



## Health Beliefs Model and Protective Behavior of postpartum women During COVID-19

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### Abstract

**Background:** Postpartum women are at high risk of severe complications accompanied with COVID-19 due to the anatomical and physiological changes occurring during pregnancy and continue postpartum. **Aim of the study:** was to evaluate health beliefs model and protective behavior of postpartum women during COVID-19. **Study design:** Descriptive study. **Setting:** The study was conducted at the Obstetrics (postnatal unit) building at Zagazig University Hospital. **Study subjects:** A convenient sample of 181 postpartum women collected within 6 months. **Tools of data collection:** Three tools were used; Structured interview questionnaire, health belief model regarding COVID-19 and Women's preventive behaviors of COVID 19. **Results:** the mean age of the studied women was 30.6±4.7 years. Almost half of them had secondary education, less than two thirds of them were from urban areas. Concerning occupation and income level, less than two thirds were housewives and almost half of them had low income. **Conclusion:** as for health beliefs of past partum women during COVID-19, all women perceived barriers facing them during COVID-19, the vast majority of them perceived susceptibility and perceived benefits and neutrally perceived severity and had cues to action. As for protective behaviors, the majority of the studied postpartum women followed the protective behaviors during COVID-19. **Recommendations:** Provision of continuous educational programs based on the health belief model to enhance women's knowledge and compliance with COVID-19 preventive behaviors.

**Keywords:** Health beliefs model, Protective behavior, postpartum and COVID-19

### Introduction:

COVID-19 is the disease caused by a new corona virus called SARS-CoV-2. It is the deadly third-generation virus in Corona family preceded by severe acute respiratory syndrome (SARS) in 2003, killed almost 10% of total affected patients (8429) across 29 international locations and Middle East Respiratory Syndrome (MERS) in 2012, even more lethal with a mortality rate of 30% of the infected patients <sup>(1)</sup>.

The anatomical and physiological changes occurring during pregnancy make the pregnant women more susceptible to severe infections as an increase in the transverse diameter of the thoracic cage and a rising level of the diaphragm, decrease maternal tolerance to hypoxia. Lung volume changes and vasodilation may lead to mucosal edema and increased secretions of the upper respiratory tract. In addition, alterations in cell-mediated immunity lead to the increased

vulnerability of pregnant women to be infected by intracellular organisms such as viruses <sup>(2)</sup>.

To adopt a healthy behavior and/or avoid risks of disease, the woman must believe that she is exposed to the disease (perceived susceptibility), believe that the disease has complications and will negatively impact her life (perceived severity), believe that adopting specific behaviors or measures is important to reduce the susceptibility or severity (perceived benefits), overlap important barriers and realize the importance of preventive measures than the needed efforts to do them (perceived barriers), trust his/her abilities to overcome any barriers during applying the protective measures (self-efficacy), use the internal (e.g., previous history for the disease) or external behavior stimuli (e.g., mass media and health team) for further increase the engagement in the preventive behavior (cues for action) <sup>(3)</sup>.

The most proper prevention measure to control the spread of COVID-19 infection in postpartum women is frequent hand wash with

water and soap or with an alcohol-based hand sanitizer if water and soap not available from 20 to 30 seconds; as hand wash can protect the woman from transmitting this highly infectious virus and after latter spreading this infection to others. Recurrent and proper hand washing is one of the most important precaution that can be used to prevent spread infection with the COVID-19 virus. Face mask application by mother and visitors to eliminate the risk of spread of respiratory droplets remains argument <sup>(4)</sup>.

### Significance of the study:

COVID-19 is a highly transmissible human-to-human disease via droplets resulting from coughing or sneezing <sup>(5)</sup>. Lacking awareness about the control of COVID-19 represents a major health threat. Increasing awareness and defensive behaviors help in The containment of the disease<sup>(6)</sup>, applying the theory of health beliefs, especially to women in the postpartum period, Especially in the light of the Covid pandemic has priority for the nursing staff and health service workers to apply this model, and this The first research study in the faculty of nursing, Zagazig University on this subject, due to its importance. So this study was done to evaluate the application of health belief model on women behaviors regarding covid-19 in the immediate postpartum period.

### Aim of the study:

The aim of the current study was to evaluate health beliefs model and protective behaviors of postpartum women during COVID-19.

### Research question:

1. What are health beliefs of postpartum women during COVID-19?
2. What are protective behaviors of postpartum women during COVID- 19?

### Subjects and Methods:

#### Research design:

A descriptive design was adopted to carry out this study.

#### Study Setting:

The current study was conducted in the Obstetrics (postnatal unit) building, at Zagazig University Hospital. This building consists of 5 floors whereas delivery reception in the first floor, postnatal ward in second floor, high risk pregnancy in the 3<sup>rd</sup> floor, operation ward in 4<sup>th</sup> floor. It works in Saturday, Monday, and Wednesday. Zagazig University Hospital provides low cost services and free with high quality of

care for all levels of population in Zagazig city and its villages.

### Study Subjects:

A convenient sample of 181 postpartum women collected within six months.

### Tools for data collection:

The data of this study were collected by using three tools as the following;

#### Tool I: Structured interview questionnaire sheet:

This was developed by the researcher in simple Arabic language to collect the necessary data for achieving the study objectives. It was composed of two parts:

**Part (A):** Socio demographic characteristics of women. It composed of five questions about women's age, level of education, occupation, place of resident and level of income

**Part (B):** Obstetric history of women. It consisted of questions about number of pregnancy (gravity), number of live births (parity), mode of delivery, any complications before/during/after delivery. It composed of 4 questions

#### Tool II: Health Belief Model (HBM) regarding COVID-19:

The health belief model was adapted from to assess postpartum women' health beliefs regarding COVID-19<sup>(6)</sup>. Modifications were done by the researchers on Arabic language. It included *six HBM constructs*: perceived susceptibility

- **Perceived susceptibility** to COVID 19: such as woman considers being at risk of COVID-19 due to health conditions .....etc (6 Questions).
- **Perceived benefits** of COVID 19 such as the woman believe that hand washing is helpful to protect herself from COVID-19.....etc (9 Questions).
- **Perceived severity** of COVID 19 such as, the woman will be very sick if she got infected by COVID-19... etc (3 Questions).
- **Perceived barriers** to COVID- 19 as, the woman had no knowledge on how to prevent COVID-19.....etc (11 Questions).
- **Perceived cues of action** such as respondents got infected with Corona virus .....etc (4 Questions)

### Health Beliefs Model Score

Each item of the above mentioned constructs will be recorded on a Likert scale of five levels (1 to 5). Accordingly, each of the options was be scored as follows: 5 points score for "totally agree", 4 points score for "agree", 3 points score for "no idea", 2 points score for "disagree", and 1 point score for "totally disagree".

### Health Beliefs Model level

The total HBM constructs score was calculated by the expansion of the overall score of all areas and classified as the following:

- Low < 50%
- Moderate 50-75
- High >75 %

### Tool III: Women's preventive behaviors of COVID 19 (Appendix III):

It was developed by the researcher in simple Arabic language to collect the necessary data based a review of the literature on the World Health Organization recommendations on the measures to prevent human-to-human transmission of COVID-19 infection<sup>(8)</sup>.

Composed of 17 questions regarding COVID 19 preventive behavior such as washing hands with soap and water, rubbing hands with alcohol, mask wearing, ...etc.

### Preventive behaviors Score

Each item of preventive behaviors were recorded on a Likert scale rating from 1 to 5; "totally agree" was scored 5 points, "agree" was scored 4 points, "no idea" was scored 3 points, "disagree" was scored 2 points, and "totally disagree" was scored 1 point.

### Preventive behaviors level

The total score for preventive behaviors was calculated by the expansion of the entire score of all areas and classified as the as the following:

- Low < 50%
- Moderate 50-75
- High >75 %

### Content Validity and Reliability:

Validity of the tools was tested for content validity by Jury of three experts' one professor and other assistant professor Obstetrics and gynecological Health Nursing. They assessed the tool for clarity, relevance, comprehensiveness, applicability, and understanding. All recommended modifications in the tools were done. The reliability was done by Cronbach's Alpha coefficient test to ensure that three tools of data collection consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool, it was (0.81) for self-protective measures practice and (0.79) for health belief model.

### Field work:

Once permission was approved to proceed with the study, the researcher started to prepare a schedule for collecting the data. Participants were interviewed by the researcher who introduced

herself and explained the aim of the study briefly. Data collection was within the period of one year from the beginning January 2022 to April 2022. The researcher allocated two days weekly per week from 09.00 Am to 2.00 PM. The average number which interviewed was 3women per day. The approximate time spent was around 30- 45 minutes according to response of pregnant women.

### Pilot study:

The pilot sample was applied on 10% of the study sample who selected from the study setting. The purpose of the pilot study was to ascertain the feasibility of the tools, and to detect any problems peculiar to the statement as sequence and clarity. After conducting the pilot study, found that the questions of the tools were clear and relevant, but few words were modified to increase clarity. The data collection form was finalized based on the results of the pilot. The subjects of pilot sample were excluded in the main study sample.

### Administration design:

Permission to collect data and implement of the educational program in the outpatient clinics building at Zagazig University hospitals was obtained. This was through submission of a formal letter from post-graduate department then referred to the dean of the Faculty of Nursing Zagazig University, followed to the hospital director seeking permission to perform the study after clarifying the objective.

### Ethical consideration:

The ethical issues were taken into consideration during all phases of the study. Firstly, the study approved by the pertinent authority of research ethics committee of the Faculty of Nursing at Zagazig University (M.D ZU.NURS/162/14/12/2021).. Then, approved was taken by the director of Zagazig University Hospital (Appendix IV). On the other hand, verbal agreement for participants was taken after fully explanation of the aim of the study. Participants was given the opportunity to refuse the participation, and they were notified that they could withdraw at any stage of the data collection interviews without giving any reason and with no consequences; also, they assured that information would be confidential and used for the purpose of the study only. The researcher assured maintaining anonymity and confidentiality of the subject's data. The researcher phone number and all possible communicating methods were identified to the participants to return at any time for any explanation.

**Statistical Analysis:**

Data entry and statistical analysis were done by using the Statistical Package for Social Sciences (SPSS) version 26. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency.

**Results:**

**Table 1** shows socio-demographic and obstetric characteristics of the studied women. It is obvious that the mean age of the studied women was  $30.66 \pm 4.79$  years. 51.9% of the studied women had secondary education and 64.1% of them were from urban areas. Concerning occupation and income level, 62.4% were housewives and 52.5% of them had low income. The mean number of pregnancies was  $2.3094 \pm .94479$ , mean number of parity was  $2.0110 \pm .88813$  and only 1.1% of women had complications during last child birth.

**Figure 1** shows the distribution of women according to their perceived susceptibility to COVID-19. It revealed that 99.4% of the women believed in their susceptibility.

**Table 2** shows that, there was no significant relation between socio-demographic characteristics and perceived susceptibility towards COVID-19 ( $P > 0.05$ ).

**Figure 2** shows the distribution of women according to their perceived benefits during COVID-19. It revealed that 85.1% of the women believed that perceived benefits can protect them during COVID-19.

**Table 3** shows that, there was no significant relation between socio-demographic characteristics and perceived benefit during COVID-19 ( $P > 0.05$ ).

**Figure 3** shows the distribution of women according to their perceived severity to COVID-19. It revealed that the less than three-quarters (72.9%) of the women were natural.

**Table 4** shows that, there was significant relation between monthly income and perceived severity of COVID-19 ( $P = 0.012$ ). Additionally there was no significant relation between women age, education level, occupation, resident and perceived severity of COVID-19 ( $P > 0.05$ ).

**Figure 4** shows the distribution of women according to their level of perceived barriers to COVID-19. It revealed that the all (100.0%) of the women were neutral.

**Figure 5** demonstrates level of health belief model constructs for COVID-19.

With regard to the perceived barriers and susceptibility, 100% and 99.4% respectively were in agreement. While, 79.4% & 85.1% respectively of them were in disagreement with the cues of action and perceived benefits.

**Table 5** shows relation between socio-demographic characteristics and cues of action of COVID-19. There was not significant relation between the studied women age, education level, residence and cues of action ( $P > 0.05$ ). While, there was significant relation between women occupation, monthly income and cues of action of COVID-19 ( $P = 0.000$  &  $0.026$ ) respectively.

**Figure 6** shows that 85.1% of the women disagreed protective behaviors followed during COVID-19. However, only 3.3% of them agreed.

**Table 6** shows that there was highly significant correlation between health belief model constructs and preventive behaviors of women toward COVID-19 ( $P = 0.000$ ).

**Table 7** shows that, there was not significant relation between women age, education, residence, income and preventive behaviors towards COVID-19 ( $P > 0.05$ ). While, there was significant relation between women occupation and preventive behaviors of COVID-19 ( $P = 0.01$ ).

**Table 8** shows that there was highly significant correlation between health belief model constructs and preventive behaviors of women toward COVID-19 ( $P = 0.000$ ).

**Discussion:**

COVID-19 is an emerging infectious disease that poses a significant threat to public health. Given the severe threats imposed by COVID-19 and, preventive measures play a vital role in decreasing infection rates and halting the spread of the disease<sup>(9)</sup>. The HBM comprises five constructs including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action which effect health behaviors<sup>(10)</sup>.

The Health Belief Model (HBM) contains four dimensions. The first, perceived susceptibility, references a person's perception of risk, or susceptibility of contracting a condition. The second, perceived severity, relates to concerns regarding the seriousness of contracting a particular illness and the potential consequences that result. The third, perceived benefits, relates to the belief that an action will be effective in reducing a threat. The fourth, perceived barriers,

are the potential challenges with undertaking a recommended behavior<sup>(11)</sup>.

According to<sup>(12)</sup>, prevention practices include staying six feet apart from others, wearing a face mask if unable to have physical distance or in poorly ventilated settings, washing hands regularly with soap and water or an alcohol-based sanitizer, and staying home if feeling unwell. To ensure these prevention measures are practiced, the public needs to understand the purpose and value of the measures, and be persuaded to comply, which involves behavior change<sup>(13)</sup>.

The current study aimed to evaluate health beliefs model and protective behaviors of postpartum women towards covid-19.

### **Part I: Socio-demographic characteristics of the studied women**

Concerning socio-demographic characteristics of the studied women, the current study showed that the mean age of women was  $30.66 \pm 4.79$  years. More than half of them held secondary education and less than two-thirds were lived in urban areas. Regarding occupation and the level of income, less than two-thirds of them were housewives and more than half had low income. This was similar to<sup>(14)</sup> investigated "Knowledge and preventive measures against COVID-19 among pregnant women in a low-resource African setting." They noted that the study participants had secondary education and resided in urban areas. In contrast, to a study conducted about pregnant woman's knowledge, attitude, and practice of self-protection measures in relation to the prevention of coronavirus: a health education intervention by<sup>(15)</sup> who reported that most pregnant women were living in rural areas and were not working. The differences in culture and society among women may be the reasons for this discrepancy.

### **Part II: Health belief model constructs toward COVID-19**

*Concerning the COVID-19-related risk perception of women*, the present finding showed that most study participants agreed regarding the risk of infection and death if they become infected. This finding is consistent with<sup>(16)</sup> who stated that pregnant women believed that COVID-19 infection was transmitted to the fetus and may result in adverse pregnancy outcomes, in Pakistan.

Also, this result is comparable to study in Egypt by<sup>(17)</sup> about COVID-19 risk perception of pregnant women and its relationship with their protective behaviours. They reported that most pregnant women had a high-risk perception level

regarding COVID-19. In addition a study done in Sweden by<sup>(18)</sup> reported that most participants perceived their high-risk perception of contracting and dying from COVID-19 infection.

Similarly, a study done in Pakistan reported that most of women believe COVID-19 can damage their pregnancy, be transmitted to fetuses, and affect children respectively<sup>(19)</sup>. Thus, the risk perception of pregnant women towards the COVID-19 led to the practice of preventive measures against it. In contrast,<sup>(20)</sup> noted that the vast majority of participants expressed a low level of susceptibility to COVID-19.

*According to women's perceived benefit from COVID-19*, the results of the current study revealed that the majority of women did not agree that there was a way to reduce the incidence or severity of COVID-19. This finding differed with<sup>(21)</sup>, who reported that most participants agreed that COVID-19 can be easily prevented by regular hand washing and personal protective equipment.

Concerning severity perception of women with *COVID-19*, the current findings revealed that most women had a moderate awareness of the threat of COVID-19 to their health and the potential consequences thereof. In contrast,<sup>(20)</sup> noted that higher percentage expressed a high perceived severity of COVID-19.

In disagreement with, a study done in Hong Kong by<sup>(22)</sup> found that about one fifth of the participation had higher perceived severity of COVID-19. Also,<sup>(21)</sup> showed that majority of participants considered themselves susceptible to coronavirus and considered the disease dangerous in the case of its perceived severity. Study in Egypt, most participants were believed that COVID-19 is a life-threatening, so any member of the families have risk of infection, whereas 80% of china's were believed that COVID 19 severely harms health<sup>(23)</sup>.

*Regarding women's perception of barriers to COVID-19*, The present results indicated that all of them had a moderate level of potential challenges with recommended behaviour towards COVID-19. This finding agrees with a cross-sectional study in America, half of study participants were perceived the risk of COVID 19<sup>(24)</sup>.

*With regard to cues to the action of COVID-19*, the current study showed that the majority of participants had a low level of information and guidance that individuals receive from their surroundings or within the environment to prevent infection with COVID-19. This finding agrees with<sup>(23)</sup> who indicated that the participants had a

good knowledge about COVID-19 and its methods of transmission and prevention.

### **Part III: Preventive behaviors of women toward COVID-19**

*Regarding the level of protective behaviours among women towards COVID-19*, the current study showed that majority of them did not agree with the preventive behaviour for COVID-19. This finding is consistent with a study in India, <sup>(25)</sup> showed that 93.2% of the participants have adopted preventive measures to control COVID-19. Thus, awareness of women about the dangers of COVID-19 should be the focus of educational programs.

### **Correlations between health belief model and preventive behaviors of women toward COVID-19**

*Regarding correlations between health belief model and preventive behaviors of women toward COVID-19*, the current study showed that, there was significant correlations between health belief model and preventive behaviors of women toward COVID-19 ( $P < 0.000$ ). This is consistent with <sup>(26)</sup> about cognitive and affective risk beliefs and their association with protective health behavior in response to the novel health threat of covid-19. They showed positive associations between perceived severity of COVID-19 and personal preventative measures.

In contrast with a study by <sup>(27)</sup> about utilized the health belief model (HBM) to explain the public's adopted prevention practices during the COVID-19 outbreak in Saudi Arabia. They showed that perceived susceptibility of contracting COVID-19 was not associated with preventative practices. The HBM has provided a framework to understand the association between the HBM and COVID-19 prevention practices. There were consistent findings regarding the positive association with the domains of perceived benefits and perceived barriers and use of prevention practices.

### **Study Strengths**

This study addresses an important issue relating to COVID-19. Data generated from this study may help decision-makers to build their educational intervention about COVID-19 based on HBM. Therefore, it needs to be applied by nursing educators to change women's health

beliefs regarding essential topics like infection control and safety measures of COVID-19.

### **Study limitations**

The study has some limitations that could be addressed in future studies as the study focused only on the model of health beliefs and behaviors of women. Differences in the level of health care providers, availability of different resources, and communication factors were not covered in the study.

### **Conclusion:**

Based on the present study findings, it can be concluded that as for health beliefs of past partum women during COVID-19, all women perceived barriers facing them during COVID-19, the vast majority of them perceived susceptibility and perceived benefits and neutrally perceived severity and had cues to action. As for protective behaviors, the majority of the studied postpartum women followed the protective behaviors during COVID-19.

### **Recommendations:**

The following recommendations are suggested based on the findings of the present study:

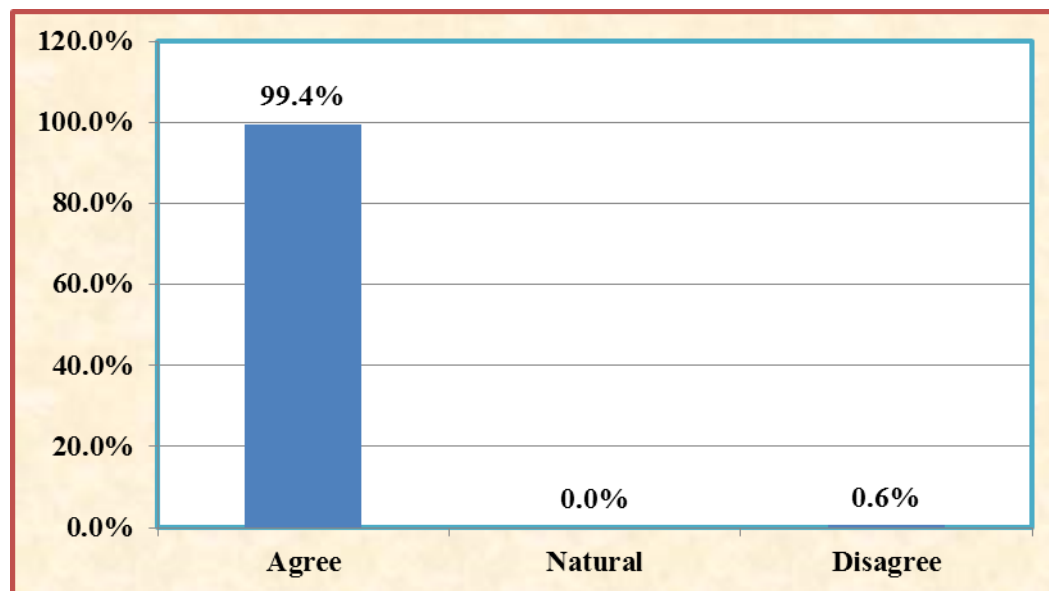
1. Health education interventions should specifically target postpartum women who may be at increased risk of contracting COVID-19.
2. Provision of continuous educational programs based on the health belief model to enhance women's knowledge and compliance with COVID-19 preventative behaviors.
3. Highlight the necessity of following COVID-19 preventative precautions during standard postnatal care instructions.
4. Determine predictors of compliance with COVID-19 preventative behaviors in pregnant women using HBM.

### **Further studies:**

- Identify barriers to COVID-19-related health behaviors during postpartum by applying the health belief model.
- Examine the impact of health belief model based education on postpartum women's intention to get the COVID-19 vaccine.

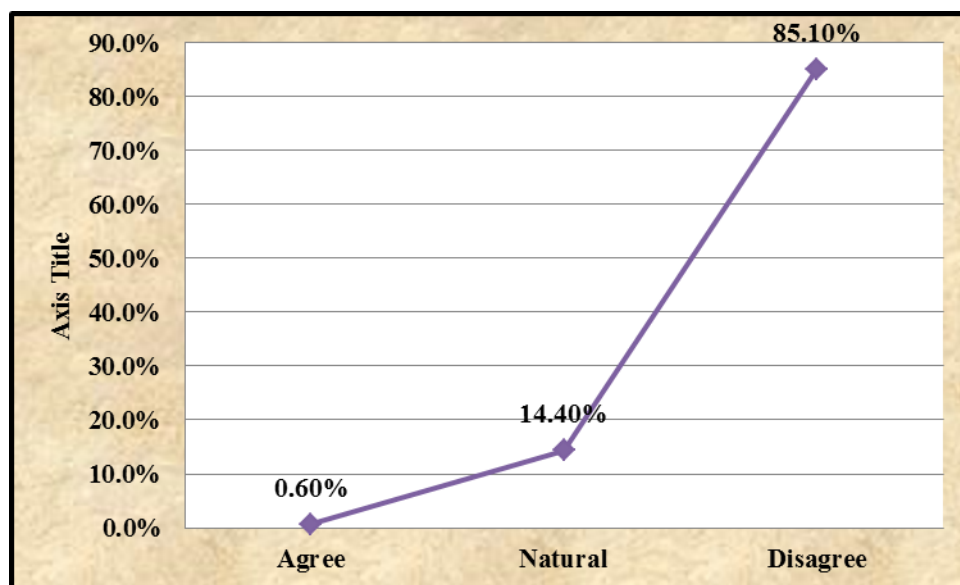
**Table 1: Distribution of the studied women according to their socio demographic and obstetric characteristics (n = 181).**

Socio-demographic characteristics		No	%
<b>Age</b>			
Mean $\pm$ SD		30.6575 $\pm$ 4.79164	
Range (Min- Max)		22.0 (20- 42)	
<b>Education Level</b>	Illiterate	4	2.2
	Read and write	4	2.2
	Primary education	1	0.6
	Preparatory	10	5.5
	2nd School	94	51.9
	University	68	37.6
<b>Occupation</b>	House	113	62.4
	Working	68	37.6
<b>Residence</b>	Urban	116	64.1
	Rural	65	35.9
<b>Monthly income level</b>	Low	95	52.5
	Medium	79	43.6
	High	7	3.9
<b>Gravidity</b>			
Mean $\pm$ SD	2.3094 $\pm$ .94479		
<b>Parity</b>			
Mean $\pm$ SD	2.0110 $\pm$ .88813		
<b>Complications during last child birth</b>		2	1.1

**Figure 1: Distribution of the studied women according to their perceived susceptibility towards COVID-19 (n = 181).**

**Table 2:** Distribution of the studied women according to the relation between socio-demographic characteristics and perceived susceptibility towards COVID-19 (n = 181).

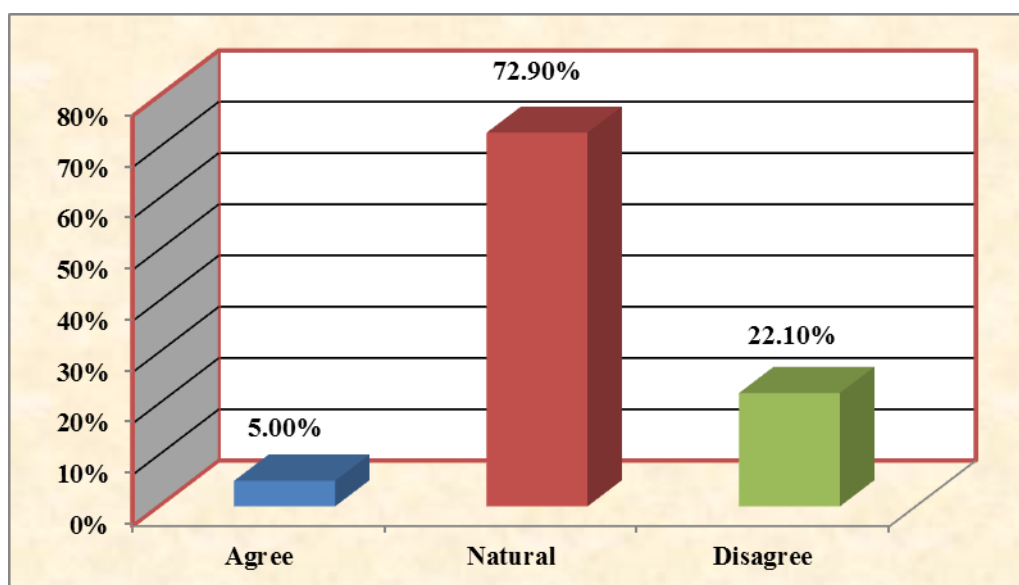
Socio-demographic characteristics		Perceived susceptibility						X <sup>2</sup> Test	P value
		Agree		Neutral		Disagree			
		No	%	No	%	No	%		
Age (year)	20-26	44	24.4	0	0.0	0	0.0	0.779	0.677
	27-35	101	56.1	0	0.0	1	100.0		
	36-42	35	19.4	0	0.0	0	0.0		
Education Level	Illiterate	4	2.2	0	0.0	0	0.0	1.671	0.893
	Read and write	4	2.2	0	0.0	0	0.0		
	Primary education	1	0.6	0	0.0	0	0.0		
	Preparatory	10	5.6	0	0.0	0	0.0		
	2nd School	94	52.2	0	0.0	0	0.0		
University	67	37.2	0	0.0	1	100.0			
Occupation	House	113	62.8	0	0.0	0	0.0	1.671	0.196
	Working	67	37.2	0	0.0	1	100.0		
Residence	Urban	115	63.9	0	0.0	1	100.0	0.563	0.453
	Rural	65	36.1	0	0.0	0	0.0		
Monthly income	Low	95	52.8	0	0.0	0	0.0	1.298	0.522
	Medium	78	43.3	0	0.0	1	100.0		
	High	7	3.9	0	0.0	0	0.0		

**Figure 2:** Distribution of the studied women according to their perceived benefits during COVID-19 (n = 181).



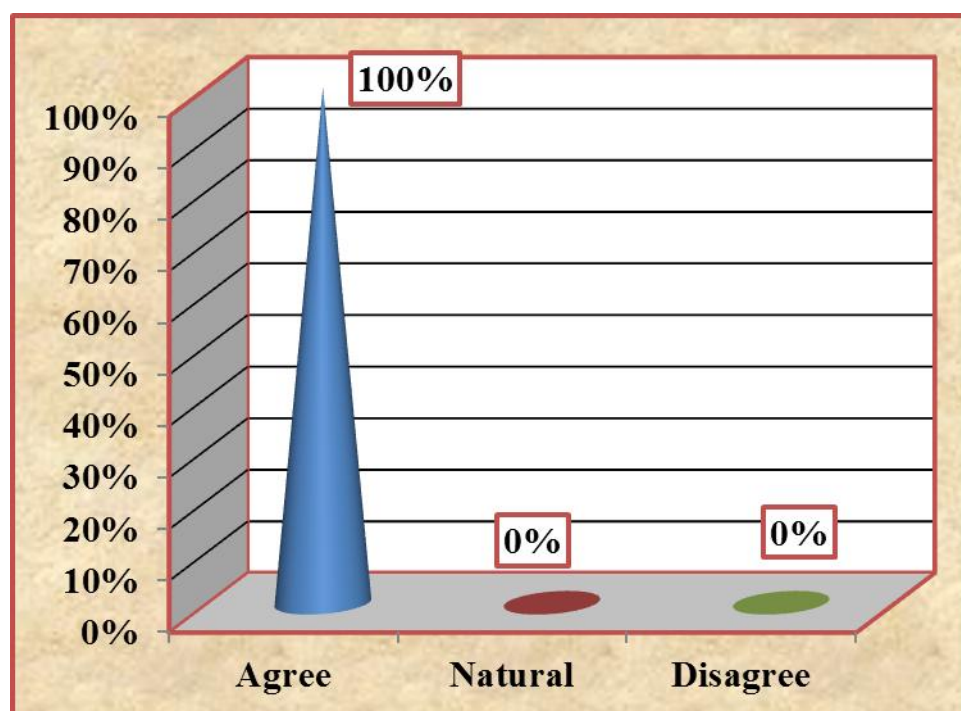
**Table 3: Distribution of the studied women according to the relation between socio-demographic characteristics and perceived benefits during COVID-19 (n = 181).**

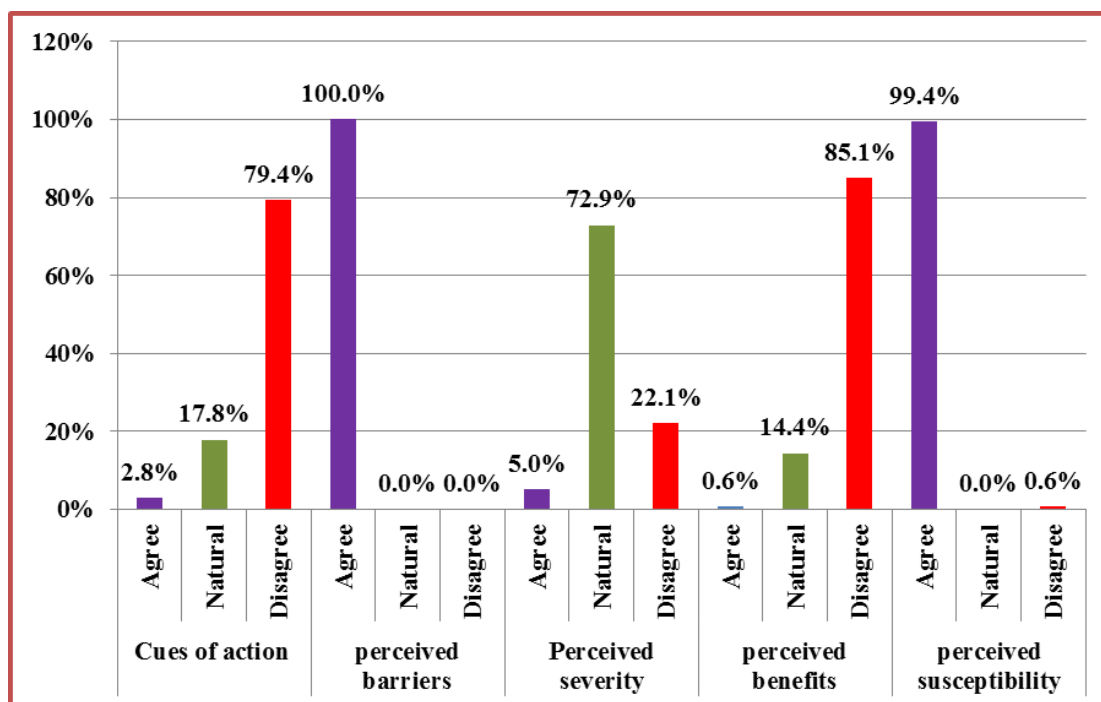
Socio-demographic characteristics		Perceived benefit						X <sup>2</sup> Test	P value
		Agree		Neutral		Disagree			
		No	%	No	%	No	%		
Age (year)	20-26	0	0.0	10	38.5	34	22.1	4.419	0.352
	27-35	1	100.0	13	50.0	88	57.1		
	36-42	0	0.0	3	11.5	32	20.8		
Education Level	Illiterate	0	0.0	0	0.0	4	2.6	8.247	0.605
	Read and write	0	0.0	1	3.8	3	1.9		
	Primary education	0	0.0	0	0.0	1	0.6		
	Preparatory	0	0.0	1	3.8	9	5.8		
	2nd School	0	0.0	9	34.6	85	55.2		
University	1	100.0	15	57.7	52	33.8			
Occupation	House	0	0.0	14	53.8	99	64.3	2.705	0.259
	Working	1	100.0	12	46.2	55	35.7		
Residence	Urban	1	100.0	15	57.7	100	64.9	1.070	0.586
	Rural	0	0.0	11	42.3	54	35.1		
Monthly income	Low	0	0.0	15	57.7	80	51.9	2.634	0.621
	Medium	1	100.0	11	42.3	67	43.5		
	High	0	0.0	0	0.0	7	4.5		

**Figure 3: Distribution of the studied women according to their perceived severity of COVID-19**

**Table 4: Distribution of the studied women according to the relation between socio-demographic characteristics and perceived severity of COVID-19**

Socio-demographic characteristics		Perceived severity						X <sup>2</sup> Test	P value
		Agree		Neutral		Disagree			
		No	%	No	%	No	%		
Age (year)	20-26	2	22.2	33	25.0	9	22.5	4.022	0.403
	27-35	5	55.6	78	59.1	19	47.5		
	36-42	2	22.2	21	15.9	12	30.0		
Education Level	Illiterate	0	0.0	3	2.3	1	2.5	9.579	0.478
	Read and write	0	0.0	3	2.3	1	2.5		
	Primary education	0	0.0	1	0.8	0	0.0		
	Preparatory	1	11.1	7	5.3	2	5.0		
	2nd School	1	11.1	74	56.1	19	47.5		
University	7	77.8	44	33.3	17	42.5			
Occupation	House	3	33.3	87	65.9	23	57.5	4.344	0.114
	Working	6	66.7	45	34.1	17	42.5		
Residence	Urban	6	66.7	81	61.4	29	72.5	1.682	0.431
	Rural	3	33.3	51	38.6	11	27.5		
Monthly income	Low	3	33.3	76	57.6	16	40.0	12.861	0.012*
	Medium	4	44.4	53	40.2	22	55.0		
	High	2	22.2	3	2.3	2	5.0		

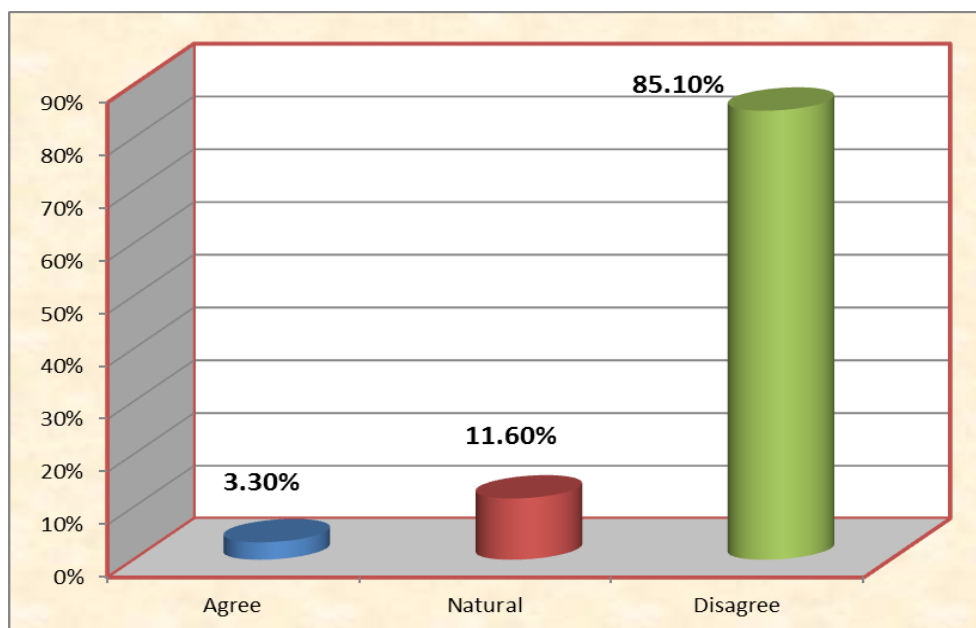
**Figure 4: Distribution of the studied women according to their perceived barriers of COVID-19 preventive measure**



**Figure 5:** Distribution of the studied women according to level of health belief model constructs for COVID-19

**Table 5:** Distribution of the studied women according to the relation between socio-demographic characteristics and cues of action of COVID-19

Socio-demographic characteristics		Cues of action of COVID-19						X <sup>2</sup> Test	P value
		Agree		Natural		Disagree			
		No	%	No	%	No	%		
Age (year)	20-26	0	0.0	8	25.0	36	25.2	2.612	0.625
	27-35	4	80.0	16	50.0	81	56.6		
	36-42	1	20.0	8	25.0	26	18.2		
Education Level	Illiterate	0	0.0	0	0.0	4	2.8	13.153	0.215
	Read and write	0	0.0	0	0.0	4	2.8		
	Primary education	0	0.0	0	0.0	1	0.7		
	Preparatory	1	20.0	0	0.0	9	6.3		
	2nd School	0	0.0	16	50.0	77	53.8		
University	4	80.0	16	50.0	48	33.6			
Occupation	House	1	20.0	12	37.5	100	69.9	15.796	0.000**
	Working	4	80.0	20	62.5	43	30.1		
Residence	Urban	3	60.0	19	59.4	93	65.0	0.397	0.820
	Rural	2	40.0	13	40.6	50	35.0		
Monthly income	Low	1	20.0	10	31.3	83	58.0	11.047	0.026*
	Medium	4	80.0	21	65.6	54	37.8		
	High	0	0.0	1	3.1	6	4.2		



**Figure 6:** Distribution of the studied women according to their protective behaviors followed during COVID-19.

**Table 6.** Mean and standard deviation of health belief model constructs regarding covid-19 among studied women (N= 181)

Health belief model constructs	Mean $\pm$ SD
Perceived susceptibility	15.78 $\pm$ 4.69
Perceived benefit	28.84 $\pm$ 4.34
perceived severity	8.19 $\pm$ 1.81
perceived barriers	15.21 $\pm$ 6.21
Cues of action	12.77 $\pm$ 2.24

**Table 7:** Distribution of the studied women according to the relation between socio-demographic characteristics and preventive behaviors (n= 181)

Socio-demographic characteristics		Preventive behaviors						X <sup>2</sup> Test	P value
		Agree		Neutral		Disagree			
		No	%	No	%	No	%		
Age (year)	20-26	1	16.7	7	33.3	36	23.4	4.797	0.309
	27-35	2	33.3	11	52.4	89	57.8		
	36-42	3	50.0	3	14.3	29	18.8		
Education Level	Illiterate	0	0.0	0	0.0	4	2.6	12.172	0.274
	Read/write	0	0.0	0	0.0	4	2.6		
	Primary	0	0.0	0	0.0	1	0.6		
	Preparatory	0	0.0	1	4.8	9	5.8		
	2nd School	2	33.3	6	28.6	86	55.8		
University	4	66.7	14	66.7	50	32.5			
Occupation	House wife	3	50.0	7	33.3	103	66.9	9.277	0.010*
	Working	3	50.0	14	66.7	51	33.1		
Residence	Urban	5	83.3	16	76.2	95	61.7	2.687	0.261
	Rural	1	16.7	5	23.8	59	38.3		
Monthly income	Low	2	33.3	7	33.3	86	55.8	6.210	0.184
	Medium	4	66.7	12	57.1	63	40.9		
	High	0	0.0	2	9.5	5	3.2		

**Table 8** Correlation between health belief model constructs and preventive behaviors of women toward COVID-19 (n= 181)

Health Belief Model	Preventive behaviors	
	r	P value
Perceived susceptibility	0.382 <sup>**</sup>	0.000
Perceived benefit	0.459 <sup>**</sup>	0.000
perceived severity	0.459 <sup>**</sup>	0.000
perceived barriers	-0.419 <sup>**</sup>	0.000
Cues of action	0.439 <sup>**</sup>	0.000

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