records and employment records in Qatar. All these results were very low in comparison to the results of the current study .The high percentage of COVID -19 infection rate among health care workers in the present study could be due to the difference in method of diagnosis as the mentioned study documented the rate of confirmed lab tested infections while in the current work we considered both laboratory and clinically confirmed cases due to unavailability and high cost of PCR tests in Egypt.

About attending awareness cessions towards COVID-19 vaccine; 25.05% of the studied group did it (Table 1). This comes in line with CDC recommendations that training about awareness cessions towards COVID-19 vaccine must be ongoing as new COVID-19 vaccines become available as it increases its acceptability (Dooling et al., 2020). So the awareness campaign should be extended.

In the current study, 50.9% of the studied physicians stated that they would take the vaccine if available and 26% probably agree to take it (Table 2).A comparable study done in France found that 77.6% of participants "probably agreed" to get vaccinated against COVID-19 (Detoc et al., 2020). Another study carried out by Kabamba Nzaji et al., 2020 in their work on acceptability of vaccination against COVID-19 among healthcare workers in the Democratic Republic of Congo; they found that only 28% of the participants would get COVID-19 vaccine if it is available. Recently, another low acceptance level was observed by Shekhar et al, 2021 in their work on COVID-19 vaccine acceptance among health care workers in the United States; and declared that 36% of respondents were intended to receive the vaccine when available while 56% documented that they would wait to see more data results about vaccination. Also, in Saudia Arabia,

Qattan et al., 2021 detected that 340 participants (50.5%) were willing to take the vaccine out 673 health care workers in Saudi Arabia.

Also, Gadoth et al., 2020 who conducted a study among health care workers in Los Angeles and showed that 47.3% of respondents reported unwillingness to participate in a coronavirus vaccine trial, and 66.5% of them intend to postpone vaccination.

The low acceptance to get the COVID-19 vaccine if it was available in the previously mentioned studies (Kabamba Nzaji et al., 2020; Gadoth et al., 2020 and Shekhar et al., 2021), was explained by the harm of social networks and spread of misinformation which was clarified by WHO as an infodemic (excessive amounts of misinformation and rumors that make it difficult to find trust worthy sources of information) (Barua et al., 2020). So, it is important to generate true information about safety and effectiveness of vaccine to control vaccine hesitancy and increase its acceptance.

In the same line, the current work revealed that most of the participants (73.9%, 60.5%) considered comics about the vaccine are not true, these comics causing a mess among the public (Table 2). Misinformation spread through many channels and media could have a deleterious effect on the acceptance of a COVID-19 vaccine (Cornwall, 2020).

In the present study, 52.8% will recommend relatives and friends to take the vaccine (Table 2). Healthcare worker recommendations play a critical role in their patients' vaccination behavior, as they serve as trustable source of information for the public and their consultation can influence patients' decision to be vaccinated or not (Gostin et al., 2020).

Awareness campaigns towards COVID-19 vaccine were confirmed by (64.2%) of the participants (Table 2). According to Kabamba Nzaji et al., 2020; there is an urgent need for increasing awareness and addressing concerns regarding the acceptance of a COVID-19 vaccine. Otherwise, there will be an inevitable chance of mass rejection of the COVID-19 vaccine among the general population when a vaccine becomes already available. Previous infectious disease outbreaks, and public health crises, such as HIV, H1N1, SARS, MERS, and Ebola, have taught us that credible sources of knowledge and guidance

are fundamentals to disease control (Siegrist et al., 2014).

In the present study male physicians, those above 40 years, and those who are working at COVID-19 isolation units, working as a specialist, having COVID 19 before, and attending awareness campaigns about COVID 19 vaccine had statistically significant higher mean concern score about COVID 19 vaccine than others (Table 3).Similar results were noted by Petek, and Kamnik-Jug, 2018 who stated that vaccine awareness and acceptance increase with increasing risk of infection at the workplace, also they declared a positive relation between age and vaccine awareness.

Also Petravic et al., 2021in Slovenia and Qattan et al., 2021 in Saudi Arabia revealed that higher COVID-19 vaccine acceptance was associated with older participants, male, who perceived high risk of infection and among those who was newly hospitalized or had relatives died from COVID-19.

The current work showed that long experience duration, working in a COVID-19 isolation unit, history of COVID 19 infection, and attendance of awareness campaigns are independent predictors for high concern of physician toward COVID-19 vaccine (Table 4).This was in accordance with Szmyd et al., 2021who done similar study in Poland and reported post-COVID syndrome and deterioration of their own health , or one of family members and detailed information about experiences with COVID-19 were the main COVID-19-related concerns among all participants. Also Kabamba Nzaji et al., 2020 reported that attendance lectures/discussions about COVID-19 were significantly associated with the COVID-19 vaccine acceptance as well as the participant's age and the presence of higher risk for contracting infection. While Shekhar et al., 2021 found that vaccine acceptance increased with the increasing age, education, and income level.

Studies that were conducted in the USA documented different factors affecting vaccine acceptance, as the current political climate in the USA, fast-tracked vaccine development and queries about vaccine safety and effectiveness (Gadoth et al., 2020).

A survey on USA adults showed that participant characteristics associated with a negative attitude towards COVID-19 vaccine were being younger than 60 years, female gender, having lower educational level, and

more likely to live in rural areas (Fisher et al., 2020).

A pioneer meta-analysis carried by Wang et al, 2018 on 11 studies with a total of 8847 HCWs, five studies were conducted in Europe, three studies in Asia, two studies in Africa, and one study in North America (USA) (Wang et al., 2018).The overall proportion of HCWs that intent to accept COVID-19 vaccination was 55.9% (95% CI: 43.6-67.9%) with a wide range among studies from 27.7% to 81.5%. The intention of HCWs to accept COVID-19 vaccination was higher in studies that were conducted in Europe. The following factors were associated with increased HCWs' willingness to get vaccinated against COVID-19: male gender, older age, physician profession and less work experience (Wang et al., 2018).

Two previous reviews regarding influenza vaccination (Huang, 2020) and hepatitis B vaccination (Auta et al., 2018) did not find any relation between gender and vaccination coverage.

Conclusion

Healthcare workers' concern score toward COVID 19 vaccine is of prime importance as it drives them to accept or refuse to take the vaccine .HCWs were considered a confident source of health information and advice, the modifiable factor that improves vaccine concern was attending awareness campaigns about COVID 19 vaccine, so continuing and increasing awareness campaigns about COVID 19 vaccine is urgently recommended.

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