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# Egyptians' Perceptions of COVID-19: Applying the Health Belief Model: A Cross-sectional Study

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**Abstract**

**BACKGROUND:** Many studies have found that assessing COVID-19 preventive behaviors using the health belief model (HBM) to understand both motives and fears is critical to better controlling the disease.

**AIM:** The aim of the study was to assess the perceptions of social distancing as a preventive measure during the COVID-19 pandemic using the HBM among a sample of the Egyptian population.

**METHODS:** An exploratory cross-sectional study was conducted using an online survey distributed through one of Egypt's most popular social media platforms. Four hundred and seventy people responded to the survey. The survey constructed of two sections; the first section for sociodemographic data and Section 2 was for HBM constructs of self-efficacy, perceived susceptibility, and severity to COVID-19 prevention benefits and barriers.

**RESULTS:** More than half of the participants (59.8%) were in the age range of 20–29, with an average age of 29.0 ± 6.4 years. Two hundred ninety-seven participants (63.2%) were females; 60.2% lived in the canal region; 57.9% were single; and 70% had university degrees. There were statistically significant differences regarding gender; females' perceived higher scores in almost all model constructs (benefits, susceptibility, severity, self-efficacy, and total score). Many statistically significant differences were observed; those who were older than 30 years had higher scores in barriers, benefits, self-efficacy, and total score than younger ones. Similarly, married participants reported higher scores in barriers, benefits, self-efficacy, and total score than younger ones. Postgraduate education perceived higher scores than university in benefits, susceptibility, self-efficacy, and total score.

**CONCLUSION:** In the present study, the majority of respondents had relatively high perceived benefits, severity, and self-efficacy, with the lower perceived self-COVID-19 susceptibility but higher for family members. Females perceived higher scores in almost all model constructs (benefits, susceptibility, severity, self-efficacy, and total score).

## Introduction

A coronavirus disease 2019 (COVID-19) pandemic has emerged in December 2019 due to the newly discovered coronavirus [1]. The COVID-19 virus is principally spread during close contact through droplets [2]. People contract the virus when non-infected people with the virus have close and sustained contact with people who are infected, even if they are not symptomatic [3]. This means being in close contact for more than 15 min within 2 m of an infected person. This close contact could be achieved by talking to someone who is infected [4].

Social distancing makes space between people. When infected people stay away from others, they cannot pass it to anyone else [5]. Social distancing also includes not going out unless necessary, avoiding social situations, and working from home whenever possible [6]. Prevention of infection is the foundation and most proven strategy for pandemic containment and control [7].

The health belief model (HBM) is a social psychological health behavior change model that was developed in the early 1950s by social scientists at the U.S. Public Health Service to explain and predict health-related behaviors, such as the failure of people to uptake disease preventive measures [8]. The model was derived from a theory of two major components: (1) The desire of escape illness, or contrary-wise recover if at present ill; and (2) the belief that a specific health behavior will prevent or cure illness [9].

It depends on five constructs (perceived benefits, perceived susceptibility, perceived severity, perceived barriers, and perceived self-efficacy) [8]. Many studies have found that assessing COVID-19 preventive behaviors using the HBM to understand both motives and fears is critical to better controlling the disease [10], [11], [12]. Hence, this study aims to assess the perceptions of social distancing as a preventive measure during the COVID-19 pandemic using the HBM among a sample of the Egyptian population.

## Methods

### *Study design*

The current exploratory and cross-sectional study was carried out using an online survey distributed through one of Egypt's most popular social media platforms, the Facebook application. To ensure a high response rate, requests were made to the administrators of these groups for permission to distribute the survey. The researchers then posted the link to the survey along with a statement explaining its purpose and encouraging members to participate. The study lasted 2 weeks (from December 2020 to February 2021) and lasted 1 week during the second wave.

### *Sampling technique and sample size*

A sample size of 287 was calculated based on the previous work by [13]. The reported the perceived susceptibility of COVID-19 was 24.8%. Using the following formula

$$n = [Z_{\_} (\propto/2)/E] \text{ ^2*p } (1-p)$$

n = required sample size, = 1.96, p = prevalence of the outcome [14], E = margin of error; 0.05. Assuming the non-response rate is 10%, a minimum sample of 316 participants was needed.

The researchers employed a convenience sampling technique, searching on Facebook for groups with a large network. They found the groups and distributed announcements about the study to them, along with a link to the study page. For 2 weeks, this link was made available in some groups. Four hundred and seventy people completed the questionnaire during this period.

### *A data collection tool*

A pre-tested Arabic language E-form questionnaire with two sections was used for data collection:

- Section I: Sociodemographic data: Age, sex, region of residence, marital status, educational level, residence, occupation, living with kids in home, and working status
- Section II: HBM constructs of self-efficacy, perceived susceptibility, and severity to COVID-19 prevention benefits and barriers.

There were *five items measured as barriers* (Cronbach's $\alpha$ = 0.41)*, four items measured benefits* (Cronbach's $\alpha$ =0.78)*, four items measured perceived susceptibility* (Cronbach's $\alpha$ = 0.51)*, four items measured perceived severity* (Cronbach's $\alpha$ = 0.68), *and four items measured self-efficacy* toward health (Cronbach's $\alpha$ = 0.77). For each question on a Likert scale, a score was given as follow for neutral score 0, disagree = 1, and agree = 2. For other questions; no was given a score of zero and yes score = 1; the summation of score was done in each section and total score was calculated.

The included items were originally written in English and then translated into Arabic by two experts, who were followed by a back translation into English by other independent experts. Following the collection of public health experts' perspectives, the face and content validity were examined. The preliminary data collection form was tested on ten participants to assess question clarity and comprehension, as well as the time required to complete the questionnaire. It took 10 min to complete, and no phrases or words were omitted. The survey could not be taken from the same electronic device more than once.

### *Statistical analysis*

The Statistical Package for the Social Science program was used for statistical analysis (SPSS, version 24.0 IBM). For qualitative variables, numbers and percentages were used. For qualitative variables, the Chi-square test was used to make group comparisons. For score comparisons between groups; independent *t*-test and ANOVA test followed by pair-wise comparison by Bonferroni test were used as appropriate. $p < 0.05$ was considered statistically significant.

### *Ethical considerations*

All data collection procedures were conducted in accordance with the Helsinki declarations of biomedical ethics. The electronic form included information about the study's purpose and the following question: Do you want to take part in the survey? (If not, the form will be submitted.) After providing their consent, the participants were given access to the survey. Participants were informed that they would be taking part in an anonymous survey and that their participation was entirely voluntary.

## Results

More than half of participants (59.8%) were in the age range of 20–29 with an average age of 29.0 ± 6.4 years. Two hundred and ninety-seven participants (63.2%) were females, 60.2% lived in canal region, 57.9% were singles and 70% had university degrees. Comorbid diseases present in 21% of participants with 9.3% reported to had chest diseases.

The majority of participants (71.7%) were not worker or not working in the medical field; working pattern after COVID-19 has been changed 66% of participants (Table 1).

**Table 1: Demographic and characteristics of participants (n = 470)**

| Gender | No (%) |
|---|---|
| Female | 297 (63.2) |
| Male | 173 (36.8) |
| Age group (years) | |
| 20–29 | 281 (59.8) |
| 30–39 | 166 (35.3) |
| 40–49 | 17 (3.6) |
| 50–59 | 5 (1.1) |
| >60 | 1 (.2) |
| Residence | |
| Canal region | 283 (60.2) |
| Alex region | 12 (2.6) |
| Delta region | 123 (26.2) |
| Great Cairo | 29 (6.2) |
| Upper Egypt region | 23 (4.9) |
| Marital status | |
| Married | 191 (40.6) |
| Single | 272 (57.9) |
| Widow | 1 (0.2) |
| Divorced | 6 (1.3) |
| Kids in home | |
| No | 212 (45.1) |
| Yes | 258 (54.9) |
| Education | |
| Secondary (General-technical) | 14 (3.0) |
| University | 329 (70.0) |
| Postgraduate degree | 127 (27.0) |
| Occupation | |
| Working medical field | 133 (28.3) |
| working not medical field | 171 (36.4) |
| Not working | 166 (35.3) |
| Work after COVID-19 status (n = 304) | |
| I took a vacation | 64 (21.1) |
| I work online from home | 64 (21.1) |
| I still go to work every day of the week | 73 (24.0) |
| I still go to work, not every day of the week | 103 (33.9) |
| Comorbidity-chronic diseases | |
| Yes | 103 (21.9) |
| Type of comorbid diseases* | |
| Obesity | 22 (4.7) |
| Chest | 46 (9.8) |
| DM | 14 (3.0) |
| HTN | 17 (3.6) |
| Cardiac | 7 (1.5) |
| Others | 16 (3.4) |

*Participants reported more than one comorbid disease at he same time, DM: Diabetes mellitus, HTN: Hypertension.

About 75% of participants considered living with a daily working family member is a barrier, 27% believed that the virus has become widely spread and social distancing is useless, and 74% believed that depending on social distancing for long periods is not applicable.

The results showed that the most respondents had relatively high perceived benefits, severity, and self-efficacy. On the other hand, they showed lower perceived self-susceptibility but higher for family members (Table 2).

There were statistically significant differences regarding gender; females perceived higher scores in almost all model constructs (benefits, susceptibility, severity, self-efficacy, and total score). Many statistically significant differences were observed. Those who were older than 30 years had higher scores in barriers, benefits, self-efficacy, and total score than younger ones. Similarly, married participants reported higher scores in barriers, benefits, self-efficacy, and total score than younger ones. Postgraduate education perceived higher scores than university in benefits, susceptibility, self-efficacy, and total score.

**Table 2: Frequency distribution of answers to questions based on the health belief model constructs**

| Perceived Barriers | No | Yes | |
|---|---|---|---|
| I live with a family member who has to go to work every day | 116 (24.7) | 354 (75.3) | |
| I have to go to my elder parents to take care of them daily | 326 (69.4) | 144 (30.6) | |
| Have to be in crowded places every day (such as metros and crowded markets) | 343 (73.0) | 127 (27.0) | |
| | Neutral | Disagree | Agree |
| The virus has become widely spread among all members of society and everywhere, which makes community distancing useless "COVID cannot be kept away by social distancing | 162 (34.5) | 181 (38.5) | 127 (27.0) |
| No one can commit to social distancing all the time and for long periods | 67 (14.3) | 55 (11.7) | 348 (74.0) |
| Perceived benefits | | | |
| I believe that social distancing is effective in protecting me from the emerging corona virus infection | 127 (27.0) | 45 (9.6) | 298 (63.4) |
| I believe that social distancing is effective in protecting my family members from the emerging coronavirus infection | 125 (26.6) | 40 (8.5) | 305 (64.9) |
| Social distancing is effective in protecting others if I am infected with the emerging coronavirus | 66 (14.0) | 22 (4.7) | 382 (81.3) |
| There is still no proven treatment and thus preventing infection is the only effective method | 54 (11.5) | 9 (1.9) | 407 (86.6) |
| Perceived susceptibility | | | |
| Only people with chronic health problems are at risk of contracting the emerging coronavirus disease | 71 (15.1) | 339 (72.1) | 60 (12.8) |
| I think that I am more likely than others to contract the emerging coronavirus disease" | 189 (40.2) | 160 (34.0) | 121 (25.7) |
| I think that one of my family members is more likely than others to contract the emerging coronavirus disease | 137 (29.1) | 80 (17.0) | 253 (53.8) |
| I am concerned about the risk of rapidly deteriorating if I contract the emerging coronavirus due to other health problems I have | 119 (25.3) | 185 (39.4) | 166 (35.3) |
| Perceived severity | | | |
| The emerging coronavirus infection may lead to serious health problems | 46 (9.8) | 6 (1.3) | 418 (88.9) |
| The emerging coronavirus infection may lead to death, regardless of age group | 39 (8.3) | 13 (2.8) | 418 (88.9) |
| The emerging coronavirus infection may lead to the loss of loved ones | 17 (3.6) | 5 (1.1) | 448 (95.3) |
| I think if I contract the emerging corona virus, I will not be able to do daily activities | 125 (26.6) | 27 (5.7) | 318 (67.7) |
| Perceived Self-efficacy | | | |
| I can commit to staying at home as much as he recommends according to the instructions of the Ministry of Health and the concerned authorities | 97 (20.6) | 98 (20.9) | 275 (58.5) |
| Members of my family can afford to stay at home as much as is recommended, according to the instructions of the ministry of health and the concerned authorities | 101 (21.5) | 143 (30.4) | 226 (48.1) |
| My contact through the Internet and the phone with my loved ones without visits and gatherings sufficed during the period of the epidemic | 83 (17.7) | 119 (25.3) | 268 (57.0) |
| Unlike others, I can persuade my family members, especially children, to stay home for long periods of time | 112 (23.8) | 142 (30.2) | 216 (46.0) |

Participants with comorbidity had higher beliefs of susceptibility, and those working in medical fields had higher beliefs than non-workers and workers outside the medical field (Table 3).

## Discussion

According to the findings of the current study, the majority of respondents had relatively high perceived benefits, severity, and self-efficacy. They showed lower perceived self-COVID-19 susceptibility but higher for family members. This was consistent with the findings of a recent Saudi Arabian study, which

**Table 3: Relation between the health belief model constructs and participants demographic characteristics**

| Characteristics | Barriers | Benefits | Susceptibility | Severity | Self-efficacy | Total |
|---|---|---|---|---|---|---|
| | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD | Mean ± SD |
| Gender | | | | | | |
| Female | 3.8 ± 1.4 | 6.7 ± 2 | 4.5 ± 1.8 | 7.1 ± 1.5 | 6 ± 2.3 | 27.5 ± 4.9 |
| Male | 3.9 ± 1.7 | 5.4 ± 2.9 | 3.7 ± 2.1 | 6.7 ± 1.9 | 4.8 ± 2.7 | 24.4 ± 7.5 |
| p-value | 0.686 | <0.001 | <0.001 | 0.038 | 0.001 | <0.001 |
| Age | | | | | | |
| <30 | 4 ± 1.5 | 5.9 ± 2.6 | 4.1 ± 1.9 | 7 ± 1.6 | 4.6 ± 2.5 | 25.6 ± 6.4 |
| ≥30 | 3.6 ± 1.5 | 6.5 ± 2.2 | 4.4 ± 1.9 | 6.9 ± 1.8 | 6.2 ± 1.9 | 27.6 ± 5.6 |
| p-value | 0.007 | 0.01 | 0.068 | 0.614 | <0.001 | <0.001 |
| Marital status | | | | | | |
| Married | 3.7 ± 1.5 | 6.5 ± 2.2 | 4.3 ± 1.9 | 6.8 ± 1.8 | 5.9 ± 2.2 | 27.2 ± 5.7 |
| Single and currently no partner | 4.0 ± 1.5 | 6.0 ± 2.6 | 4.1 ± 2 | 7.0 ± 1.6 | 4.8 ± 2.5 | 25.8 ± 6.4 |
| p-value | 0.047 | 0.021 | 0.223 | 0.264 | <0.001 | 0.017 |
| Education | | | | | | |
| Secondary (General-technical) | 4 ± 1.4 | 6.6 ± 2 | 4.7 ± 2.1 | 7.1 ± 1.7 | 6.1 ± 2.3 | 28.5 ± 5.4 |
| University | 3.9 ± 1.5 | 6.0 ± 2.5a | 4.0 ± 1.9b | 6.9 ± 1.7 | 5.0 ± 2.5c | 25.8 ± 6.2d |
| Postgraduate degree | 3.7 ± 1.6 | 6.6 ± 2.2a | 4.5 ± 1.9b | 7.0 ± 1.5 | 5.8 ± 2.2c | 27.7 ± 5.8d |
| p-value | 0.368 | 0.038 | 0.023 | 0.712 | 0.002 | 0.005 |
| Kids in home | | | | | | |
| No | 4 ± 1.5 | 5.9 ± 2.7 | 4.1 ± 2 | 7 ± 1.5 | 4.7 ± 2.5 | 25.7 ± 6.6 |
| Yes | 3.7 ± 1.5 | 6.4 ± 2.2 | 4.2 ± 1.8 | 6.9 ± 1.8 | 5.8 ± 2.3 | 27.0 ± 5.7 |
| p-value | 0.049 | 0.053 | 0.502 | 0.295 | <0.001 | 0.031 |
| Comorbidity-chronic D | | | | | | |
| No | 3.9 ± 1.5 | 6.2 ± 2.4 | 3.9 ± 1.8 | 6.9 ± 1.7 | 5.3 ± 2.3 | 26.2 ± 6.2 |
| Yes | 3.8 ± 1.6 | 6.1 ± 2.5 | 5.1 ± 2 | 7.1 ± 1.6 | 5.1 ± 2.8 | 27.2 ± 6 |
| p-value | 0.89 | 0.766 | <0.001 | 0.236 | 0.502 | 0.110 |
| Occupation | | | | | | |
| Working medical field | 3.6 ± 1.4 | 6.9 ± 1.9 | 4.8 ± 1.6 | 7.1 ± 1.3 | 6.1 ± 1.9 | 28.6 ± 4.4 |
| Working not medical field | 4.3 ± 1.5 | 6.0 ± 2.5 | 4.0 ± 1.9 | 6.7 ± 1.9 | 5.4 ± 2.3 | 26.4 ± 6.6 |
| Not working | 3.6 ± 1.5 | 5.8 ± 2.7 | 3.8 ± 2 | 7.0 ± 1.6 | 4.4 ± 2.6 | 24.6 ± 6.3 |
| p-value | <0.001 | <0.001 | <0.001 | 0.093 | <0.001 | <0.001 |

Similar small case letters are statistically significant.

found that the majority of respondents rated COVID-19 susceptibility and severity as high [15]. This indicates that respondents were aware that they were at risk of contracting COVID-19 and were concerned about the severity of the disease. As a result of the high level of perceived benefits, they would adopt preventive measures. The high self-efficacy reported in the present study was significant, as individuals with high self-efficacy are more likely to maintain long preventive behaviors against COVID-19. [15], [16], [17]. It is critical to investigate perceived susceptibility and perceived severity because they are important constructs of the HBM and may have significant effects in various social contexts. Teitler-Regev *et al*. [15] and Karimy *et al*. [16] discovered that perceived susceptibility and perceived severity were significant predictors of health behaviors.

Our study revealed that participants with comorbidity had higher beliefs in susceptibility, and those working in medical fields had higher beliefs than non-workers and workers outside the medical field. This finding contrasted with a recent Saudi Arabian study, which found that people with diseases linked to a higher risk of COVID-19 contraction, such as diabetes mellitus and systemic arterial hypertension [1], [3], have no significantly different perception of contamination risk in their environment when compared to a control group of people with no self-reported chronic diseases. One possible explanation is that these patients act as if they do not have a chronic disease because they are mostly asymptomatic and have a stable and clinically controlled disease. As a result, we can create information dissemination policies that emphasize, if not specifically target, this risk group.

In the present study, postgraduate education outperformed university education in terms of benefits, susceptibility, self-efficacy, and total score. In contrast to what has been discovered in terms of the severity of symptoms and disease progression characteristics, participants with the lower levels of education (some and secondary education) in our sample expressed greater concern about potential symptoms, because their perceived severity levels were higher than in other schooling levels [18]. This group may seek medical attention sooner if they believe that their symptoms are more severe.

In the present study, there were statistically significant differences regarding gender; females perceived higher scores in almost all model constructs (benefits, susceptibility, severity, self-efficacy, and total score). This is an interesting target audience to provide more information regarding the virus.

## Conclusion

The majority of respondents had relatively high perceived benefits, severity, and self-efficacy, with the lower perceived self-COVID-19 susceptibility but higher for family members. Females perceived higher scores in almost all model constructs (benefits, susceptibility, severity, self-efficacy, and total score).

This is the first study of its kind in Egypt that has evaluated the individual's perception toward community preventive practices based on HBM. However, the present study had its own limitations, the sample was representative of a younger population, with the majority holding a bachelor's degree. In addition, as face-to face interviews were not possible due to the pandemic situation, we were not able to obtain responses from people who were uneducated and/or less proficient with smartphone usage.

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