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Quick Response Code:

Website: www.jehp.net
DOI: 10.4103/jehp.jehp_440_23

Comparison of infection severity of vaccinated and unvaccinated health workers with Corona Virus: A cohort study

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Abstract:

BACKGROUND: Hospital staff members are most susceptible to the COVID-19 illness, which is currently prevented through vaccination. Hospital staff members also refuse vaccinations, albeit the underlying causes have not been identified. The study aimed to compare the severity of the symptoms of the disease on the body for health workers who took the coronavirus vaccine and those who did not take the vaccine.

MATERIALS AND METHODS: This cohort study aimed to estimate the of infection severity of vaccinated and unvaccinated health workers with Corona Virus in Mosul Hospital, Iraq. Data were obtained from the General Mosul Hospital, Nineveh, Iraq. The first of the three components of this questionnaire outlined the demographic characteristics. Second part: First group of unvaccinated Health care workers included those who had not received the COVID-19 immunization or had only gotten one dose of the vaccine; the second group included those who had received their first dose of Corona vaccine and the third group included those who had received two doses of Corona Vaccine. HCWs who got corona vaccine were included in the three-dose final group.

RESULTS: The study's findings indicate that as compared to the corona vaccination, the vaccinated experienced less severe infection symptoms and fewer dosage stays. The high share of healthcare workers among the 20- to 30-year-olds who received vaccinations accounts for the gender gap between the vaccinated and unvaccinated groups.

CONCLUSION: This study concluded that the results of the corona vaccine are not consistent among the various groups of HCWs. The acceptability of vaccinations is practically unanimous among nurses, but less so among doctors and other healthcare professionals.

Keywords:

Corona Virus, health workers, infection severity, unvaccinated, vaccinated

Introduction

Health care workers (HCWs) "are at higher risk for Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) infection due to their care and proximity to COVID-19 patients, in addition to the severity of the infection through social contacts".^[1,2] As of October 9, 2021, more than 238 million individuals had contracted COVID-19 since it first broke

out, resulting in more than 4.8 million fatalities.^[3] Vaccination is currently the only effective method of combating the COVID-19 virus because there is no known therapy for it. On December 11, 2020, the COVID-19 mRNA vaccine received clearance from the "US Food and Drug Administration" for the first time under an emergency use authorization "BNT162b2". More than 6.47 billion doses of different COVID-19 vaccines have been administered globally as of October 9, 2021.^[4] Only those

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How to cite this article: Ayed AY, Younis NM, Ahmed MM. Comparison of infection severity of vaccinated and unvaccinated health workers with Corona Virus: A cohort study. J Edu Health Promot 2023;12:336.

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Received: 29-03-2023

Accepted: 15-06-2023

Published: 29-09-2023

who were at the highest risk of contracting an infection or at the greatest risk of contracting a serious disease were vaccinated on a priority basis due to the shortage of vaccines that resulted from the original rollout of vaccines. Compared to the general population, healthcare workers (HCWs) who are directly engaged in the care of COVID-19 patients are more likely to become infected.^[5] HCWs have shown professional devotion throughout the COVID-19 pandemic despite their anxiety about contracting the virus and spreading it to family members.^[6] They also provide the general public with trustworthy sources of information on immunization and can guard against false or conflicting information.^[7,8] Given the requirement to find variables linked to vaccine acceptance and reluctance to execute immunization policy.^[9-12]

All HCWs are impacted by these phenomena, both physically and psychologically. According to a number of academic studies, HCWs experienced psychological impacts from the COVID-19 pandemic, including “stress, melancholy, anxiety, trauma, burnout, and even suicidal thoughts and attempts”.^[13-15] A different research found that 29.5% of the HCWs employed by UMMC reported having depressive symptoms, while 36.5% of them reported having anxiety symptoms.^[13]

As of December 2020, COVID-19 vaccines are available in many parts of the globe. At least 12 vaccines are currently used on four different platforms throughout the globe.^[16] These seven vaccines have seen widespread use across countries, but there are believed to be 150 different vaccine types in differing stages of development or efficacy testing. The COVISHIELD vaccine, created by AstraZeneca and Oxford University (SII),^[17] is produced by the Serum Institute of India. The COVAXIN vaccine, created by the “Indian Council of Medical Research and Bharat Biotech”,^[18] is the second most popular vaccine in India. However, COVISHIELD was created in genetically altered human embryonic kidneys “HEK” 293 cells and is a recombinant, replication-deficient chimpanzee adenovirus vector carrying the “SARS-CoV-2 Spike (S) glycoprotein”. The whole-virion inactivated Vero cell-derived platform technology was used to develop COVAXIN.^[19,20]

The COVID-19 vaccine, however, is very effective in lowering infection, hospitalization, and mortality in these groups, according to a number of observational studies that used real-world data to evaluate the vaccine efficacy (VE) among HCWs.^[21,22] The prevalence of emerging variants or the relative contributions of waning vaccine-induced immunity since receiving a primary vaccination series to observed changes in VE over time have not been determined by current studies, despite a decline in VE being observed in this population

during the time that the Delta variant (B.1.617.2) was in circulation.^[23]

Determining the factors that affect the severity of Corona Virus infection in both vaccinated and unvaccinated healthcare workers is the objective of this research, which also aims to describe the prevalence of severe symptoms of coronavirus among many HCWs in Mosul, Iraq.

Materials and Methods

Design and setting

This cohort research sought to determine the level of infection with the coronavirus among health workers who had received vaccinations and those who had not in Mosul Hospital, Iraq. The main Mosul Hospital in Nineveh, Iraq, provided the data. The Institutional Review Board of the Faculty of Nursing at Mosul University gave its approval to the research protocol (Nu 022/169).

Studying participants and sampling

(111) was attended by health workers in hospitals in the city of Mosul, and the sample was taken from health workers in hospitals in the city of Mosul. The participants were among the health workers who took the coronavirus vaccine and those who did not take the coronavirus vaccine.

Data collection tools and technique

The research tool was a self-administered paper. Each survey took around 10 minutes to finish. A subject-matter specialist who was in charge of the questionnaire’s development validated the questions through an iterative process. The form was initially written in English before being translated into Arabic. To verify the Arabic translation and correct any discrepancies between the original and back-translated versions of the questionnaire, the study team reverse-translated it from Arabic into English. The first of the three sections of this questionnaire outlined the demographic characteristics. Part two: The unvaccinated first group of HCWs consisted of those who had not received the COVID-19 vaccine or had only received one dose; the one-dose second group consisted of those who had received their first Cor-Vac dose; and the two-dose third group consisted of those who had received their full course of Cor-Vac vaccination. The three-dose final group included HCWs who received Cor-Vac.

Statistical analysis

SPSS Statistics (version 24) was used for the statistical study. Frequency and percentage were used to show categorical variables. As examples of continuous variables, median and standard deviation were used. In contrast, the ANOVA test and the Bonferroni test were

used. Were examined using “univariate and multivariate regression analysis, and the odds ratio (ORs) and 95% confidence intervals (CIs)” for the relationship were reported. Demographics variables, and conditions were used to stratify the subgroup analysis. At 0.05, the significance threshold was established.

Ethics consideration

The University of Mosul’s newly established Ethics Committee gave its approval to this research. Joint among the medical group’s schools (Study code 121/3311). Individual informed permission was not required, according to the review panel.

Results

The first table shows that the highest age group that participated in the study was from 20 to 30, with a range of (47.74%). And that the male participants were twice as high as the females, meaning that the percentage of males was around (68.46%), and a small percentage of the participants had chronic diseases or hereditary diseases around 18.02. Finally, most of the sample participating in the study had taken the Pfizer vaccine, with a rate of 73.83%.

Discussion

The findings of our research comparing the severity of infection in vaccinated and unvaccinated HCWs provide us with practical information on the efficacy of the available vaccines. Infections with COVID-19 caused far fewer complications in those who had received the vaccination than in those who hadn’t, negating the need to increase the corona vaccine among HCWs. When compared to people who received the corona vaccine, the severity of illness and number of dose stays were also lower in the vaccinated group. The high percentage of healthcare workers among the 20- to 30-year-olds. They represented the highest percentage (47.74%), as shown in Table 1. Who received vaccinations accounts for the gender gap between the vaccinated and unvaccinated groups.

The vaccinated group had a higher percentage of people (20-40 years) than the control group (78.11%), but their rate of complications was reduced. The current research confirms that vaccinations aid in preventing COVID-19 complications, including death. The number of people infected with the disease was among the vaccinated and unvaccinated health workers (81.98%), while the number of infected people was much less than that (20.02%). As indicated in Table 1. The numbers of individuals or health workers in the hospital were close in terms of vaccination, while the vaccinated individuals with the first dose were within (50.45%), the second dose (29.72%), the third part was (3.6%). As shown

previously in the Table 1. Through the doses taken by the health workers, the lowest percentage was in the third dose, and this means that the health workers were convinced that the first and second doses were sufficient to prevent coronavirus and other problems.

Nurses were more likely to accept vaccinations than doctors, which was comparable to studies done in France but much higher than studies done in Hong Kong, the Democratic Republic of the Congo, and Malta.^[24] The greater vaccine acceptance may have been due to HCWs having a higher infection risk than non-medical workers.^[25] Another explanation could be that HCWs were more open to accepting the vaccine when it was made available as a result of their increased understanding of COVID-19 and its effects on human health.

The study’s contradictory findings could be the outcome of the imbalance in differences between men and women among HCWs across the board for COVID-19. Nearly (70%) of the HCWs who were infected in the group under study were female, with nurses making up the majority of them. The current study’s higher percentage of nursing personnel may have lessened the impact that men’s gender has on severe infection. For this reason, the percentage of men (70.9%) was higher than women (29.1%) among those vaccinated and those who were willing to take the vaccine in two doses, as shown in the Table 1. The previous research also discovered that there is only a weak correlation between male gender and severe COVID-19 illness.^[26,27]

One year after the COVID-19 pandemic, numerous vaccine varieties have been produced and widely dispersed to create herd immunity. Iraq experienced a shortage of vaccine supplies, and vaccine reluctance prevented the start of widespread vaccination programs. The main vaccine regimen for front-line healthcare workers was Corona Vaccine.^[28,29]

Severe COVID-19 illness among healthcare workers (HCWs) at Mosul General Hospital caused (15) instances, or (18.2%), of the (55) COVID-19 diseases in this study.

As with all COVID-19-positive individuals, the rate of serious infection in the present study is also less than that previously reported. That is, within (48,64%) they were infected in COVID-19, as shown in Table 2. For illustration, a census of French hospital patients revealed that 39 percent of them had severe illnesses, of which 32% needed ICU admission and 13% resulted in death.^[30] An investigation into patients admitted to a major medical facility revealed similar results, with 87 (376%) of the patients needing intubation.^[31-33]

Table 1: The demographic characteristics of the study sample

Characteristics	(NT=111)	Vaccinated (55)	Unvaccinated (56)	P
Age n (%)				
20-30	53 (47.74)	23 (41.81)	24 (42.85)	0.001
31-40	34 (30.63)	11 (20)	23 (41.07)	
41-50	18 (16.21)	11 (20)	8 (14.28)	
51-60	6 (5.4)	5 (9.09)	1 (1.78)	
Gender n (%)				
Male	76 (68.46)	39 (70.9)	37 (66.07)	0.175
Female	35 (31.54)	16 (29.1)	19 (33.93)	
Comorbidities n (%)				
Non-disease	91 (81.98)	44 (80)	47 (83.93)	0.115
One or More disease	20 (18.02)	11 (20)	9 (16.07)	
Vaccinated status n (%)				
Unvaccinated	56 (50.45)	----	56 (100)	
Dose I	33 (29.72)	33 (60)	----	
Dose II	18 (16.21)	18 (32.73)	----	
Dose III	4 (3.6)	4 (7.27)	----	
Vaccine type n (%)				
Pfizer	42 (73.83)	42 (76.36)	----	
AstraZeneca	9 (8.1)	9 (16.36)	----	
Sino pharm	4 (3.6)	4 (7.27)	----	

Table 2: Vaccination schedules linked to lowering serious infection

	N-S (n=88)	S (n=23)	“Crude OR (95% CI)”	P	“Adjusted OR (95% CI)”	P
Vaccination						
Un-vaccinated	46	8	1		1	
Dose I	33	15	0.66 (0.51–1.11)	0.211	0.71 (0.32–2.76)	0.001
Dose II	7		0.04 (0.02–0.47)	0.002	0.07 (0.06–0.69)	0.002
Dose III	2		0.36 (0.01–1.44)	0.003	0.22 (0.21–0.87)	0.000
Vaccination type						
Unvaccinated	46	8	1		1	
Pfizer	31	14	0.21 (0.05–1.32)	0.111	0.19 (0.07–1.33)	0.009
AstraZeneca	10	1	0.43 (0.65–1.39)	0.004	0.13 (0.02–0.54)	0.012
Sino pharm	1	0		No event		

NS=Non-Severe, S=Severe

Table 3: The effect of vaccinations on lowering the severity of infection

Vaccination Status	n	“Mean (95% CI)”	SD	“Difference in Mean (95% CI)”	P
Un-vaccinated	56	19.12 (19.23–19.86)	5.76		
Dose I	33	18.78 (19.11–19.41)	4.51	0.06 (1.43–1.87)	0.988
Dose II	18	17.92 (19.20–20.13)	5.81	0.16 (1.76–2.98)	1.000
Dose III	4	3.55 (18.66–19.07)	8.98	2.56 (5.11–2.24)	0.432

According to recent studies, two doses of vaccination greatly decrease infectious severity particles and help to stop the spread of viruses.^[34,35] Vaccination with a single dose effectively cut the chance of developing a serious illness. After receiving a booster shot, no serious cases were found, and a two-dose vaccination demonstrated a higher risk reduction. Most likely, the level of protection is dose-dependent. The dose I, the dose II were respectively (18.78, 17.92) as shown in Table 3. This was consistent with another research from Thailand that discovered that the quantity of vaccination doses increased the protective effects against associated serious infections.^[36-38]

When compared to corona vaccine dose (I) of Coronavaccine-19 greatly reduced the risk of developing a serious illness. This study found that the dose (II) vaccination, independent of the type of vaccine, had a highly protective effect against serious infection. As previously shown in Table 3. Following first- and second-dose vaccinations, women were discovered to be at a reduced risk than men. However, it is presently difficult to conclude the effectiveness of Corona Vaccine-19 based on gender.

Limitations and recommendations

There was not enough time for the purpose of the

participation of all health workers in the study sample, as well as the evening shift. One of the barriers to the study was the fact that the focus of the health institutions at the time of the study was on the evening shift. The important and necessary recommendations for our study are to conduct the study on a large scale at the country level for the purpose of the participation of the largest number of health workers and to expand the study time for the purpose of including the evening shift and finally to conduct educational lectures within educational and health institutions about the benefits of taking vaccines and the types of vaccines and the way to immunize health workers from virus infection Corona.

Conclusion

The researchers in this study concluded that the use of the corona vaccine varies among the various groups of HCWs based on the findings of the research mentioned above. The acceptance of vaccinations is almost universal among nurses, but less so among physicians, when compared to those who were either unvaccinated or only partially vaccinated, those who had received all recommended vaccinations were found to have extremely low rates of severe illness. These results imply that even in the presence of a high prevalence of severe infection in the HCWs, broad and efficient vaccination of HCWs ensures a secure environment.

Acknowledgment

For health workers who volunteered to participate in the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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