

Health care workers attitudes toward COVID-19 vaccination and the effect on personal and professional life

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ABSTRACT

Introduction

While the discovery of the Coronavirus disease 2019 (COVID-19) vaccine renewed the hope to restore normal life, the attitude of Health Care Workers (HCWs) towards vaccination and its impact on their life are yet to be evaluated.

Methods

We conducted a cross-sectional study from late January to mid-February at the MedStar Health Hospitals in Baltimore, Maryland. Eligible HCWs completed the questionnaires anonymously. The primary outcomes were attitudes of HCWs towards vaccination and the impact on HCWs' comfort and anxiety in caring for patients, sleep, mood, attendance of social gatherings, and utilization of health clubs, before and after vaccination.

Result

A total of 300 respondents completed the questionnaires. The mean age was 37.2 years with 37.7% physicians and 45.7% registered nurses. Of the respondents only, 15.7% refused vaccination. The most common reason for refusal was concerns for long-term adverse effects, cited by 59.5%. Following vaccination, comfort level in caring for patients with COVID-19 and other illnesses improved (6.3 (2.8) to 8.2 (2.0), $p < 0.005$, and 8.4 (2.4) to 9.1 (1.0), $p < 0.005$, respectively). Additionally, a significant decrease in anxiety was noted in HCWs caring for patients with COVID-19 and other illnesses (5.0 (3.3) vs. 3.5 (3.2), $p < 0.005$ and 2.7 (3.3) vs. 2.3 (3.4), $p = 0.001$, respectively). Significant improvement in mood scores (6.9 (2.4) vs. 7.7 (2.1), $p < 0.005$) and comfort level at social gatherings (4.3 (3.2) vs. 6.3 (3.0), $p < 0.005$) were also noted.

Conclusion

Vaccination against COVID-19 resulted in overall improvement in HCWs physical and mental wellbeing.

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1. Introduction

Coronavirus disease 2019 (COVID-19) was initially identified in Wuhan, China following the

presentation of numerous individuals with respiratory symptomatology and characteristics consistent with a viral pneumonia [1]. The causative agent of

the new disease was a single-stranded, positive-sense ribonucleic acid (RNA) virus that shared sequence homology with the coronavirus family. The new virus was named Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), given its genetic resemblance to the original SARS-coronavirus that resulted in SARS outbreak in 2013 [2]. Since the early reports, COVID-19 has rapidly spread, resulting in a global pandemic [3], with in excess of 127 million cases and 2.7 million fatalities as of 31 March 2021 [4], placing a significant strain not only on the healthcare system, but also the general socioeconomic fabric of society. For instance, the lockdown resulted in increased social discord as typified by increased violence and firearms sales [4] as well as a significant financial strain with increased numbers of unemployed workers as well as bankruptcies [5].

The clinical presentations of COVID-19 are broad, ranging from asymptomatic to acute respiratory failure and death. The unexpected nature of the disease has taken its toll not only on patients and their families, but also on Health Care Workers' (HCWs) physical and mental health [6]. Unfortunately, while original reports touted the preventative properties of numerous medications [7], no therapy has been proven to prevent the transmission of COVID-19. Two medications, in contrast, Dexamethasone and Remdesivir demonstrated efficacy in managing individuals with hypoxia due to COVID-19, however, did not prevent viral transmission. In contrast, strong recommendations for social isolation and distancing were recommended to prevent further viral transmission and alleviate the burden on the health care system.

Global efforts and heavy investments have been made to end the pandemic and its sequelae on different sectors, leading to the discovery of a COVID-19 vaccine. Multiple vaccines have been approved by the USA Food and Drug Administration with promising results. Despite its promise, many concerns have been raised by the public and HCWs regarding the efficacy, safety, and long-term efficacy of vaccination. In this study, we analyzed the attitude of HCWs towards vaccination as well as reasons for refusal, the prevalence of side effects, and the professional and personal effects of the vaccination on HCWs at our community hospital network in Baltimore, Maryland.

2. Methodology

We conducted a cross-sectional study from late January to mid-February 2021 at the Medstar Health Hospitals in Baltimore, Maryland (Franklin Square Hospital, Good Samaritan Hospital, Harbor Hospital, Union Memorial Hospital). The questionnaires were distributed to HCWs in the general medical/surgical units, intermediate care units, and

intensive care units. All questionnaires were completely deidentified. The data was entered into an excel sheet and coded using an alphanumeric code and subsequently analyzed using Excel and Statistical Package for the Social Sciences (SPSS) software. Inclusion criteria included HCWs in direct contact with patients (nurses, physicians, respiratory therapists, and technicians) who were offered Pfizer-BioNTech or Moderna vaccine. Only HCWs who were previously infected with SARS-CoV-2 were excluded from the study. The primary outcomes were attitude of HCWs towards vaccination, level of comfort and anxiety in taking care of patients with and without COVID-19 disease, sleep, mood, attendance of social gatherings, and utilization of health clubs, focusing specifically on the time before and after vaccination. The previously mentioned outcomes were also evaluated in HCWs who refused vaccination. In addition, we also compared the outcomes data on HCWs before vaccination to those who refused vaccination. Secondary outcomes were side effects of the vaccines and their prevalence in HCWs.

3. Statistical analysis

Parametric variables were reported as means and standard deviations (SD) while non-parametric continuous variables as medians and interquartile ranges. Categorical variables were reported as frequencies and proportions. T-tests were utilized to compare mean questionnaire item scores between the vaccinated and un-vaccinated groups. A P-value <0.05 demonstrated statistical significance. All analyses were performed using the Statistical Package for the Social Sciences (SPSS) for Windows, Version 23.0 (IBM Corp., Armonk, N.Y., USA).

4. Results

A total of 300 respondents completed the questionnaires. Mean age of respondents was 37.2 (10.8) years. A total of 227 (75.7%) of respondents received the Pfizer vaccine, 26 (8.7%) respondents received the Moderna vaccine, and the remainder 47 (15.7%) refused vaccination. The Pfizer vaccine was more available at the time the study was conducted due to earlier approval and distribution as compared to Moderna vaccine. The most common reasons for refusal were concerns for short- and long-term adverse effects cited by 26 (55.3%) and 28 (59.5%) of respondents, respectively. Table 1 summarizes these results.

Physicians and nurses comprised 83.3% of respondents, followed by technicians (13.3%) and respiratory therapists (3.3%). A total of 227 (75.7%) respondents had no comorbidities, and the most

Table 1. Baseline parameters of healthcare workers included in the study and reasons for refusal.

Parameter	Value
Mean age (SD)/years	37.2 (10.8)
Vaccine received	
Pfizer	227 (75.7%)
Moderna	26 (8.7%)
Refused	47 (15.7%)
Comorbidities	
Hypertension	38 (12.7%)
Diabetes Mellitus	8 (2.7%)
Asthma	19 (6.3%)
Heart disease	3 (1.0%)
Cancer	4 (1.3%)
Obesity	16 (5.3%)
Smoking	4 (1.3%)
None	227 (75.7%)
Job in healthcare	
Physician	113 (37.7%)
Registered nurse	137 (45.7%)
Technician	40 (13.3%)
Respiratory therapist	10 (3.3%)
Reason for refusal	
Short term adverse effects (allergic reaction, toxicity)	26 (55.3%)
Long term adverse effects (cancers, heart and lung disease)	28 (59.5%)
Safety concerns	9 (19.1%)
Insufficient research	2 (4.3%)
Religious beliefs	0 (0.0%)
Received monoclonal antibody	1 (2.1%)
Concerns about fertility	1 (2.1%)
Concerns about new variant effectiveness	1 (2.1%)
Not mandatory	1 (2.1%)
Pregnant	1 (2.1%)

reported comorbidities were hypertension (12.7%), asthma (6.3%), obesity (5.3%), and diabetes mellitus (2.7%). Table 1 summarizes these results. Pain at the injection site was the most common local adverse effect experienced by 73.1% and 68.4% after the first and second vaccine doses, respectively. Most common systematic side effects reported were muscle soreness (43.9%) after the 1st dose and Fatigue (54.5%) after the 2nd dose. Table 2 summarizes these results.

Following vaccination, significant improvement in level of comfort not only in caring for COVID-19 patients, but also in patients with other illnesses was noted (6.3 (2.8) to 8.2 (2.0), $p < 0.005$, and 8.4 (2.4) to 9.1 (1.0), $p < 0.005$, respectively). Additionally, a significant decrease in anxiety levels caring for patients with COVID-19 and other illnesses were noted (5.0 (3.3) vs. 3.5 (3.2), $p < 0.005$ and 2.7 (3.3) vs. 2.3 (3.4), $p = 0.001$, respectively). Significant improvement in mood scores (6.9 (2.4) vs. 7.7 (2.1), $p < 0.005$), comfort level at social gatherings (4.3 (3.2) vs. 6.3 (3.0), $p < 0.005$), comfort level in going to health clubs (1.3 (2.5) vs. 2.0 (3.0), $p < 0.005$), and sleep quality (7.6 (2.3) vs. 7.9 (2.2), $p = 0.001$) were also reported. In vaccinated respondents, no differences were found in pre-vaccination questionnaire items of level of comfort or anxiety taking care of patients with COVID-19, other patients, mood, sleep quality and comfort

Table 2. Local and systemic side effects after first and second dose of both vaccines (Moderna and Pfizer).

Side Effect	After the 1 st dose	After the 2 nd dose
Local side effects		
Pain at the site of injection	185 (73.1%)	173 (68.4%)
Redness	8 (3.2%)	11 (4.3%)
Swelling	16 (6.3%)	16 (6.3%)
Itching	2 (0.8%)	1 (0.4%)
Systemic side effects		
None	95 (37.5%)	53 (20.9%)
Fatigue	63 (24.9%)	138 (54.5%)
Muscle soreness	111 (43.9%)	123 (48.6%)
Aches	44 (17%)	99 (39.1)
Joint Pain	18 (7.1%)	47 (18.6%)
Headache	48 (19%)	81 (32%)
Itching	1 (0.4%)	1 (0.4%)
Shortness of breath	0	0
Loss of consciousness	0	0
Fever	10 (4%)	54 (21.3%)
Skin rash	3 (1.1%)	2 (0.8%)
Nausea	10 (4%)	17 (6.7%)
Vomiting	0	0
Chills	2 (0.8%)	16 (6.3%)
Diarrhea	1 (0.4%)	3 (1.2%)
Metallic taste	2 (0.8%)	1 (0.4%)
Cough	2 (0.8%)	1 (0.4%)
Mental fogginess	1 (0.4%)	1 (0.4%)
Night sweats	1 (0.4%)	2 (0.8%)
Dizziness	0	1 (0.4%)
Insomnia	0	1 (0.4%)
Sweating	1 (0.4%)	1 (0.4%)
Runny nose	1 (0.4%)	0
Severe allergic reaction	1 (0.4%)	0
Malaise	0	1 (0.4%)
Swollen lymph node	1 (0.4%)	0

level going to social gatherings or health clubs when stratified by sex or presence of any comorbidities ($p > 0.05$).

To evaluate baseline differences in attitudes of individuals refusing vaccination to vaccinated responders, pre-vaccination questionnaire items were compared between the two groups. Respondents refusing vaccination reported higher levels of comfort taking care of patients with COVID-19 (7.4 (2.8) vs. 6.3 (2.8), $p = 0.013$), patients with other illnesses (9.2 (1.8) vs. 8.4 (2.4), $p = 0.023$), higher mood scores (8.1 (2.1) vs. 6.9 (2.4), $p = 0.001$), and comfort level being in social gatherings (6.6 (2.7) vs. 4.3 (3.2), $p < 0.005$). Similarly, lower anxiety levels were reported by respondents refusing vaccination compared to vaccinated responders caring for COVID-19 patients (3.3 (3.2) vs. 5.0 (3.3), $p = 0.002$).

5. Discussion

In this cross-sectional study, we report a higher COVID-19 vaccine acceptance rates (84.4%) among HCWs in our hospitals compared to the acceptance rate among HCWs reported by Sakher et al [8]. The high acceptance rates might be attributed to cumulative data regarding vaccine safety and low side effect profile. The side effects reported by HCWs in our hospitals are comparable to side effects reported by Polack FP et al with few differences[9], irrespective of

vaccine type, likely due to the fact that the majority of respondents received the Pfizer vaccine (90%).

In a survey of hospice workers, despite over 75% reporting personal protective equipment (PPE) adequacy, 74.5% reported feeling neutral or uncomfortable treating patients with COVID-19, with around 40% considering themselves at high risk to develop complications related to COVID-19[10]. COVID-19 vaccination conferred improvement in HCWs comfort and anxiety in caring for patients with COVID-19 and other illnesses likely explained by the high efficacy of vaccination in preventing symptomatic infection and critical illness. However, the improvement in caring for other illnesses was less pronounced which might be attributed to less PPE use as well as concerns for false negative COVID 19 polymerase chain reaction (PCR) results in those patients. We also found significant improvement in attending social gatherings in HCWs after vaccination, likely due to the same previously mentioned reasons. Intriguingly, participants who refused vaccination reported a comfort level comparable to participants who were vaccinated which could reflect different individual attitudes towards COVID-19 that may also impact their willingness to be vaccinated. Overall mood, sleep quality, and health club attendance have also demonstrated statistically significant increases; however, the magnitude of change was small. This may be attributed to the major effects of COVID-19 on life outside the workplace including its financial, economic, social, and personal impact. Trends whereby people are opting for exercise at home as an alternative to health clubs may also be contributing to decreased enthusiasm about attending the latter.

The main two reasons for vaccine refusal among study respondents were long-term side effects (carcinogenic effects, pulmonary and cardiac disease risks) and short-term side effects such as allergic reactions followed by safety concerns. Some participants felt that there was not enough research to recommend vaccination, while others exhibited concerns on vaccine efficacy against new strains. As long-term safety and efficacy data emerge, these concerns could be relieved for many respondents refusing vaccination.

Study limitations include the small sample size and the young age of the respondent population. Additionally, collected data measures are subjective and may be influenced by other factors. Nevertheless, these are pragmatic in nature and were aimed to reflect general attitudes rather than quantify changes due to vaccination. Recall bias is another limiting factor in our study and rely on HCWs recollection of events.

6. Conclusion

In this study, COVID-19 vaccination resulted in an overall improvement in HCWs' well-being, mental health, and increased comfort in caring for COVID-19 and non-COVID-19 patients. These findings highlight the importance of widespread vaccination of HCWs from a personal and professional perspective and may be transmissible to the general populace. In our study, COVID-19 vaccination was well tolerated with only minimal side effects and resulted in overall improvement in HCWs physical and mental well-being. Further research is needed to determine practical strategies to overcome various concerns regarding vaccination.

Disclosure statement

MedStar Health Institutional Review Board (IRB) approved this study and Informed consent was waived since all data that had been collected were completely deidentified.



Author contributions

M.H. reviewed the literature, wrote the questionnaire, distributed the questionnaires, collected them, entered the data into an excel sheet and coded them, analyzed the data using excel and Statistical Package for the Social Sciences (SPSS) software and wrote the manuscript. L. A. reviewed the literature, distributed the questionnaires, collected them, entered the data into an excel sheet and coded them. N.P., A.M., and A.S. distributed the questionnaires, collected them, entered the data into an excel sheet and coded them. Z.I. analyzed the data using SPSS software and wrote the manuscript. C.H. mentored the progress of the study and revised the manuscript.

Data availability

Manuscript related data is available upon request from the authors and upon approval of the IRB at MedStar Health, Baltimore, MD, USA.

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