Evaluation of Pregnant Woman's Perception of COVID-19 Based on the Health Belief Model in Isfahan

Abstract

Background: Coronavirus Disease (COVID-19) is a viral disease that has become an international public health concern. Thus, the present study aimed to evaluate pregnant women's perception of COVID-19 based on the health belief model in Isfahan. **Materials and Methods:** This cross-sectional study includes 100 pregnant women selected by random sampling. Data were collected using an online questionnaire on the Porsline website. This questionnaire examines the knowledge and structures of the health belief model, including perceived susceptibility and severity, perceived barriers and benefits, and self-efficacy regarding the prevention of COVID-19. Data were analyzed using analytical tests such as independent t-test and Pearson's correlation coefficient. The significance level was considered to be <0.05. **Results:** The results showed that the knowledge of COVID-19 and preventative methods was at a reasonable level among most women (77%). Also, there was a significant correlation between education and self-efficacy. Based on the findings, the mean score of knowledge ($F_{1,99} = 0.116$, $p = 0.04$) and the mean score of perceived susceptibility ($F_{1,99} = 0.02$, $p < 0.001$) of mothers who were pregnant for the first time were significantly higher than mothers who were pregnant for the second time or more. **Conclusions:** The perceived severity and susceptibility scores were higher than other constructs, indicating women's proper understanding of the risks of COVID-19. However, half of them stated that they do not go to receive services, and this issue can have adverse consequences. The researchers recommend planning to improve other model constructs, such as self-efficacy, for improving women's performance in receiving care.

Keywords: *COVID-19, health belief model, knowledge, pregnancy*

Narges Kalantari[1], Mohadeseh Khoshgoftar[2], Fatemeh Moradi[3], Asiyeh Pirzadeh[4]

[1]Department of Health Education and Promotion, Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, [2]Department of Health Education and Health Promotion, Student Research Committee, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran, [3]Department of Community Nutrition, Student Research Committee, School of Nutrition and Food Science, Isfahan University of Medical Sciences, Isfahan, Iran, [4]Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran

Introduction

In January 2020, the World Health Organization (WHO) declared that the Coronavirus Disease (COVID-19) is a public international health concern.[1] Since then, many problems have arisen about women expecting to have a baby and the possible effects of this issue on catastrophic outcomes in many nations.[2] Pregnant women may be more susceptible to COVID-19 due to their greater vulnerability to respiratory infections.[3] Some research on pregnant women infected with COVID-19 showed that they were all infected in the third trimester and had similar clinical findings to those of non-pregnant adults. Also, there were some cases of fetal distress and pre-term delivery among these individuals.[4] Pregnant women are highly nervous about the prevalence of COVID-19 and its effects on their health.[5] Many pregnant women do not see their physicians due to their concerns about coronavirus exposure. Also, due to stress and anxiety, they are intended to give birth earlier than a cesarean section. Many pregnant mothers constantly use detergents to prevent the virus, which may lead to poisoning.[6] In another study, more than four-fifths (82%) of the women believed that COVID-19 is real, and the majority had adequate knowledge of COVID-19.[7]

The Health Belief Model (HBM) predicts behaviors based on perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy.[8,9] Therefore, in the first stage, it is essential to study the level of knowledge, susceptibility, and perceived severity of pregnant women and their self-efficacy to go through the course of the disease. HBM is an exploratory model focusing on the changes in personal beliefs. In other words, the HBM emphasizes how people's perception creates motivation and

Address for correspondence:
Dr. Asiyeh Pirzadeh,
Department of Health Education and Promotion, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.
E-mail: as_pirzadeh@hlth.mui.ac.ir

eventually changes behaviors. Currently, limited evidence base exists to assess the knowledge of pregnant women about COVID-19. Therefore, the present study aimed to evaluate the knowledge of pregnant women about COVID-19 and perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy about the prevention of COVID-19 in Isfahan.

Materials and Methods

This cross-sectional study (from July 2020 to October 2020) was conducted on pregnant women aged 18–49 years covered by health centers in Isfahan via WhatsApp. The statistical population in this study included all pregnant mothers in Isfahan who were interested in cooperating in this study, referred to one of the health centers, and had a health record. In this study, the participants were chosen based on random sampling. Samples were selected from four health centers in four directions (i.e. south, north, east, and west) of Isfahan. Inclusion criteria were pregnant women living in Isfahan who had access to smartphones, WhatsApp applications, and Internet access and were literate and willing to participate in the study. The exclusion criteria were incomplete responses to the questionnaire.

After obtaining the code of ethics and the letter of introduction from Isfahan University of Medical Sciences, the project's executors referred to Isfahan Health Centers, selected randomly. The healthcare workers selected pregnant women from the list by random sampling, contacted pregnant mothers who were eligible to study, and encouraged them to participate. Also, before starting the study, the objectives and necessity of the study were explained to them over the telephone by the midwifery healthcare staff of health centers. Afterward, they completed the online informed consent form. The link for this questionnaire was sent via the WhatsApp application. The questionnaire was self-made and consisted of several sections, including demographic information and questions related to Health Belief Model constructs such as knowledge (9 items), perceived susceptibility (22 items), perceived severity (7 items), perceived benefits (5 items), perceived barriers (10 things), cue to action (9 items), and self-efficacy (15 items) measured on a Likert scale. The items of this scale included "very agree" (=5), "agree" (=4), "no idea" (=3), "disagree" (=2), and "strongly disagree" (=1). The total time spent completing the questionnaire was 20 min. Ten health experts evaluated the tool's validity. Also, its Content Validity Index (CVI) and Content Validity Ratio (CVR) were estimated to be 0.80 and 0.74, respectively. The internal consistency method was used to assess the scale's reliability, which was confirmed to be 0.76 in Cronbach's alpha.

Data were entered into SPSS (version 16.00; SPSS Inc., Chicago, IL, USA) and analyzed using descriptive and analytical tests such as the Shapiro–Wilk test, independent *t*-test, and Pearson's correlation coefficient. The significance level in the present study was less than 0.05.

Ethical considerations

Participants' informed consent was obtained to participate in the study. The student research committee approved this project. Ethical considerations such as information confidentiality about pregnant women were observed. Also, the ethics code was received from the ethics committee of Isfahan University of Medical Sciences with the number IR.MUI.RESEARCH.REC.1399.350.

Results

In total, 100 pregnant mothers with a mean (Standard Deviation [SD]) of the age of 28.19 (4.38) years participated in the present study. Based on the findings, the educational status of 10% of the participants was related to medical sciences [Table 1]. Table 2 presents the mean score and SD of the structures of the HBM among pregnant mothers. The mean (SD) of perceived susceptibility and severity, knowledge, and self-efficacy was 71.73 (16.23), 26.50 (2.80), 6.90 (1.35), and 63.99 (8.57), respectively.

Table 3 shows the relationship between demographic characteristics and HBM constructs. Accordingly, having higher education levels increases the mean self-efficacy score among pregnant mothers. Based on the findings, the mean score of knowledge and the mean score of perceived susceptibility of first-time-pregnant mothers were significantly higher than those of mothers who were pregnant for the second time or more ($F_{1,99} = 0.116$, $p = 0.04$., $F_{2,99} = 0.02$, $p < 0.001$). However, no significant relationship was observed between other demographic variables and HBM components.

Table 1: Demographic characteristics of pregnant mothers

Variable	Number (percentages)
Field of study	
Medical sciences	10 (10%)
Other fields	90 (90%)
Education level	
High school diploma	17 (17%)
Diploma	40 (40%)
Above diploma	13 (13%)
Bachelor's degree and higher	30 (30%)
Job	
Housewife	89 (89%)
Student	4 (4%)
Employed	7 (7%)
Frequency of pregnancy	
First	50 (50%)
Second	28 (28%)
Third	18 (18%)
Fourth and more	4 (4%)
Underlying disease	
Yes	11 (11%)
No	89 (89%)

The findings showed that 70% of pregnant women wore masks when leaving their houses. Given that pregnant women are at high risk, and the best way to prevent COVID-19 is to follow health tips, this rate may seem unacceptable. Also, only 51% of pregnant women regularly visited health centers for routine prenatal care.

Discussion

This study aimed to evaluate pregnant women's perception of COVID-19 based on the health belief model in Isfahan.

According to the result, there is a positive correlation between demographic characteristics and HBM constructs. The mean score of self-efficacy among pregnant mothers increases remarkably by education level. However, no statistically significant relationship was observed between other demographic variables and Health Belief Model components. This rate may seem unacceptable, but only 51% of pregnant women regularly visited health centers for routine prenatal care.

The results showed that the knowledge of COVID-19 and preventative methods was at a good level among most women in 77% of pregnant women. Consistent with this result, Wolf *et al*. and Alahdal *et al*. reported that more than 90% of women knew how the coronavirus is transmitted.[10,11] In a similar study, Hernández-Padilla *et al*.[12] noted that the mean score of self-efficacy was consistent with the present study's findings.

In our study, the mean self-efficacy score increased due to an increase in their education levels. Several methods for increasing self-efficacy, such as verbal persuasion and increasing people's knowledge of their abilities, could be

Table 2: Mean score and standard deviation of the health belief model constructs and knowledge

The health belief model constructs	Mean (SD)	Min	Max
Knowledge	6.90 (1.35)	2	9
Perceived susceptibility	71.73 (16.23)	12	107
Perceived severity	26.51 (2.84)	14	38
Perceived benefits	22.48 (3.11)	11	35
Perceived barriers	23.31 (5.05)	12	33
Self-efficacy	63.99 (8.57)	43	79

Table 3: Determining the relationship between the demographic characteristics of pregnant mothers with health belief model and knowledge

Variable	Knowledge Mean(SD)	Perceived sensitivity Mean(SD)	Severely perceived Mean(SD)	Perceived benefits Mean(SD)	Perceived barriers Mean(SD)	Self-efficacy Mean(SD)
Field of study*						
Medical sciences	6.64 (1.54)	68.73 (16.92)	27.41 (2.63)	23.95 (2.01)	22 (5.52)	65.50 (6.43)
Other fields	6.92 (1.30)	72.06 (16.27)	26.44 (2.97)	22.32 (3.22)	23.43 (5.02)	63.83 (8.70)
p	0.50	0.40	0.60	0.30	0.30	0.09
Education**						
Under diploma	6.51 (1.06)	81.24 (22.61)	26.70 (3.62)	22.20 (3.43)	25.28 (6.80)	58.55 (12.86)
Diploma	6.95 (1.47)	70.15 (14.62)	26.71 (2.44)	21.92 (3.59)	23.27 (4.44)	63.99 (6.93)
Above diploma	6.68 (1.33)	68.51 (17.02)	26.74 (3.83)	23.63 (2.58)	22.86 (5.96)	66.94 (6.40)
Bachelor's degree and higher	7.31 (1.34)	69.76 (11.93)	25.93 (2.52)	22.83 (2.57)	22.51 (4.19)	65.86 (7.11)
p	0.20	0.07	0.80	0.30	0.10	0.02
Job**						
Housewife	6.81 (1.37)	71.44 (16.93)	26.67 (2.92)	22.54 (3.26)	23.30 (5.23)	63.87 (8.82)
Student	7.22 (0.95)	79.00 (6.62)	26.24 (3.20)	21.77 (2.30)	23.57 (3.86)	65.00 (8.16)
Employed	7.41 (2.07)	70.73 (9.05)	25.12 (1.96)	22.56 (2.31)	22.43 (3.27)	65.23 (4.17)
p	0.20	0.70	0.30	0.60	0.50	0.40
Frequency of pregnancy**						
First	7.20 (1.20)	71.71 (14.34)	26.04 (2.60)	22.55 (2.95)	23.00 (4.53)	65.27 (6.64)
Second	6.97 (1.23)	71.46 (16.05)	27.22 (2.65)	22.10 (3.64)	22.07 (4.61)	64.30 (8.61)
Third	6.14 (1.69)	66.93 (14.42)	26.64 (3.08)	22.54 (3.10)	26.16 (5.62)	61.54 (7.87)
Fourth and more	6.77 (1.57)	93.47 (31.53)	26.7 (5.52)	23.57 (1.93)	23 (7.84)	56.72 (5.07)
p	0.04	0.001	0.50	0.70	0.60	0.20
Underlying disease*						
Yes	6.70 (1.33)	65.10 (11.79)	26.13 (2.47)	22.93 (2.14)	28.73 (3.55)	62.65 (8.56)
No	6.90 (1.37)	72.53 (16.58)	26.54 (2.96)	22.44 (3.29)	22.67 (4.87)	64.18 (8.57)
p	0.60	0.07	0.60	0.40	0.03	0.3

*An independent *t*-test was used to compare the data. **Analysis of variance was used to compare the data. A significance level of <0.05 was considered

used to promote preventive behaviors against COVID-19.[13] In this study, the mean score of perceived susceptibility was good. Findings reported by similar studies are consistent with the present study. For example, Shahnaz revealed that most respondents had relatively high perceived exposure.[14]

Nasirzadeh's study in Qom (Iran) also confirmed the present study's findings.[15] In addition, another study showed that 80% of pregnant women felt vulnerable and were predominantly concerned about getting infected with coronavirus even when following the health tips.[16] In contrast, Lee *et al.* showed that 46% of pregnant women were unsure whether their infection may lead to abortion or getting into pre-term delivery. High perceived susceptibility in our participants was due to exposure to various media, including television.[17] Furthermore, the mean score of perceived susceptibility among pregnant women indicated that pregnant mothers considered themselves more susceptible to the disease. Hosseintalaei *et al.*[18] also reported this result in their study.

The high mean score of a person's perception of the susceptibility and severity of health risks significantly impacts a person's behavior to prevent the occurrence of that risk.[19] However, in Walrave *et al.*[20] study, there was no significant relationship between the intention related to perceived sensitivity and severity. Pregnant women with the underlying disease were noticeably higher than mothers without the underlying disease. According to these results, in addition to pregnant mothers, more attention should be paid to pregnant mothers who suffer from the underlying disease to prevent deteriorating diseases such as COVID-19.

People who perceive more barriers are less likely to show appropriate behaviors. For instance, Gorman found that pregnant mothers who perceived more barriers to influenza vaccination were less likely to be vaccinated.[21] Concerning the inverse relationship between perceived barriers and self-efficacy in this study, the greater the perceived barriers are, the less competent the pregnant mothers are in preventing the disease through self-efficacy. Therefore, by trying to eliminate these barriers, an effective step could be taken to increase the self-efficacy of pregnant mothers.

Due to COVID-19, many pregnant women did not visit healthcare centers, so we had to use online programs to fill out questionnaires. In this case, only those who had WhatsApp and internet access could complete the questionnaires.

Conclusion

Most pregnant women had sufficient knowledge about COVID-19 and used masks. Also, the perceived severity and susceptibility scores were higher than other model constructs, indicating women's proper understanding of the risks of COVID-19. However, half of these women have stated that they do not go to receive services, and this issue can have adverse consequences. Therefore, researchers plan to improve other structures of the model, such as self-efficacy, which effectively improves women's performance in receiving care, especially in women with a lower level of education.

Conflicts of interest

Nothing to declare.

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