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Observational Study**Effect of patients' COVID-19 vaccine hesitancy on hospital care team perceptions**

Caspi I *et al.* Effect of vaccine hesitancy on medical team

Inbar Caspi, Ophir Freund, Omer Pines, Odelia Elkana, Jacob N Ablin, Gil Bornstein

7**Abstract****BACKGROUND**

The coronavirus disease 2019 (COVID-19) pandemic poses new challenges in patient care worldwide. Vaccinations, which have proven efficacious in lowering the COVID-19 hospital burden, are still avoided by large populations. We, therefore, hypothesized that hospital care teams would have worse perceptions regarding the characteristics and care of patients with vaccine hesitancy.

AIM

To evaluate whether patients' vaccine hesitancy affects the hospital care team (HCT) perceptions.

METHODS

We performed a prospective clinical study using structured questionnaires. We approached physicians and nurses with previous experience caring for COVID-19 patients, from 11 medical centers across Israel during the fourth COVID-19 surge (September and October 2021). The participants completed a questionnaire with the following parts: (1) sociodemographic characteristics; (2) assessment of anger (STAXI

instrument) and chronic workplace stress (Shirom-Melamed burnout measure); and (3) three tools to assess the effect of patients' vaccine hesitancy on the HCT perceptions (the difficult doctor-patient relation questionnaire, the medical staff perception of patient's responsibility questionnaire, and the characterological derogation questionnaire). Results were evaluated according to each part of the questionnaire and the questionnaire as a whole. Associations between HCT's perceptions and their baseline characteristics, anger, or chronic workplace stress were assessed.

RESULTS

The HCT experienced their relationship with unvaccinated patients as more difficult ($P < 0.001$, Cohen's $d = 0.85$), perceived unvaccinated patients as responsible for their medical condition ($P < 0.001$, $d = 1.39$), and perceived vaccinated patients as having a higher value character ($P < 0.001$, $d = 1.03$). Unvaccinated patients were considered selfish ($P < 0.001$), less mature ($P < 0.001$) and less satisfying to care for ($P < 0.001$). The relationship with unvaccinated patients was more difficult among HCT with higher burnout ($r = 0.37$, $n = 66$, $P = 0.002$). No correlations with baseline characteristics were found. All three study tools showed high internal consistency (α between 0.72 and 0.845).

CONCLUSION

Our results should raise awareness of the possible effects of vaccine hesitancy on HCT perceptions regarding unvaccinated patients. In order to minimize the potential negative impact on patient care, designated departments should promote specific patient-centered preparations. Further investigations should assess whether vaccine hesitancy directly affects patients' quality of care.

Key Words: COVID-19; Vaccination; Hesitancy; Patient care; Doctor-patient relationship; Attitudes

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Core Tip: ²Coronavirus disease 2019 (COVID-19) vaccine hesitancy is common around the world. We considered that patients' vaccine hesitancy can affect the hospital care team perceptions. To test that possibility, we implemented a questionnaire during the Delta variant surge, among physicians and nurses with prior experience in caring for COVID-19 patients. We found that patients' vaccine hesitancy negatively affects how the medical care team perceives these patients and their care. Vaccine hesitancy can negatively affect the physician-patient relationship and raising awareness of this important issue is crucial for proper interventions.

INTRODUCTION

Medical care team beliefs and practices are impacted by patient characteristics^[1]. Such characteristics also have the potential to intervene with the shared decision-making process by changing physicians' perceptions of their patients^[2,3]. The ¹³coronavirus disease 2019 (COVID-19), which continues to affect millions of people globally since 2019, poses new challenges regarding patient care^[4,5]. Severe COVID-19 infection has the potential for hospitalization, due to possible complications, which results in a high burden on the hospital care team (HCT)^[6]. Caring for hospitalized COVID-19 patients requires functioning with full personal protective equipment and caring for patients who may rapidly deteriorate. This environment creates obvious stressful triggers. The introduction of the mRNA COVID-19 vaccines was a crucial step ²in preventing the spread of the virus, limiting disease transmission and infectivity^[7,8]. COVID-19 vaccines dramatically reduced the rate of hospitalizations due to severe disease as well as complications among hospitalized patients, regardless of any comorbidities or age^[9,10]. Despite its obvious benefits, several large populations avoided vaccination for various reasons, demonstrating distrust against the vaccines^[11]. Therefore, it is not surprising that many studies focused on attitudes toward COVID-19 vaccines themselves, and, specifically, on vaccine hesitancy, for both patients and medical teams^[11-13]. However, it is still unknown whether patients' vaccine hesitancy influences the HCTs' perceptions of them. We hypothesized that the HCT will have negative perceptions towards the characteristics and care of vaccine-hesitant patients. Our aim was to evaluate this hypothesis and to raise awareness in order to promote early intervention, hopefully preventing potential negative effects on patient care.

MATERIALS AND METHODS

Study design

¹²This is a prospective clinical study conducted at 11 medical centers throughout Israel between September and October 2021 using standardized questionnaires. We held the study during the fourth surge of COVID-19 pandemic when the Delta variant was

predominant, and the hospital disease burden reached its peak. We approached physicians and nursing staff that treat COVID-19 patients to participate in the study. Invitations to participate in the study were offered personally or *via* social networks and, whenever needed, were followed by a text message with an active link to the questionnaire. Consenting participants were enrolled using an online interface. All participants accepted to an informed consent form, agreed to participate by pressing “continue” within the questionnaire electronically, and had the ability to drop out at any stage. Only participants who completed at least one of the three study tools (described below) were included in our final cohort. The study was approved by the ethics committee of The Academic College of Tel Aviv-Yaffo (Authorization number 2021142).

Study instrument

We created a computerized questionnaire *via* the Qualtrics platform. The design of our study instrument appears in Figure 1. The first set of questions discussed sociodemographic information, such as age, gender, profession (physician, nurse *etc.*), and prior experience with treating COVID-19 disease. The second part included questions about participant anger (4-point Likert scale, using the STAXI instrument^[14]) and their chronic workplace stress (7-point Likert scale, using the Shirom-Melamed Burnout Measure, SMBM^[15]). The third part of the questionnaire assessed the effect of patients’ COVID-19 vaccine hesitancy on the participants. To properly assess this aspect, we used three validated tools that together created a comprehensive review of the topic. For comparison purposes, the third part (including the three tools) appeared twice – first regarding unvaccinated patients and second regarding vaccinated patients. The three selected tools used were as follows:

Tool 1-difficult doctor-patient relation questionnaire: A well-established questionnaire, consisting of 10 items answered on a 6-point Likert scale, with values ranging from 1 (“Not at all”) to 6 (“A great deal”)^[16]. Higher scores indicate that the physician experiences the relationship with the patient as more difficult. In our study, we made a

minor modification by using a 1 to 7 scale, to give participants an option of expressing a neutral (middle range) opinion, which is achieved by an uneven number of items.

Tool 2-medical staff perception of patient's responsibility questionnaire: previously used in similar studies evaluating physician perception of illness, with a variety of patient populations^[17,18]. It is written as a 10-item questionnaire, answered on a 7-point Likert scale, with values ranging from 1 ("Not at all") to 7 ("A great deal"). A higher score indicates that the participant perceives the patient as more responsible for his own medical condition.

Tool 3-characterological derogation questionnaire: Written by Brouns^[19], as part of a thesis regarding negative attitudes towards refugees, and based on previous questionnaires by Correia *et al*^[20]. It is a nine-item questionnaire, relating to the question: "In your opinion, what represents "X" best?". Five items include positive characteristics, *e.g.*, polite, responsible, mature, warm, nice, and four items include negative characteristics *e.g.*, stupid, selfish, untrue, unaware. The scoring was by a 7-point Likert scale, with values ranging from 1 ("Not at all") to 7 ("A great deal"). A high score indicates that the participant perceives the patient's character as a high-value character.

9 *Statistical analysis*

Categorical variables were described using frequencies and percentages. Continuous variables were described by mean and standard deviation. Comparison between answers regarding vaccinated and unvaccinated patients was utilized using paired samples *t*-test. **11**
P < 0.05 was defined as statistically significant. The effect size of significant results was **4**
calculated using Cohen's *d* test. The internal consistency of each tool in the study instrument was measured using the alpha Cronbach score (alpha above 0.7 is considered high). Correlations were examined using the Pearson correlation coefficient. The **4**
analysis was performed using SPSS 26.0 for Windows.

RESULTS

Participants

During the study period, we approached more than 500 active physicians and nursing staff from 11 different medical centers. 138 participants agreed to enroll in the study, and of them, 66 (48%) completed at least one of the three study tools and were included in our cohort. Participant characteristics are presented in Table 1. In total, 38 (58%) participants were women, mean age was 40.5 ± 10 , 37 (56%) were physicians (senior doctors, residents, and interns), and 29 (44%) participants were staff of internal medicine departments. All but two were vaccinated (97%) and 12 (18%) had prior COVID-19 disease.

Effect of patients' vaccine hesitancy on the HCT perceptions

The three tools used for this study [difficult doctor-patient relation questionnaire (DDPRQ-10), medical staff perception of patient's responsibility questionnaire (PPRQ), and characterological derogation questionnaire (CDQ)] showed a high internal consistency based on our results (α between 0.72 and 0.845). Table 2 presents the mean scores of selected questions from each tool comparing vaccinated and unvaccinated patients. Based on tool 1 (DDPRQ-10), the HCT considered caring for unvaccinated patients to be more frustrating ($P < 0.001$), time-consuming ($P < 0.001$), and less satisfying ($P < 0.001$). Answers in tool 2 (PPRQ) revealed that HCT perceived unvaccinated patients to be responsible for their illness ($P < 0.001$), to consciously endanger their surroundings ($P < 0.001$), and as less deserved of occupying beds in the intensive care unit than vaccinated patients ($P = 0.002$). HCT also believed that social and economic sanctions should be imposed on unvaccinated people (mean scores 4.2 and 4.1, respectively, $P < 0.001$ for both). Tool 3 (CDQ) indicated that unvaccinated patients were perceived as less mature, more selfish, and more ignorant ($P < 0.001$).

The mean total scores for each tool are presented in Figure 2. Based on these results, the HCT experienced their relationship with unvaccinated patients as more difficult (DDPRQ-10 tool, $P < 0.001$, Cohen's $D = 0.85$), perceived unvaccinated patients as more

responsible for their medical condition (PPRQ tool, $P < 0.001$, Cohen's $D = 1.39$), and perceived vaccinated patients' character as a higher value character (CDQ tool, $P < 0.001$, Cohen's $D = 1.03$).

None of the participants' baseline characteristics correlated with results in any of the above tools. HCT with higher workplace burnout (SMBM tool) perceived the relationship with unvaccinated patients as more difficult (DDPRQ-10 tool, $r = 0.37$, $n = 66$, $P = 0.002$). No other correlations were found between workplace burnout or anger (STAXI tool) and any of the other tools.

DISCUSSION

This study explores our hypothesis that patients' COVID-19 vaccine hesitancy can have a negative effect on HCT perceptions. Our results showed that vaccine hesitancy had a negative impact on how the HCT perceived patients' character, their care, and their responsibility for their disease. We specifically addressed active physicians and nursing staff working in medical centers that treat COVID-19 patients, as they were directly affected by the pandemic. By approaching 11 different centers, our results may reflect the effect on HCT perceptions on a national scale. As stated above, several previous studies describe the attitude of patients and medical personnel toward COVID-19 vaccines^[12,13,21]. However, whether patients' beliefs on this issue affect their treating team have yet to be described.

Our study was conducted during the fourth surge of the COVID-19 pandemic. Despite multiple studies demonstrating the safety and efficacy of mRNA vaccines^[7,9,22], large populations still refuse to get vaccinated. Vaccination hesitancy continues to be a serious concern worldwide^[23,24], with amplification of the discussion in social media settings^[25]. During the fourth surge, most hospitalized patients were unvaccinated, showing worse clinical outcomes^[10]. This situation created a fertile ground for the development of frustration among medical staff, particularly in the context of the highly stressful work environment in COVID-19 departments. We hypothesized that this confluence of factors might aggravate negative feelings while taking care of unvaccinated

patients, as presented in our results. This trend is reflected in our study by the strong correlation between higher workplace burnout and the perception of more difficult relationships with unvaccinated patients.

In Israel, vaccines were free for every citizen and available in multiple centers all over the country with the option for home visits when needed. Therefore, it is not surprising that the unvaccinated COVID-19 patients in our study were considered not only as being responsible for their own medical predicament ($P < 0.001$) but were also blamed for allowing the pandemic to spread, thus endangering others ($P < 0.001$). This dynamic can conceivably lead to more strain on the doctor-patient relationship. The results of the current study demonstrate the strong effect that vaccine status has on the HCT perceptions of their patients.

The use of three different study tools emphasizes the internal consistency of the results since the negative attitude is consistent in all three independent instruments. Additionally, the results of all three questionnaires were statistically significant, demonstrating a large effect, despite a relatively small sample size. It is important to note that 97% of the participants were vaccinated for COVID-19. While it may seem like a potential selection bias, it is important to keep in mind that in Israel vaccination was obligatory for hospital medical teams and therefore the vaccine status does not reflect the participants' attitudes towards the COVID-19 vaccines^[21].

Throughout the history of medicine, physicians deal with situations in which the patient may be held responsible for his condition due to various health behavior (*e.g.*, obesity, diabetes, chronic obstructive pulmonary disease). Some medical conditions have even been stigmatized due to moral failure (*e.g.*, venereal disease). Although it remains difficult to establish whether such perceptions play a role in the doctor-patient relationship, in all such cases, medical professionalism and ethics call for a non-judgmental and unbiased approach toward patients. Additionally, the treating hospital care team must be familiar with variables that might influence their perceptions or interaction with their patients^[26,27]. As shown by Mateo *et al*, there is a high prevalence of harmful bias and discrimination within the health professions, with a proven negative

impact on patient care. It is argued that addressing these biases ⁵ is the professional responsibility of every provider and essential to effective and equitable care^[28]. In light of this, we assume that ongoing negative perceptions can eventually lead to a harmful effect on the quality of care of unvaccinated patients. We believe that our findings should raise awareness for potentially harmful biases in medical practice and hopefully lead to the establishment of specific measures in designated COVID-19 departments to combat this issue. For example, departments should be able to offer the staff a reassuring environment to express their feelings and prevent their aggravation.

This study has several limitations. We used questionnaires, which can cause report bias. Only participants who completed the questionnaire were included, which can cause selection bias. To avoid those biases, further research should aim ² to assess the effect of patients' COVID-19 vaccine hesitancy on hospital care team perceptions in a direct manner. Observational prospective studies with consecutive patients are needed for this purpose and to assess for any effect on patients' quality of care. Furthermore, it can be assumed that since the reporting bias is a concern in both study groups, it has a relatively negligible influence on our results. Although we approached a variety of medical personnel in multiple centers, our cohort size is relatively small. A potential reason could be the timing of the study during the peak of an outbreak, finding the medical staff extremely busy, and therefore less responsive to participate in online surveys, especially considering the multiple tools included in our questionnaire. Furthermore, even though the survey was anonymous, medical staff might have been hesitant to reveal negative attitudes toward patients. This study was designed as a "snapshot" study, capturing the essence of medical staff perceptions of ² COVID-19 patients during the peak of the outbreak.

CONCLUSION

Our study demonstrated that patients' vaccine hesitancy has a strong negative effect on the HCT perceptions regarding these patients. We aimed to raise awareness and promote

preventive interventions. Early detection might prevent negative feelings from escalating and mitigate the feared consequence of harming patient care.

ARTICLE HIGHLIGHTS

Research background

Patient characteristics can affect their medical care team practice and intervene in the shared decision-making process. The coronavirus disease 2019 (COVID-19) pandemic posed new challenges to patient care, especially severe infections with high rates of deterioration and adverse outcomes. COVID-19 vaccines have proven highly efficacious in reducing the disease severity and as a result, its burden. We, therefore, hypothesized that patients' vaccine hesitancy will influence the hospital care team (HCT) perceptions.

Research motivation

Many studies focused on the attitudes toward COVID-19 vaccines themselves, and, specifically, on vaccine hesitancy, for both patients and medical teams. However, it is still unknown whether patients' vaccine hesitancy influences HCT perceptions.

Research objectives

To study the effect of patients' vaccine hesitancy on HCT perceptions towards these patients' characteristics and care.

Research methods

We conducted a prospective study at 11 medical centers during the Delta variant surge using standardized questionnaires. Hospital physicians and nursing staff treating COVID-19 patients ($n = 66$) were recruited and completed a questionnaire, which included three validated tools to assess the effect of patients' vaccine hesitancy. We analyzed the questionnaire results in all different items and evaluated their associations with participants' characteristics.

Research results

Our data demonstrated that HCT experienced their relationship with vaccine-hesitant patients as more difficult, perceived them as responsible for their disease, and has having a lower character. The relationship with unvaccinated patients was more difficult among HCTs with higher workplace burnout.

Research conclusions

We concluded that patients' vaccine hesitancy had a negative impact on how the HCT perceived patients' character, their care, and their responsibility for their disease.

Research perspectives

Our results should raise awareness of the potentially harmful biases in medical practice and hopefully lead to the establishment of specific measures in designated COVID-19 departments to combat this issue. Early detection might prevent negative feelings from escalating and mitigate the feared consequence of harming patient care.

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