Beliefs, barriers, and acceptance associated with COVID-19 vaccination among Taif University students in Saudi Arabia

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ABSTRACT

Background: COVID-19 was declared a public health emergency of global concern by the World Health Organization (WHO) on January 30, 2020. Vaccination is one of the most effective methods for halting the pandemic and preventing complications. Vaccine hesitancy is a possible threat to global public health. Understanding the key determinants that influence the community’s preferences and demands for a future vaccine may aid in the development of strategies to improve the global vaccination program. The aim of this study was to assess the beliefs, barriers, and acceptance of COVID-19 vaccination among Taif University students in Saudi Arabia.

Materials and Method: This was a descriptive cross-sectional study, based study in Taif University, Saudi Arabia. Data was collected using a designed self-administered questionnaire that was shared as a link through social media. 332 students were considered eligible to participate voluntarily. Data were analyzed using the (SPSS) program version 25. Results: Out of 332 participants, 278 (83.7%) were accepting to take the covid vaccine, while 54 (16.3%) refused. Believes in vaccine safety and effectiveness and trust in the ability of the vaccine to prevent the complication, were all associated with high acceptance rate. Fear about side effects is considered a major factor for vaccination refusal. Conclusion: Most of the participants have the willingness to be vaccinated. The majority of students who agreed to take the vaccine were in the medical field, and that is mostly due to their high knowledge exposure. This indicates the importance of raising the awareness of the non-medical students.

Keywords: COVID-19, medical education, acceptance, vaccine

Introduction

On January 30, 2020 World health organization (WHO) stated COVID-19 as an outbreak of a public health emergency of international concern.[9] Globally, the number of cases confirmed until February 28, 2021 were 113,467,303 COVID-19 cases, including 2,520,550 deaths reported by WHO.[9]

Many interferences are recommended by WHO that can reduce the rate of virus spread and help in flattening the epidemic curve such as quarantine and social distancing.[9] One of the best effective methods for stopping the pandemic and preventing the complications related to the infection

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is vaccination. Although herd immunity should be established within the population to stop the COVID-19 pandemic, which is commonly obtained either by infection or vaccination. A lot of academic institutions and pharmaceutical companies put their effort to launch programs on vaccine origination versus SARS-CoV-2. Even though public beliefs and perceptions toward vaccines and their acceptance play an important role.

Several studies have shown different factors associated with vaccine acceptance when a novel vaccine becomes available. These include the effectiveness and safety of the vaccine, suspicion in the health system, side effects of the vaccine, poor community information about vaccine-preventable diseases, and misconceptions about vaccine necessity. During the current crisis, public health will be at threat if misinformation about vaccination and vaccine hesitancy still exists.

Vaccine acceptance and hesitancy differ across the globe and up to date, only a few studies have looked to the public practice toward the COVID-19 vaccine and contributing factors.

A study conducted among healthcare workers (HCWs) in China showed a high acceptance of COVID-19 vaccination compared with the general population. Another research in the United States revealed that only 20% of HCWs plan to avoid vaccination with the new COVID-19 vaccine. Additional study done among college students in South Carolina showed that the adoption of the COVID-19 vaccine among the students was affected by information resources.

According to that, it is important to disseminate transparent and honest information on the safety and efficacy of vaccines to increase consumer trust, even hesitant and skeptical people. Moreover, given the current public avoidance of influenza vaccine in Saudi Arabia, a COVID-19 vaccine is expected to face significant public hesitancy.

In Saudi Arabia, during the period between January 3 to February 28, 2021, a total of 377,061 confirmed cases of COVID-19 have been reported with 6,488 deaths. There are limited number of studies related to this public acceptance and knowledge about COVID1-9 vaccine. One national web-based study was done to assess the prevalence of the acceptance of COVID-19 vaccine and their determinants. The study found that 64.7% of the participants were interested to accept the COVID-19 vaccine if it is available, where the willingness was higher among older age groups, married, with postgraduate educational level or higher, non-Saudi, and being employed in the government sector.

This study aimed to assess the beliefs, barriers, and acceptance of COVID-19 vaccination among Taif University students in Saudi Arabia.

**Methods**

**Study design and time frame:** A descriptive cross-sectional study was done from March 2021 to May 2021.

**Study settings:** An online survey was done at Taif University in Saudi Arabia.

**Study population:** A sample size of 332 students were the study participants, where the inclusion criteria were all students of Taif University, and the exclusion criteria were students who refused to participate or left unanswered questions.

**Tools and data collection procedure:** A predesigned questionnaire was used to collect data about students’ sociodemographic data such as age, gender, nationality, marital status, specialty, education level, having any chronic diseases, anyone who has been diagnosed in their circle with coronavirus, and whether they received annual influenza vaccine or not. The second section assessed the diffusion of coronavirus information by asking whether their information about coronavirus was enough, whether information about corona virus was sufficient in Saudi society, trust in health system, and the source of their information. The third Section collected information on the students’ beliefs toward COVID-19 vaccine (e.g., safe, effective, the best way to avoid complications of COVID-19, and public awareness is needed or not). And the fourth section assessed potential barriers that may prevent participants from being vaccinated such as fear of side effects, they do not believe that the vaccine will stop the infection, vaccine conspiracy, do not like the needles, they follow the preventive measures, or because they are young and healthy. In the fourth section, we also assessed under which scenarios participants would accept the vaccine (physician recommendation, mandatory by job, compulsory by the government, if family or friends got vaccinated, if more studies showed the safety of the vaccine, if there is a way other than needles, or would not take it in any situation).

**Ethical considerations:** An ethical approval for the study was obtained from the Research Ethics Committee (REC) of Taif university.

**Statistical analysis:** Data were analyzed using the Statistical Package for the Social Sciences (SPSS) program version 25. Qualitative data were expressed as numbers and percentages, and the Chi-squared test ($\chi^2$) was used to assess the relationship between variables. A $P$ value of $< 0.05$ was considered statistically significant.

**Results**

**Demographics data**

Table 1 shows that 63.6% of students had an age that ranged from 20 to 25 years, 71.5% were females, 95.8% had a Saudi nationality, and 76.5% were unmarried. Furthermore, 88.6% had a bachelor’s degree of education, 59% had a medical specialty, and 8.1% had chronic diseases. More than half (52.4%) knew...
someone diagnosed with COVID-19 this year, and 35.2% got the seasonal influenza vaccine before.

**Diffusion of information about COVID-19**

A total of 81.6% of students thought that their information about COVID-19 was enough. Furthermore, 68.4% believe that there is sufficient information about COVID-19 in Saudi society. A total of 90.4% of participants had trust in the ability of the health system to manage this pandemic.

Regarding the source of information, the Website of the Ministry of Health was the most trusted source for 97.6%, followed by the websites of the International Health Organization (WHO, CDC) for 63.9%, to a lesser extent 54.8% trust in doctors or other healthcare providers and 44.6% trust on the other National Health Agency’s Websites as a source of information. [Table 2]

**Beliefs and barriers toward COVID-19 vaccine**

Table 3 shows that 66.6% and 62.3% of students thought that the COVID-19 vaccine would be safe and effective, respectively. Most of them (75.3%) thought that vaccine is the best way to avoid the complications of COVID-19, and 89.5% thought that greater public awareness is needed about the COVID-19 vaccine. Most of the students (83.7%) reported that they plan to get a vaccine whenever it is available.

On the other hand, the most common reasons for those who were not planning to get the vaccine, their concerns regarding the vaccine’s side effects (72.2%), they did not need the vaccine because they do all the right things like washing hands (40.7%) and they did not believe that the vaccine will stop the infection (12.9%). Most of the students who were not planning to get the vaccine reported that they would not take it in any situation (53.7%). Of them, the most common scenarios that can make them more likely to get it are if it was compulsory by the government (MOH) (51.8%) and if it was mandatory by my job (35.1%).

Table 4 shows that students who thought that the COVID-19 vaccine would be safe and effective, who believed that vaccine would be the best way to avoid the complications of COVID-19, who thought that their information about COVID-19 is enough, and who had trust in the health system to manage the situation had a significantly higher percentage of those who were planning to get COVID-19 vaccine if available ($P = 0.05$). On the other hand, a nonsignificant relationship was found between planning to get COVID-19 vaccine if available ($P = 0.05$).
Mubarak, et al.: Beliefs, barriers, and acceptance of COVID-19 vaccine, prevalence

Table 3: Distribution of studied participants according to their beliefs and barriers toward COVID-19 vaccination (No. 332)

| Variable                                                      | No. (%) |
|---------------------------------------------------------------|---------|
| Do you think that the COVID-19 vaccine, whenever available, would be safe? |         |
| No                                                            | 16 (4.8) |
| Do not know                                                   | 95 (28.6) |
| Yes                                                           | 221 (66.6) |
| Do you think that the COVID-19 vaccine, whenever available, would be effective? |         |
| No                                                            | 17 (5.1)  |
| Do not know                                                   | 108 (32.5) |
| Yes                                                           | 207 (62.3) |
| Do you think that the best way to avoid the complications of COVID-19 is by getting the vaccine? |         |
| No                                                            | 25 (7.5)  |
| Do not know                                                   | 57 (17.2)  |
| Yes                                                           | 250 (75.3) |
| Do you think that greater public awareness is needed about COVID-19 vaccine? |         |
| No                                                            | 35 (10.5)  |
| Yes                                                           | 297 (89.5) |
| If the COVID-19 vaccine is available, are you planning to get it? if “Yes,” please stop here. and if “No,” please answer the following questions. |         |
| No                                                            | 54 (16.3)  |
| Yes                                                           | 278 (83.7) |
| Check which statement shows why you do not plan to get COVID-19 vaccine (check all that apply): (No. 54) |         |
| I am concerned about the vaccine's side effects                | 39 (72.2)  |
| I don't believe that the vaccine will stop the infection       | 16 (12.9)  |
| I don't need the vaccine because I do all the right things. I wash my hands and wear a mask and gloves | 22 (40.7)  |
| I don't like needles                                           | 3 (5.5)   |
| The COVID-19 vaccine is a conspiracy                           | 3 (45.5)   |
| Other                                                          | 4 (7.4)    |
| Under those scenarios, would you be more likely to get the COVID-19 vaccine? (No. 54) |         |
| If my physician recommended it to me                          | 10 (18.5)  |
| If it was mandatory by my job                                  | 19 (35.1)  |
| If it was compulsory by the government (MOH)                   | 28 (51.8)  |
| If my family or friends got vaccinated                         | 8 (14.8)   |
| If I know that more studies showed that the vaccine is safe and effective. |         |
| I would not take it in any situation                          | 29 (53.7)  |
| If there is a way other than injection                        | 9 (16.6)   |
| Other                                                          | 1 (1.8)    |

Table 5 shows that students of an age ranging from 18 to 19 years had a significantly higher percentage of those who thought that hating needles was a barrier to getting the vaccine (P =< 0.05). And students with ages ranging from 20 to 25 years had a significantly higher percentage of those whose motivating scenario to get the vaccine is that their physician recommended it (P =< 0.05). On the other hand, a nonsignificant relationship was found between other barriers to the COVID-19 vaccine and other reasons encouraging participants to get it and participants’ age (P => 0.05).

Table 6 shows that a nonsignificant relationship was found between barriers to COVID-19 vaccine and reasons encouraging the participants to get it and participants’ gender (P => 0.05).

Table 7 shows that students of nonmedical specialty had a significantly higher percentage of those concerned about the vaccine’s side effects, who did not need the vaccine because they do all the right things as washing hands and wearing a mask and gloves. And they had a significantly higher percentage of those willing to take the vaccine if their family or friends got it (P =< 0.05).

Discussion
As of September 24, 2021, in the Kingdom of Saudi Arabia (KSA), over 546 thousand people have been infected and 8,688 people...
| Variable                                                      | If the COVID-19 vaccine is available, are you planning to get it? | $\chi^2$ | $P$  |
|--------------------------------------------------------------|------------------------------------------------------------------|---------|------|
|                                                              | No No. (%) | Yes No. (%) |       |      |
| Age                                                          |            |             |       |      |
| 18-19                                                        | 7 (13.7)  | 44 (86.3)   | 1.26  | 0.737|
| 20-25                                                        | 35 (16.6) | 176 (83.4)  |       |      |
| 26-30                                                        | 7 (21.9)  | 25 (78.1)   |       |      |
| >31                                                          | 5 (13.2)  | 33 (86.8)   |       |      |
| Gender                                                       |            |             |       |      |
| Female                                                       | 42 (17.2) | 202 (82.8)  | 0.6   | 0.436|
| Male                                                         | 12 (13.6) | 76 (86.4)   |       |      |
| Nationality                                                  |            |             |       |      |
| Saudi                                                        | 51 (16)   | 267 (84)    | 0.28  | 0.598|
| Non-Saudi                                                    | 3 (21.4)  | 11 (78.6)   |       |      |
| Marital status                                               |            |             |       |      |
| Not married                                                  | 42 (16.2) | 212 (83.5)  | 0.05  | 0.81 |
| married                                                      | 12 (15.4) | 66 (84.6)   |       |      |
| Education level                                              |            |             |       |      |
| Bachelor's degree                                            | 50 (17)   | 244 (83)    | 1.12  | 0.569|
| Diploma                                                      | 3 (9.7)   | 28 (90.3)   |       |      |
| Master's degree                                              | 1 (14.3)  | 6 (85.7)    |       |      |
| Do you have any chronic diseases?                            |            |             |       |      |
| No                                                           | 50 (16.4) | 255 (83.6)  | 0.04  | 0.831|
| Yes                                                          | 4 (14.8)  | 23 (85.2)   |       |      |
| Do you know anyone who has been diagnosed in your circle with coronavirus this year? | 25 (15.8) | 133 (84.2)  | 0.04  | 0.835|
| No                                                           | 29 (16.7) | 145 (83.3)  |       |      |
| Yes                                                          |            |             |       |      |
| Did you get the seasonal influenza vaccine before?            |            |             |       |      |
| No                                                           | 24 (15.4) | 132 (84.6)  | 4.74  | 0.093|
| Not sure                                                     | 15 (25.4) | 44 (74.6)   |       |      |
| Yes                                                          | 15 (12.8) | 102 (87.2)  |       |      |
| Do you think that the COVID-19 vaccine, whenever available, would be safe? | 15 (93.8) | 1 (6.3)     | 107.08 | <0.001|
| No                                                           |             |             |       |      |
| Do not know                                                  | 29 (30.5) | 66 (69.5)   |       |      |
| Yes                                                          | 10 (4.5)  | 211 (95.5)  |       |      |
| Do you think that the COVID-19 vaccine, whenever available, would be effective? | 9 (52.9)  | 8 (47.1)    | 49.63 | <0.001|
| No                                                           |             |             |       |      |
| Do not know                                                  | 33 (30.6) | 75 (69.4)   |       |      |
| Yes                                                          | 12 (5.8)  | 195 (94.2)  |       |      |
| Do you think that the best way to avoid the complications of COVID-19 is by getting the vaccine? | 20 (80)  | 5 (20)      | 98.7  | <0.001|
| No                                                           |             |             |       |      |
| Do not know                                                  | 17 (29.8) | 40 (70.2)   |       |      |
| Yes                                                          | 17 (6.8)  | 233 (93.2)  |       |      |
| Do you think that greater public awareness is needed about COVID-19 vaccine? | 7 (20)   | 28 (80)     | 0.4   | 0.527|
| No                                                           |             |             |       |      |
| Yes                                                          | 47 (15.8) | 250 (84.2)  |       |      |
| Do you think your information about COVID-19 is enough?       |             |             |       |      |
| No                                                           | 16 (26.2) | 45 (73.8)   | 5.44  | 0.02 |
| Yes                                                          | 38 (14)   | 233 (86)    |       |      |
| Is the available information about coronavirus sufficient in Saudi society? | 10 (30.3) | 23 (69.7)   | 5.32  | 0.07 |
| No                                                           |             |             |       |      |
| Do not know                                                  | 11 (15.3) | 61 (84.7)   |       |      |
| Yes                                                          | 33 (14.5) | 194 (85.5)  |       |      |
| Do you have faith/trust in the health system to manage the situation? | 6 (50)    | 6 (50)      | 24.5  | <0.001|
| No                                                           |             |             |       |      |
| Do not know                                                  | 9 (45)    | 11 (55)     |       |      |
| Yes                                                          | 39 (13)   | 261 (87)    |       |      |
have died because of SARS-CoV-2 infection. Prior studies have noted the importance of vaccinations in preventing the ongoing pandemic. Vaccine acceptance varies among the general population depending on many factors such as time, space, ethnicity, social class, and different human behavior. This study set out with the aim of assessing the acceptance rate of the COVID-19 vaccine among Taif University students and evaluating the student’s beliefs and thoughts toward taking vaccine.

Our research found that out of 332 participants, 278 (83.7%) said yes to uptake the COVID-19 vaccine, whereas 54 (16.3%) said no. Furthermore, study participants who thought that the vaccine is safe (95.5%), effective (94.2%), and the best way to prevent the complication of COVID-19 infection (93.2%) have a higher rate to accept the vaccine, whereas fearing side effects was the main reason for vaccine refusal (72.2%). Having enough information about the COVID-19 vaccine (86%) and trust in the health system (87%) are considered a good explanation of willingness to take the vaccine.

As we expect, our result shows that there is a highly significant association between planning to get the vaccine and students’ positive thoughts about vaccine safety and effectiveness, in addition to those who thought that the vaccine will prevent the complication of COVID-19 infection. As well as a result of a previous study, which, in turn, highlights the importance of positive believes as major factors related to the acceptance of the vaccine.

Also, in our cohort, we find a significant relation between trusting to the MOH and intent to vaccinate, which is similar to the findings by Lazarus et al. This is a strong point to consider as
several studies have reported that lack of trust and information was one of the hesitations causes to vaccinate.\cite{27,28}

Moreover, a high percentage of the students aged 20–25 years report that they will take the vaccine if their doctor recommends it to them as a motivating scenario, which indicates the positive influence of the physician in our society.

Among our participants, a medical specialty student significantly had a higher percentage of planning for vaccination than others in context to recently published data.\cite{28} This finding is most probably due to their awareness about vaccine development and safety as Graham et al. explain it.\cite{30}

To more surprising results, there is no significance between intent to get the vaccine and knowing someone who had been infected by COVID-19 this year. This is opposite to the published Jordanian study, which reaches a significant relationship between those two variables.\cite{26} The best explanation of this difference from our view is that it is a time of conducting the study as Jordanian was conducted on October 2020 where there was a lot of information missing about the nature of the infection and the high rise of the number of cases unlike ours.

Furthermore, there is ininsignificance between the participants’ character as (having chronic illness and history of getting influenza vaccine before) and their planning to get the vaccine in contrast to a recently published Saudi study that states those people have a higher percent of intent to get a vaccine.\cite{25}

Regarding barriers to getting vaccines, in our study, nonmedical students had a significantly higher percentage of those who concern about the side effects of the vaccine and those who thought they did not need the vaccine because they are already following the protective measurement. This partially agrees with several previous studies which state that concern about side effects is one of the common hesitancy factor in the general population.\cite{31–33}

In the light of the present study’s results, primary healthcare physicians could play an important role in correcting the misconceptions and wrong beliefs concerning COVID-19 vaccine among university students through health education and consequently encourage them to uptake the vaccine.

The current research has some drawbacks; first, it was performed using an online self-administered questionnaire. Several factors, such as internet accessibility and social media network access, may directly affect the sample population. As a consequence, it is necessary to account for reporting bias. Second, the current research did not look at the reasons for vaccine acceptance or the various obstacles to vaccination. Third, since our sample was relatively small and restricted to Taif University students, further study was needed to investigate the barriers and acceptance of the vaccine among University students in the rest of Saudi Arabia.

**Conclusion**

In conclusion, our research findings show that there is a strong association between vaccine initiation and positive attitudes toward vaccine safety and effectiveness among students, the significant conclusion of our research was that medical specialty students had a significantly higher percentage of vaccination initiation than other specialty students, this is most likely due to their knowledge of vaccine production and safety, also we found that there is a strong connection between trusting the MOH and vaccine intention, which we regard as a strong point in our culture and society.

**Key points**

- Acceptance rate for uptake of COVID-19 vaccine among Taif University students is high.

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### Table 7: Relationship between barriers to COVID-19 vaccine and reasons encouraging participants to get it and participants’ specialty

| Variable | Specialty | Medical No. (%) | Non-medical No. (%) | $\chi^2$ | P |
|----------|-----------|----------------|---------------------|--------|----|
| I am concerned about the vaccine’s side effects | 16 (41) | 21 (59) | 5.84 | 0.016 |
| I don’t believe that the vaccine will stop the infection | 7 (43.8) | 9 (56.3) | 1.59 | 0.206 |
| I don’t need the vaccine because I do all the right things. I wash my hands and wear a mask and gloves | 8 (36.4) | 14 (63.6) | 4.95 | 0.026 |
| The COVID-19 vaccine is a conspiracy | 1 (33.3) | 2 (66.7) | 0.81 | 0.366 |
| Other | 1 (33.3) | 2 (66.7) | 0.81 | 0.366 |
| Under those scenarios, would you be more likely to get the COVID-19 vaccine? | 2 (50) | 2 (50) | 0.13 | 0.715 |
| Check which statement shows why you do not plan to get COVID-19 vaccine (check all that apply). | 0 (0) | 1 (100) | 1.44 | 0.229 |
| If my physician recommended it to me | 6 (60) | 4 (40) | 0.004 | 0.95 |
| If it was mandatory by my job | 8 (42.1) | 11 (57.9) | 2.38 | 0.122 |
| If it was compulsory by the government (MOH) | 14 (50) | 14 (50) | 1.03 | 0.31 |
| If my family or friends got vaccinated | 2 (25) | 6 (75) | 3.92 | 0.048 |
| If I know that more studies showed that the vaccine is safe and effective. | 16 (55.2) | 13 (44.4) | 0.19 | 0.658 |
| I would not take it in any situation | 4 (44.4) | 5 (55.6) | 0.81 | 0.367 |
| If there is a way other than injection | 1 (50) | 1 (50) | 0.06 | 0.794 |
| Other | 0 (0) | 1 (100) | 1.44 | 0.229 |
• Perception of the vaccine safety, its effectiveness, and that it is the best way to prevent the complication of COVID-19 infection are essential to accept the vaccine
• Fearing vaccine side effects was the main reason for vaccine refusal
• Primary healthcare physicians could play an important role in improving uptake of the vaccine.

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Conflicts of interest
There are no conflicts of interest.

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