




Original Research

Depression, anxiety and stress after COVID-19 vaccination: A retrospective cross-sectional study among health care providers

Luma M. Al-Obaidy , Heba M. Attash , Harith Kh. Al-Qazaz 

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Abstract

Background: Corona virus disease (COVID-19) is a health concern that produced considerable psychological and physical health challenges to Health care providers (HCPs) internationally. **Aims:** This study aims to determine the level of depression, anxiety, and stress after receiving the COVID-19 vaccine among HCPs in Iraq. **Methods:** A retrospective cross-sectional study design was used in this study. The participants involved were 700 Iraqi HCPs who received one or two doses from COVID-19 vaccines. The questionnaire was designed and brought to them electronically using Google form and distributed by social media. Then mental health status was measured using a specific depression, anxiety and stress scale named DASS-21. Each domain of the DASS scale was calculated for each subject and DASS-21 scores were compared between different demographic groups. **Results:** Females represented a large percentage of participants (80%). The majority of participants had a normal level of DASS-21 after receiving the vaccine. Higher scores were obtained among graduated young age groups also among individuals who have side effects associated with the vaccine. **Conclusions:** To the best of our knowledge, this is the first study that assesses mental health after receiving the COVID-19 vaccine in the middle east. The study concluded that HCPs have low DASS-21 scores and this gives us promising results for the use of the COVID-19 vaccine in future.

Keywords: COVID-19; vaccine; stress; anxiety; depression; health care providers

INTRODUCTION

In December 2019, China reported the first case of a new COVID-19 and since that time a large number of people all over the world were infected.¹ This rapid spread of the disease around the world prompts the World Health Organization (WHO) to declare that COVID-19 was a pandemic disease in March 2020.² The exponential increase of COVID-19 cases with a high mortality rate produces a wide range of harmful health problems from both physical and psychological aspects like fear of the unknown, stress, depression and anxiety in general populations as well as HCPs.³ Many preventive approaches like social isolation, lockdown, using facemasks, and travel limitations were undertaken by the governments to prevent the spread of this disease due to the lack of vaccines or effective therapeutic alternatives.⁴ Despite these interventions, the spread of disease was uncontrolled and the presence of an effective and relatively safe vaccine is perhaps the only hope to save the world from this disaster.² In December 2020, the COVID-19 vaccine was licensed by the Food and Drug Administration (FDA) for emergency use in individuals over 16 years old.⁵ Lifestyle changes highly affect the mental health

of individuals during the pandemic. After months of adjusting to new situations, we have to make decisions on COVID-19 vaccines, which may cause anxiety, stress, or even other responses.⁶ Pfizer vaccine works by interfering with the virus's mRNA, to become inactive.⁷ AstraZeneca, on the other hand, impacts the virus S protein by employing adenovirus from replication-deficient chimps like a vector used by the virus to create inert S protein.⁸ Sinopharm was an inactivated Chinese vaccine made from viruses handled by physicochemical methods to minimize their pathogenicity.⁹ Antibodies towards attenuated viruses would be formed to prepare the immune system for future attacks.¹⁰ Because HCPs are more vulnerable to biological risks in their daily work, immunization protocols established by various governmental institutions around the world recognized them as the first group to receive the vaccine.² Acceptance of people to get the vaccine depends on their beliefs of the vaccines' hazard and benefit as well as on their trust in immunization.¹¹ Insufficient understanding of the immunization's benefit-to-risk ratio may affect the success of the vaccination process.⁷ Regarding efficacy, initial results were obtained and demonstrated that the efficacy of Pfizer and AstraZeneca vaccines are 95% and 62%, respectively.¹² There were some reported adverse events related to vaccine after it had been licensed and approved like fever, redness, swelling at the site of injection and anaphylactic reactions.¹³ Behavioral and psychological factors are key determinants of the immune system's response to many different types of vaccines, especially the COVID-19 vaccine (since it is an emergency vaccine and little information were provided about its efficacy and safety) and these factors have a negative impact on vaccine response.¹² Unfortunately, many of these psychological factors (like stress) resulted from COVID-19 itself.¹⁴ People had been anxious about the dangers and risks of vaccination since the

Luma M. AL-OBAIDY*. MSc. Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Ninevah 81011, Iraq. l.m.saadallah@uomosul.edu.iq

Heba M. ATTASH. MSc. Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Ninevah 81011, Iraq. heba.attash@uomosul.edu.iq

Harith Kh. AL-QAZAZ. PhD. Department of Clinical Pharmacy, College of Pharmacy, University of Mosul, Ninevah 81011, Iraq. al_qazaz73@uomosul.edu.iq



beginning of vaccine manufacture.⁷

Wang et al., 2021 compared anxiety, depression, and stress related to COVID-19 infection using the DASS-21 scale in seven Asian countries, they identified protective and risk factors associated with mental health in these countries. The highest score was in Thailand, whereas Vietnam had reported the lowest score.¹⁴ In a study conducted by Szmyd et al., 2021, they compared anxiety, stress and depression between HCPs and the control group in aspect regarding willingness to get the COVID-19 vaccine. The results showed that depression among HCPs was higher but there were no significant differences in anxiety and stress level between the two groups.²

Iraq like the rest of the world was affected by COVID-19. The first incidence was recorded in February 2020, and the number of infected individuals increased subsequently. Despite these challenges, Iraq made significant measures to counteract COVID-19, one of which was the approval of COVID-19 vaccines for urgent use by Iraqi citizens particularly HCPs in March 2021. Sinopharm was introduced initially followed by AstraZeneca then Pfizer. Among the three available vaccines, Pfizer was the most commonly used one in all Iraqi cities.

According to studies performed in Japan and USA. Mental health was improved after vaccination with the COVID-19 vaccine.^{15,16}

To our knowledge, there were limited studies about the impact of the COVID-19 vaccine on the mental health status among HCPs all over the world. The current study aims to determine the level of depression, anxiety and stress experienced by HCPs after receiving the COVID-19 vaccine using an online survey.

METHOD

Study design and participants

A cross-sectional (online survey) study was conducted in a retrospective method. From June 18 to June 29, 2021, a self-administered online questionnaire designed in Google form was available. The settings were adapted so that each member could only send one response. The questionnaire was distributed to many organizations via social media, and other internet channels (mainly Facebook and Telegram).

Participants of vaccinated Iraqi HCPs were recruited in the study with convenience sampling methods (N = 700). Healthcare providers is a broad term that includes all people working in health institutions. In this study physicians, dentists and pharmacists who were vaccinated with one of the COVID-19 vaccines (Sinopharm, AstraZeneca and Pfizer) were included. Individuals with chronic psychiatric disorders, non-vaccinated HCPs and individuals other than HCPs were excluded from the study.

Measurement tools

The designed questionnaire was written in the Arabic language. It consisted of two sections.

The socio-demographic section and DASS-21 scale.

Socio-demographic section: The first section of the questionnaire asked about participants' gender, age, graduation level, job, years of experience, vaccination (type and status), whether vaccine associated with symptoms or not, the onset of symptoms (after first or second dose), previous infection with COVID-19 and use of glucocorticoids.

Depression, anxiety and stress scale: The second section included the DASS-21 scale, which is a specific scale consisting of three domains for depression, anxiety and stress. It is 21 items questionnaire: depression (items: 3, 5, 10, 13, 16, 17 and 21), anxiety (items: 2, 4, 7, 9, 15, 19 and 20), and stress (items: 1, 6, 8, 11, 12, 14 and 18) This scale is the shortened version of the original DASS-42¹⁷. The Arabic version of DASS-21 was obtained from Moussa et al., 2017 by sending an electronic mail to the corresponding author.¹⁸ Each question's response of the DASS-21 scale was scored: from 0 "did not apply to me at all" to 3 "applied to me most of the time". Scores were summed for each domain and then multiplied by 2 to be comparable to the original DASS-42. The highest scores indicated severe depression, anxiety and/or stress symptoms. The interpretation of depression subscale as follows: normal (0-9), mild (10-13), moderate (14-20), severe (21-27), extremely severe (28+), for anxiety, normal (0-7), mild (8-9), moderate (10-14), severe (15-19), extremely severe (20+), and for stress normal (0-14), mild (15-18), moderate (19-25), severe (26-33), extremely severe (34+).¹⁷ The scale was piloted to 30 individuals and Cronbach's alpha (α) was used to measure reliability. The resulted reliability for overall DASS-21 scale (α) = 0.950, for depression it was α = 0.857, anxiety α = 0.920, and stress α = 0.922.

Ethical approval

All potential individuals were informed about the study's purpose. The protocol of the study was approved by The University of Mosul's Collegiate Committee for Medical Research Ethics and it is in accordance with the Declaration of Helsinki's ethical approval.¹⁹

Participants were notified that their participation is completely voluntary and their agreement should be obtained before answering the questionnaire.

Statistical analysis

The data were collected using Google form, then entered, coded, and analyzed using Microsoft excel 10 and Statistical Package for Social Sciences "IBM SPSS Statistics for Windows, version 25) (IBM Corp., Armonk, N. Y., USA). Descriptive statistics including means and standard deviation were used to calculate different demographic variables (age, gender, graduation level, years of experience,) and also used for DASS-21 scores. A Chi-square test was used to determine the distribution of demographic variables between doctors, dentists and pharmacists. The same test was used to determine the distribution of DASS-21 subscales scores among HCPs groups. Independent-sample t-test and one-way analysis of variance (ANOVA) were used to determine whether there were any significant differences of the means of DASS-21 subscales between two or more than two demographic groups respectively. Bonferroni test was used as a post Hoc



test to ANOVA test if there were statistical differences between groups. The p-value selected <0.05 is statistically significant.

RESULTS

Description of study population

Table 1, show the descriptive results of 700 participants in the study. The mean age (SD) of the study population was 32.54 (6.98) and the mean years of experience were 8.15 (6.86). Of the 700 respondents, there were 560 (80%) females and 140 (20%) males. From the total respondents, there were 347 (49.6%) doctors to study survey and they were the higher percentage 81 (51.9%) of being post-graduated compared to the pharmacists and dentists. Most of the respondents were completed their second dose of the vaccine 550 (78.6%) and the Pfizer type of the vaccine was the most used one among the study population 405 (58.4%). Around half of the participants were previously infected with COVID-19 before

being vaccinated 320 (45.7%).

Depression, anxiety and stress outcomes

DASS-21 level was calculated for all participants and each domain. The mean (SD) for depression, anxiety and stress were 2.77 (4.34), 2.14 (3.26) and 3.28 (4.96) respectively. Table 2 showed the outcome of the DASS-21 survey among the study population. Scores of each domain were categorized according to the previously published work.¹⁷ No significant association between the participants' specialty and each domain of the DASS-21 scale as shown in Table 2. Although a higher percentage of the participants were found with normal values of depression, anxiety and stress score which mean they did not suffer from any psychological complication to be recorded after the vaccination. There was a noticeable proportion of the study population suffered from moderate to very severe mental symptoms. In terms of depression, 46 (13.2%) of doctors were reported that they have moderate

Variable	Specialty			P value*
	Doctors 347 (49.6%)	Dentists 165 (23.6%)	Pharmacists 188 (26.9%)	
Age n (%)				0.127
20 – 29 years	132 (47.8)	71 (25.7)	73 (26.4)	
30 – 39 years	166 (51.9)	62 (19.4)	92 (28.7)	
40 years and older	49 (47.1)	32 (30.8)	23 (22.1)	
Gender				0.974
Male	69 (49.3)	34 (24.3)	37 (26.4)	
Female	278 (49.6)	131 (23.4)	151 (27.0)	
Graduation level				0.003
Graduated	266 (48.9)	117 (21.5)	161 (29.6)	
Postgraduates	81 (51.9)	48 (30.8)	27 (17.3)	
Years of Experience				0.012
Less than 5 years	139 (54.9)	59 (23.3)	55 (21.7)	
5 – 9 years	98 (50.0)	37 (18.9)	61 (31.1)	
10 – 14 years	63 (45.3)	30 (21.6)	46 (33.1)	
15 – 19 years	17 (34.7)	19 (38.8)	13 (26.5)	
20 years and more	30 (47.6)	20 (31.7)	13 (20.6)	
Vaccination status				0.183
First dose only	67 (44.7)	34 (22.7)	49 (32.7)	
Two doses	280 (50.9)	131 (23.8)	139 (25.3)	
Type of vaccine				0.754
Sinopharm	67 (50.8)	35 (26.5)	30 (22.7)	
AstraZeneca	80 (50.3)	37 (23.3)	42 (26.4)	
Pfizer	200 (48.9)	93 (22.7)	116 (28.4)	
Symptoms				0.329
Yes	240 (47.8)	123 (24.5)	139 (27.7)	
No	107 (54.0)	42 (21.2)	49 (24.7)	
Onset of symptoms (n=526)				0.764
After 1st vaccine dose	110 (48.0)	54 (23.6)	65 (28.4)	
After 2nd dose	45 (42.9)	27 (25.7)	33 (31.4)	
After 1st and 2nd dose	97 (50.5)	46 (24.0)	49 (25.5)	
History of previous infection				0.254
Infected	168 (52.5)	75 (23.4)	77 (24.1)	
Not infected	179 (47.1)	90 (23.7)	111 (29.2)	
Corticosteroid use (n=520)				0.221
Yes	32 (59.3)	9 (16.7)	13 (24.1)	
No	222 (47.6)	119 (25.5)	125 (26.8)	

*Chi-square test



Table 2. Distribution of DASS-21 groups among health care providers

Variable	Specialty			P-value
	Doctors	Dentists	Pharmacists	
Depression level				0.61
Normal 0-9	282 (50.7)	132 (23.7)	142 (25.5)	
Mild 10-13	19 (50.0)	10 (26.3)	9 (23.7)	
Moderate 14-20	19 (45.2)	9 (21.4)	14 (33.3)	
Severe 21-27	11 (34.4)	9 (28.1)	12 (37.5)	
Very severe 28+	16 (50.0)	5 (15.6)	11 (34.4)	
Anxiety level				0.179
Normal 0-7	288 (52.5)	124 (22.6)	137 (25.0)	
Mild 8-9	10 (32.3)	10 (32.3)	11 (35.5)	
Moderate 10-14	25 (38.5)	16 (24.6)	24 (36.9)	
Severe 15-19	9 (42.9)	7 (33.3)	5 (23.8)	
Very severe 20+	15 (44.1)	8 (23.5)	11 (32.4)	
Stress Levels				0.24
Normal 0-14	299 (51.6)	132 (22.8)	148 (25.6)	
Mild 15-18	10 (35.7)	9 (32.1)	9 (32.1)	
Moderate 19-25	12 (38.7)	10 (32.3)	9 (29.0)	
Severe 26-33	14 (37.8)	9 (24.3)	14 (37.8)	
Very severe 34+	12 (48.0)	5 (20.0)	8 (32.0)	

to very severe depression. In addition, 23 (13.9%) and 37 (19.6%) of dentists and pharmacists respectively reported moderate to very severe depression symptoms. With regards to anxiety, 49 (14.1%) of doctors, 31 (18.7%) of dentists and 40 (21.2%) of pharmacists were found to have moderate to very severe anxiety symptoms respectively. For the stress domain, 38 (10.9%) of doctors, 24 (14.5%) of dentists and 31 (16.4%) of pharmacists were found to have moderate to very severe symptoms of stress respectively.

Differences of DASS-21 scores between demographic characteristics

Total score for each domain of the DASS-21 was used for further analysis to find the differences in scores between groups of study variables. Table 3 showed the results of the score differences among the study groups. Significant differences in depression, anxiety and stress scores between the specialty of the study participants with higher scores of the three domains found among pharmacists ($p < 0.05$). Younger participants were found to have higher scores of DASS-21 significantly ($p < 0.05$).

Table 3. Differences in DASS-21 scores among the study groups

Variable	Depression Total mean \pm SD 2.77 \pm 4.34		Anxiety Total mean \pm SD 2.14 \pm 3.266		Stress Total mean \pm SD 3.28 \pm 4.962	
	Mean (SD)	P value	Mean (SD)	P value	Mean (SD)	P value
Specialty		0.038		0.01		0.011
Doctors	2.42 (4.21)		1.77 (3.11)		2.73 (4.67)	
Dentists	2.76 (4.05)		2.41 (3.39)		3.59 (4.96)	
Pharmacists	3.42 (4.74)		2.59 (3.36)		4.02 (5.37)	
Age		0.048		0.034		0.002
20 – 29 years	3.13 (4.54)		2.49 (3.47)		3.89 (5.3)	
30 – 39 years	2.73 (4.26)		2.02 (3.08)		3.20 (4.82)	
40 years and older	1.90 (3.90)		1.58 (3.19)		1.91 (4.14)	
Gender		0.404		0.187		0.605
Male	2.49 (4.07)		1.81 (3.02)		3.09 (4.73)	
Female	2.84 (4.4)		2.22 (3.32)		3.33 (5.02)	
Graduation level		0.028		0.059		0.002
Graduated	2.96 (4.48)		2.26 (3.31)		3.58 (5.06)	
Postgraduates	2.10 (3.84)		1.71 (3.06)		2.22 (4.46)	
Years of Experience		0.195		0.176		0.065
Less than 5 years	2.76 (4.16)		2.12 (3.05)		3.43 (5.06)	
5 – 9 years	2.93 (4.64)		2.19 (3.36)		3.47 (4.97)	
10 – 14 years	3.17 (4.59)		2.54 (3.64)		3.74 (5.21)	
15 – 19 years	2.45 (4.25)		1.94 (3.71)		2.18 (4.35)	
20 years and more	1.63 (3.41)		1.32 (2.60)		1.92 (4.14)	
Vaccination status		0.024		0.176		0.006
First dose only	3.47 (4.69)		2.46 (3.99)		4.26 (5.98)	
Two doses	2.57 (4.22)		2.05 (3.04)		3.01 (4.61)	
Type of vaccine		0.016		0.039		0.022
Sinopharm	1.82 (3.69)		1.50 (2.76)		2.26 (4.38)	
AstraZeneca	3.18 (4.85)		2.39 (3.61)		3.80 (5.55)	
Pfizer	2.91 (4.29)		2.25 (3.26)		3.41 (4.85)	
Symptoms		0.000		0.000		0.000
Yes	3.26 (4.53)		2.60 (3.56)		3.82 (5.23)	
No	1.52 (3.53)		0.98 (1.91)		1.91 (3.88)	
Onset of symptoms*		0.473		0.280		0.663
After 1st dose	3.24 (4.46)		2.40 (3.60)		3.69 (5.38)	
After 2nd dose	2.78 (4.50)		2.29 (3.18)		3.48 (5.14)	
After 1st & 2nd dose	3.46 (4.79)		2.86 (3.59)		4.02 (5.02)	



History of infection		0.021		0.011		0.208
Infected	3.15 (4.66)		2.43 (3.47)		3.55 (5.16)	
Not infected	2.44 (4.03)		1.89 (3.07)		3.05 (4.78)	
Corticosteroid use **		0.515		0.815		0.701
Yes	3.41 (4.89)		2.46 (3.5)		3.89 (5.55)	
No	2.98 (4.46)		2.35 (3.36)		3.6 (5.12)	

*n=526, **n=520

No significant differences between DASS-21 scores and gender as well as years of experience, the onset of symptoms and the use of corticosteroids during infection periods respectively. AstraZeneca vaccinated subjects found to significantly ($p < 0.05$) have higher scores of DASS-21 compared with other types of vaccines. Subjects who suffered from physical adverse effects from vaccines were found to have higher scores of DASS-21 ($p < 0.05$). Those who are previously infected with COVID-19 were found to have higher scores of DASS-21 domains ($p < 0.05$).

DISCUSSION

The current study aimed to determine the level of depression, anxiety and stress experienced by Iraqi HCPs after receiving the COVID-19 vaccine. This study was conducted by an online survey targeting vaccinated HCPs from different cities in Iraq. While there are numerous studies on the mental health effects of the COVID-19 pandemic on HCPs around the world, to our knowledge, there are limited studies about the impact of the COVID-19 vaccine on the mental health status globally and this is the first study in the middle east countries.

Health care providers generally have a special occupation with a high risk of infection with all infectious diseases including COVID-19. It is not surprising that they have higher stress levels than other people and this may affect their health status in general and mental health in particular.²

The entry of the COVID-19 vaccine, therefore, was considered a great hope to these groups of populations, however, this vaccine is new and still there is a fear from its side effects and long-term complications, and this may affect the mental health among the general population and HCPs. The results of the present study were based on a structured questionnaire that includes the DASS-21 scale.

In our results the most commonly administered vaccine was Pfizer. Whereas in a study also conducted in Iraq by Almufty et al, AstraZeneca was the major vaccine that was administered to the respondents who were Iraqi citizens.²⁰

Depression, anxiety and stress scale was employed by various studies: Szmyd et al., 2021, this study was conducted among 2300 HCPs in Poland, its reliability was (Cronbach's $\alpha = 0.928$),² Ozamiz-Etxebarria et al., 2020, a cross-sectional descriptive study conducted among 1003 population in northern Spain, its reliability was ($\alpha = 0.76, 0.82, \text{ and } 0.75$ for depression, anxiety and stress respectively),¹ and Abuzied et al., 2021, this study conducted in Riyadh, Saudi Arabia, 500 subjects were enrolled using a descriptive cross-sectional design.²¹

In the current study, we determined HCPs' mental status,

especially anxiety, stress, and depression in Iraq for the duration of the COVID-19 pandemic between June 18 and June 29, 2021. The results of our study showed that the majority of our participants have a normal level of depression, anxiety and stress subscales with aspect regarding vaccination with one of the COVID-19 vaccines.

A study in Poland conducted by Szmyd et al., 2021, used binary logistic regression to determine the effects of several factors that may affect the willingness to get vaccine among HCPs and control group, among these factors were DASS-21 and fear from the vaccine side effects, they concluded that HCPs have higher acceptance towards vaccine administration when compared to control group. On the other hand, depression affected the desire to get vaccines positively, while stress and anxiety have no effect.²

In our results, participants who develop side effects from the vaccine have higher DASS-21 scores than others ($p < 0.05$). Szmyd et al., 2021 concluded that fear from vaccine side effects and long-term complications may affect the tendency of participants to get the vaccine negatively.²

In the current study, the respondents' total DASS-21 score revealed a noticeable proportion of the study population suffered from moderate to very severe mental symptoms. The reason may be due to the persistence of the pandemic even after the vaccination and the appearance of new strains.

The majority of the respondents were females, according to the data. Since 2003, females have accounted for the majority of the students of the healthcare colleges in Iraq, owing to their higher marks on the high school baccalaureate test.²²

In our study, there was no significant association between gender and DASS-21 subscales while the younger age group significantly have higher DASS-21 scores than other age groups ($p < 0.05$). This may be because the young participants are trainees who spend more time in hospitals and are in contact with patients more than the older specialist doctors. Moreover, further study has shown that education level and age group were not associated with severe traumatic stress (anxiety and excessive fear) by using another tool of measuring mental status in a study conducted in China.²³

Wang et al., 2020, conducted a study in China at the beginning of the COVID-19 disaster. They also used the DASS-21 scale to measure the impact of COVID-19 on mental health. They reported that more than half of the participants have moderate to severe levels of DASS-21 score. In contrast to our results, age was not associated with DASS-21 subscales significantly, while males were associated with higher scores in stress and anxiety subscales.²⁴



A study done in Spain to evaluate the level of depression, anxiety, and stress among general populations during the initial period of COVID-19 in Spain, found that levels of severe and extremely severe depression, anxiety, and stress in Spain were lower than in China, like our results they also found that younger age groups have higher DASS-21 subscale scores than other age groups and this may be due to the additional stress caused by their need to adapt the on-line learning in these age groups.¹

A study employed in China using the generalized anxiety disorder scale (GAD-7) and patient health questionnaire-9 (PHQ-9) to measure anxiety and depression and then determined the association between them and vaccine acceptance among students, they concluded that the students have low levels of anxiety and depression and there was no association between anxiety and depression and the vaccine acceptance.²⁵

In Bangladesh, GAD-7 and PHQ-9 were used to measure anxiety and depression among Bangladeshi HCPs during the COVID-19 pandemic. Their results showed a high incidence of anxiety and depression among them.²⁶

In Italy, a study was conducted to evaluate psychological distress among Italian populations during the COVID-19 lockdown period. This is two months follow up study and the level of stress, depression, and anxiety were measured at the initial and final period of lockdown, the anxiety was not changed but the level of stress and depression were increased, in addition to that they found that individuals who have higher levels of depression and stress at the initial period of lockdown were also had a high level of them at final period and younger age group have higher stress level than other age groups and this may be due to their rapid accessibility to internet and so any information regarding the COVID-19 may reach them faster than other age groups, also they need to adapt the new environment which affects their teaching, working, and daily activities.²⁷

In our study DASS-21 level was significantly high among participants who received the AstraZeneca vaccine, this may be due to their knowledge about the possible adverse effects associated with this type of vaccine.²⁸ The great challenge associated with this vaccine was the development of blood clots as documented by European Medicines Agency's (EMA) Pharmacovigilance Risk Assessment Committee (PRAC).⁹

Higher scores of depressions and anxiety were recognized among participants who had a history of the previous infection with COVID-19. However, it is unknown whether these symptoms are caused by the vaccine or by the disease itself since many survivors from the COVID-19 pandemic experienced long-term complications like depression and anxiety.²⁹

In the current study, there were significant differences in depression, anxiety and stress scores between the specialty of the study participants with higher scores of the three domains found among pharmacists. A significant association between anxiety, stress and depression with the profession, age and residence in the multivariate logistic regression analysis were also found in a study conducted in the Metropolitan cities of

Pakistan.³⁰ A study performed by Wu et al., 2021 in China. They evaluate the level of stress among young pharmacists after COVID-19 in a hospital. They concluded that more than half of the participants have job stress.³¹

In Japan, a study was done to measure anxiety and depression among HCPs using GAD-7 and PHQ-9 scales. HCPs were divided into a vaccinated and non-vaccinated group then mental health status was measured during the pandemic and after receiving the COVID-19 vaccine. The vaccinated HCPs had a higher level of anxiety and depression during the pandemic period compared with the non-vaccinated HCPs. After receiving the vaccine, there was a significant difference in the rate of change of mental health between the two groups. The vaccinated HCPs have lower scores of anxieties and depression compared to the non-vaccinated group implying that the vaccine led to an improvement of mental health.¹⁵

In the USA, Chen et al, used items of GAD-7 and PHQ-9 scales to compare anxiety and depression between vaccinated and non-vaccinated people. The vaccinated individuals had a lower odds ratio of both depression and anxiety compared to non-vaccinated individuals. The vaccine has a positive impact on the mental health of people by reducing their fear of COVID-19 and its controlling issues.¹⁶

Strength and limitation of the study

The current study involved a large sample from different cities in Iraq, but it was associated with some limitations. First, it was a cross-sectional study that used an electronic Google form so the response rate was not measured. The use of convenience sampling limits the generalization of results. Additionally, we used an internet-based self-reported tool, which introduces selection bias. A Comprehensive cohort or prospective study can provide more generalizable results. However, this provides evidence for further works.

CONCLUSION

Since the entry of the COVID-19 vaccine till now, many individuals have started to get the vaccine, especially HCPs. However, many conspiracy theories about the vaccine may affect the mental status of populations, especially aspects regarding its safety and long-term complications. While many studies evaluate mental health status during the COVID-19 pandemic, to the best of our knowledge, this is the first study that assesses mental health after receiving the COVID-19 vaccine in the middle east. In our study depression, anxiety and stress were measured among HCPs after receiving a first or second dose of COVID-19 vaccines. The study concluded that HCPs have low DASS-21 scores. This means that the COVID-19 vaccine has a minor effect on mental health and this gives us promising results that may encourage general populations in Iraq to receive the vaccine.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.



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