The Coronavirus Disease Pandemic: Assessment of Perceived Barriers and Threats among Undergraduate University Students in Saudi Arabia

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INTRODUCTION

The coronavirus disease (COVID-19) is an ongoing infectious disease that has posed a threat to people’s health globally. It has been declared as a public health emergency of international concern. The COVID-19 pandemic is unique in many ways, when compared to other previous pandemics. The first case of infection with severe acute respiratory syndrome coronavirus 2 (SARS-COV) was reported in 2003, following which a global outbreak of the disease occurred, named COVID-19. The outbreak was reported for the first time in late December 2019, when groups of pneumonia cases associated with epidemiological exposure to the seafood market and unlisted exposure were reported in Wuhan, China. Owing to the spread of the disease to other regions globally, COVID-19 was declared a pandemic.

COVID-19 is highly contagious that it has rapidly spread to almost all people worldwide. Based on the rate of spread as well as with the use of mathematical models, it is predicted that 50%-60% of the world’s population will be affected by COVID-19. According to the World Health Organization (WHO), as of December 7, 2020, more than 65.8 million cases of COVID-19 and more than 1.5 million related deaths have been reported since the start of the pandemic; of all countries, the United States of America and India have the highest incidence rates.

In light of the severe consequences of the current pandemic, the WHO has formulated several guidelines related to COVID-19. The WHO has started online sessions and training programs with an intent to increase awareness of COVID-19 and achieve prevention and control of the disease spread among healthcare workers and the general population. Prevention and control of infection require not only the application of knowledge and experience, but also a high level of self-efficacy and a low level of perceived barriers. A perceived threat is a coin that has two faces. If it is moderately perceived, then it can foster positive preventive behaviors. Contrarily, if it is highly perceived, then it may lead to panic behaviors and compromised immunity. Furthermore, when self-efficacy is increased, it can decrease barriers to improving preventive practices.

Community members are stakeholders who play a very important role in limiting the spread of COVID-19 by blocking the infection chain and eradicating the disease. This occurs
with an increase in people's awareness about the disease and the benefits of preventive measures and a reduction in perceived barriers they might have toward adopting preventive behaviors. A perceived barrier is defined as an individual's estimation of the degree of challenge due to social, personal, environmental, and economic obstacles that hinder an action or the goal of an action. Perceived barriers and threats are essential parts of many healthy behavior theories. The Health Belief Model (HBM) is one of the first models that were developed to determine and understand health-related behaviors and identify key health beliefs. In HBM, perceived barriers and benefits may precipitate the potential for recommended action, as well as any other component such as perceived threat. Moreover, according to the protection motivation theory, the general population's intention to take preventive measures is greatly influenced by high levels of perceived threats. The theory assumes that public awareness of the severity and vulnerability to a specific health risk determines their perceived threats to the disease. Therefore, during a new epidemic, obtaining information about the disease from several sources such as health teams and mass media can increase personal awareness of the associated dangers, thereby enhancing the implementation of preventive measures against the epidemic.

METHODS

Study objectives

This study aimed to identify perceived barriers and perceived threats among Najran University students during the COVID-19 pandemic. Study design: This cross-sectional study was conducted at Najran University Campus, Najran City, using a non-probability sampling technique (snowball sampling). The study was conducted from the beginning of March to the end of June 2020; data were collected using a web-based questionnaire. An online link to the questionnaire was sent to the participants through their personal e-mail address and social media applications such as WhatsApp, Facebook, and Twitter. Confidentiality of the data obtained was assured and maintained.

Inclusion criterion

All Saudi students with valid e-mail IDs, active social media users, and those who consented to participate in the study were included.

Sample size

The sample size was calculated using the Epi Info 7 program, where the sample size for frequency in a population size was 16809, corresponding to a 99% confidence level; the anticipated frequency was 50%, and the design effect was 1%. The sample size was 761 students.

Table 1. Percentage distribution of the study participants according to their perceived barrier scores (n=761)

| No. | Perceived barrier                                                                 | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|-----|-----------------------------------------------------------------------------------|-------------------|----------|---------|-------|----------------|
| 1   | For me, preventing COVID-19 infection requires a lot of difficult procedures   | 47 6.2            | 133 17.5 | 136 17.9 | 222 29.2 | 223 29.3 |
| 2   | My economic and social conditions do not enable me to adhere to COVID-19 preventive measures | 112 14.7     | 253 33.2 | 146 19.2 | 120 15.8 | 130 17.1 |
| 3   | I cannot easily change my unhealthy habits                                      | 68 8.9            | 176 23.1 | 150 19.7 | 214 28.1 | 153 20.1 |
| 4   | Being committed to health quarantine is difficult for me                         | 132 17.3          | 205 26.9 | 133 17.5 | 156 20.5 | 135 17.7 |
| 5   | Adherence to preventive measures restricts my freedom                           | 115 15.1          | 205 26.9 | 145 19.1 | 161 21.2 | 135 17.7 |
A self-administered questionnaire was developed by the researchers after consulting relevant literature. It consists of two parts: demographic variables and perceived barriers. The demographic variables included sex, age, college, residence, marital status, family income, and medical history, while the questionnaire on perceived barriers was based on the HBM. It consisted of five statements for the evaluation of perceived barriers to seeking health care during COVID-19. It was rated on a 5-point Likert scale. The overall scale scores ranged from 5 to 25.

**Table 2.** Percent distribution of the study participants according to their perceived threat scores (n=761)

| No. | Perceived threats                                                                 | True to a great extent | True | I don’t know | Not true at all |
|-----|-----------------------------------------------------------------------------------|------------------------|------|--------------|----------------|
|     |                                                                                   | n          | %    | n          | %       | n          | %    | n          | %    |
| 1.  | My body-build is weak and will not be able to fight infection                      | 142        | 18.7 | 82         | 10.8   | 209        | 27.5 | 328        | 43.1 |
| 2.  | I am concerned that I cannot control the epidemic                                  | 212        | 27.9 | 170        | 22.3   | 196        | 25.8 | 183        | 24.0 |
| 3.  | I am concerned about death if I become infected                                    | 178        | 23.4 | 92         | 12.1   | 180        | 23.7 | 311        | 40.9 |
| 4.  | I have a great fear of COVID-19 infection                                          | 193        | 25.4 | 138        | 18.1   | 206        | 27.1 | 224        | 29.4 |
| 5.  | I think that COVID-19 will have a negative impact on my life                       | 156        | 20.5 | 126        | 16.6   | 188        | 24.7 | 291        | 38.2 |
| 6.  | I am worried about my family                                                       | 444        | 58.3 | 165        | 21.7   | 88         | 11.6 | 64         | 8.4  |

**Tool I**

Patient Threat Perceptions in the Emergency Department Scale (PTPEDS).

The scale developed by Cornelius et al. (2018) consisted of 12 items rated on a 4-point Likert scale.\(^2\) The scale was adapted to the COVID-19 outbreak containing 6 items. The total score ranged from 6 to 24.

**Instrument validity and reliability**

The tools were tested for face, content, and construct validity by a jury of five experts from the fields of nursing and medicine. Instrument reliability was assessed using the Cronbach’s alpha coefficient test.

A pilot study was conducted among 10% of the participants who were excluded from the main study. This pilot study aimed to ascertaining the clarity and validity of the instrument.

**Data collection and analysis**

Data were collected during the study period using a web-based questionnaire. The data collected were analyzed using SPSS software, version 23. Categorical variables were presented as frequency (n) and percentage, while continuous variables were presented as mean ± standard deviation (SD). Relationships and correlations

**Table 3.** Percent distribution of the study participants according to their total perceived barriers and threats score (n=761)

| Total perceived barriers and threats score | Low | Moderate | High |
|-------------------------------------------|-----|----------|------|
|                                           | n   | %        | n    | %    | n    | %    |
| Total perceived barriers                  | 122 | 16.0     | 272  | 35.7 | 367  | 48.2 |
| Total perceived threats                   | 174 | 22.9     | 367  | 48.2 | 220  | 28.9 |

Table 3 shows that about half (48.2%) of the study participants had high perceived barriers. Besides, the same percentage of the study participants had moderate total perceived threats.
among variables were analyzed using Fisher’s exact test. Values of p <0.05 were considered as indicating statistical significance.

RESULTS

Demographic data

Mean age of the participants was 20.27±4.39 years. Moreover, 75.5% of the study participants were urban residents, and 67.5% were females. Less than two-thirds (60.4%) of the participants were affiliated with non-health science colleges, and 84.8% were single. Furthermore, more than three-fourths (76.9%) of the participants had a monthly family income of less than 5000 SAR. Only 10.9% of the participants had a history of chronic disease.

DISCUSSION

According to Khosravi (2020), primary emotional concerns and public confidence are crucial factors that mitigate perceived threats and decrease perceived barriers associated with a pandemic, thereby enhancing public acceptance of protective measures\textsuperscript{13}. Therefore, specialists can develop and use behavior models to decrease perceived barriers as an effective response to a pandemic, and in the face of new threats.

The present study found that half of the study participants had a high level of perceived barriers to the prevention of COVID-19. These study participants had a moderate level of total perceived threats regarding COVID-19. The study findings also demonstrate that the most common source of threat was emotional concern toward their families. These findings are in agreement with those reported earlier by at least four other studies. In a study on the effect of HBM-based education on nursing student’s health beliefs and knowledge about COVID-19, Elgzar et al. (2020) reported that the mean scores for perceived barrier in the intervention and control groups were 11.37±2.03 and 11.21±2.22, respectively, on a 15-point scale before intervention. Therefore, the participants were considered to have moderate perceived barriers to COVID-19, which were significantly decreased after the intervention. The study emphasized the importance of knowledge in decreasing perceived barriers among the students.
It is worth mentioning that the Elgzar et al. (2020) study was conducted in Najran University, the same setting as that of the present study. This could be one of the possible justifications for the consistency in the results of the two studies. In a cross-sectional study conducted to evaluate COVID-19-associated risk perception among Iranian medical students, Taghrir et al. (2020) reported moderate risk perception scores among the study participants. In a research on the application of HBM for the identification of COVID-19 risk perception, Costa (2020) reported a moderate level of total perceived susceptibility, and moderate-to-high levels of perceived barrier scores among the study participants. The efficiency of HBM in assessing COVID-19 determinants was further emphasized. In contrast, Bashirian et al. (2020) applied the protection motivation theory to investigate factors associated with COVID-19 preventive behaviors among Iranian hospital staff and found a high threat among the participants, with paramedical staff having the highest threat score. The differences between the results of the present study and those of the Bashirian et al. (2020) study may be attributed to differences in the study settings. The study by Bashirian et al. (2020) was conducted at a hospital wherein the infection risk was expected to be very high.

### Table 5. Relationship between total perceived threats and their demographic characteristics (n=761)

| Demographic characteristics | Low | Moderate | High | Total | FET    | P     |
|-----------------------------|-----|----------|------|-------|--------|-------|
|                             | n   | %        | n    | %    | n      |       |
| Age ≥19 years               | 13  | 19.7     | 47   | 71.2 | 6      | 9.1   | 66    | 20.99 | 0.000* |
| 20-24 years                 | 128 | 22.5     | 261  | 45.9 | 180    | 31.6  | 569   |       |        |
| 25 years and more           | 33  | 26.2     | 59   | 46.8 | 34     | 27.0  | 126   |       |        |
| Location of residence       |     |          |      |      |        |       |       |       |        |
| Urban                       | 135 | 23.5     | 276  | 48.1 | 163    | 28.4  | 574   | 5.70  | 0.222  |
| Semi-urban                  | 23  | 19.2     | 66   | 55.0 | 31     | 25.8  | 120   |       |        |
| Rural                       | 16  | 24.2     | 25   | 37.9 | 25     | 37.9  | 66    |       |        |
| Type of college             |     |          |      |      |        |       |       |       |        |
| Health sciences             | 95  | 31.6     | 153  | 50.8 | 53     | 17.6  | 301   | 40.10 | 0.000* |
| Non-health sciences         | 79  | 17.2     | 214  | 46.5 | 167    | 36.3  | 460   |       |        |
| Gender                      |     |          |      |      |        |       |       |       |        |
| Male                        | 61  | 24.7     | 122  | 49.4 | 64     | 25.9  | 247   | 1.77  | 0.409  |
| Female                      | 113 | 22.0     | 245  | 47.7 | 156    | 30.4  | 514   |       |        |
| Marital status              |     |          |      |      |        |       |       |       |        |
| Married                     | 26  | 22.4     | 53   | 45.7 | 37     | 31.9  | 116   | 0.64  | 0.732  |
| Unmarried                   | 148 | 22.9     | 314  | 48.7 | 183    | 28.4  | 645   |       |        |
| Monthly income              |     |          |      |      |        |       |       |       |        |
| <5000 SAR/month             | 125 | 21.4     | 300  | 51.3 | 160    | 27.4  | 585   | 15.10 | 0.006* |
| 5000-10,000 SAR/month       | 26  | 23.4     | 49   | 44.1 | 36     | 32.4  | 111   |       |        |
| >10,000 SAR/month           | 23  | 35.4     | 18   | 27.7 | 24     | 36.9  | 65    |       |        |
| Chronic illness             |     |          |      |      |        |       |       |       |        |
| Yes                         | 11  | 13.3     | 44   | 53.0 | 28     | 33.7  | 83    | 5.25  | 0.07   |
| No                          | 163 | 24.0     | 323  | 47.6 | 192    | 28.3  | 678   |       |        |

*P<0.05. FET = Fisher Exact test.

Table 5 shows statistically significant associations between total perceived threats and age, type of college, and monthly income. On the other hand, there was no relationship between perceived threats and location of residence, gender, marital status, and chronic illness.

### Table 6. Correlation between participants' total perceived barriers and threats associated with COVID-19 pandemic

| Perceived barriers and threats | Mean ±SD | r     | P     |
|--------------------------------|----------|-------|-------|
| Total threats                  | 14.65±5.29 | 0.562 | 0.000* |
| Total barriers                 | 15.66±5.1  |       |       |

*P <0.05 (r =Pearson correlation coefficient).

Table 6 shows statistically significant correlation between total perceived barriers and threats (p<0.05).
Thus, the threat was also high. In contrast, the present study was conducted in a university setting where the participants had no direct contact with COVID-19 patients. The present study results indicated a significant relationship between students’ perceived barriers and perceived threats to their family income. Low-income students had higher perceptions of barriers and threats toward COVID-19. These findings seem logical because low-income students could not afford to buy protective equipment, unlike high-income students. Consequently, they may find themselves at a higher risk of contracting COVID-19. In addition, they may feel insecure among their families because they cannot stay at home during health quarantine because they are low-income earners.

The results of this study indicate significant relationships among the total perceived threats, barriers, and age. An in-depth analysis of the relationship between perceived threats and age revealed that older students had higher perceived threats and perceived barriers than their younger counterparts. This may be attributed to the fact that older students, who more mature, can effectively evaluate the severity of the COVID-19 situation. De Zwart et al. (2009)\textsuperscript{19} obtained a similar result in a study on perceived threats, risk, and efficacy with regard to SARS. They reported a significant relationship between perceived threats and age: perceived threat levels increased as age increased.

The findings of Yildirim et al. (2020)\textsuperscript{20} and de Zwart et al. (2009)\textsuperscript{19} show variance with the results obtained in the present study. They found that females had higher perceived threats and fear of COVID-19 than males. The difference between the findings of the current study and those of previous studies may be attributed to differences in the culture and age of the study populations. The study by Yildirim et al. was conducted among Turkish adults with a mean age of 30.33 years, while the current research was carried out among Saudi university student participants with a mean age of 20.27 years.

Another significant relationship was found between college type and perceived barriers and perceived threats. Surprisingly, non-health science college students had higher levels of perceived threats and perceived barriers than health sciences college students. The hospital training provided to students in health science colleges such as medicine, nursing, dentistry, and applied medical sciences may place them at risk for COVID-19. Usually, these college students receive more training on preventive and protective measures against infectious diseases than other college students. In addition, they attended infection control courses before starting the hospital training. Thus, they may have more self-confidence in COVID-19 control because of their medical background. Lack of knowledge about infection control and self-protection may be a major barrier for non-health science college students. There are no published studies on the relationship between perceived threats and college type.

A significant association was observed between perceived barriers and residence location, wherein 69.7% of the rural residents had high levels of perceived barriers. This result may be attributed to the lack of health facilities in rural areas, when compared to urban and suburban areas. Furthermore, rural dwellers may lack health orientation programs about preventive and protective practices for COVID-19. An association was found between sex and perceived barriers, with male students having higher levels of perceived barriers than female students. In Saudi culture, males have more freedom of movement than females. They can visit different recreational places with their peers. Consequently, they may find it more difficult to maintain social distancing than female students who usually spend most of their time at home.

To the best of our knowledge, this is the first study on the relationship between perceived barriers, perceived threats, and participants’ demographic variables during the COVID-19 pandemic. The findings of the present study provide valuable information for decision-makers about factors that may affect a population’s perceived barriers and perceived threats during the COVID-19 pandemic.

CONCLUSION

The results of this study indicate that approximately half of the study participants had...
high levels of perceived barriers and moderate levels of total perceived threats toward COVID-19. There were significant associations between participants’ total perceived barriers and threats, age, college type, and monthly income. Moreover, the present study demonstrated significant relationships between perceived barriers and participants’ residence location and sex. In addition, perceived barriers were significantly correlated with perceived threats.

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CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

AUTHORS’ CONTRIBUTION
All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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DATA AVAILABILITY
All datasets generated or analyzed during this study are included in the manuscript and/or the Supplementary Files.

ETHICS STATEMENT
The research was approved by the Deanship of Scientific Research and the Institutional Review Board of the College of Medicine, Najran University. Formal approval was obtained from the administration of each college. Informed consent was obtained from all the participants. All data obtained were kept confidential and used for research purpose only.

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