Educational program for pregnant women about Coronavirus (COVID-19) at Assiut University Hospitals

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Abstract
Background: Pregnant women are a vulnerable group, so improving knowledge, perception, attitude, and practises regarding COVID-19 are key elements that ensure pregnant women's health and safety. **The aims of the study** are to assess the knowledge, perceptions, attitude, and practices for pregnant women about the coronavirus (COVID-19) and evaluate the effect of health educational intervention on pregnant women's knowledge, perceptions, attitudes, and self-protective measures (practices) toward the prevention of corona virus. **Setting**: The study was conducted at an antenatal outpatient clinic and an emergency clinic at Woman's Health Hospital in Assiut City. **Methods:** A purposive sample of 277 pregnant women was included in the study. A quasi-experimental research design was used. **Tools:** five tools were used, including a structured interview questionnaire, knowledge, perception, attitude, and self-protective scale. **Results:** There are statistically significant differences between pre and posttest regarding total knowledge, perception, practices, and attitudes of pregnant women about Covid-19 after the implementation of the educational program at p-value 0.001**. **Conclusion:** Educational program was significantly improving pregnant women's knowledge, perception, attitude, and practice regarding prevention of COVID 19. **Recommendation:** Pregnant women should be given continuous education to raise their awareness about the preventive measures for COVID-19 infection.

Keywords: Attitude, COVID19, Educational program, Knowledge, Perception, Practice & Pregnant women

Introduction
The World Health Organization has declared that Coronavirus Disease-2019 (COVID-19) is a global topic of discussion, a pandemic, and a public health emergency of international concern (WHO). With the present COVID-19 transmission generating tensions for everyone, including health systems, an important topic of how we manage information to assist people in times of public health emergencies arises. (**Bhagavathula., et al., 2020 & Wang, et al., 2020**)

In January 2020, the World Health Organization (WHO) officially declared COVID-19 a public health emergency. Unexpectedly, a large number of additional cases were discovered globally during the first week of March, and COVID-19 was declared a pandemic. More than 125,000 confirmed cases and over 4600 deaths had been recorded as of March 12, 2020, spanning 118 countries (**Euro-surveillance Editorial Team and WHO, 2020**). By the beginning of April 2020, there had been over 800 confirmed cases in Egypt, with more than 50 deaths and a quick increase in the number of illnesses (**Egyptian PM., 2020**). Egypt presently has 513,944 confirmed cases of COVID-19, with 24,718 deaths, reported by WHO data from January 2020 to May 2022 (**WHO, 2022**).

COVID-19 is a novel infection that affects the lungs and breathing, causing symptoms ranging from a typical cold to severe acute respiratory syndrome. A new generation of coronavirus is to blame. Fever is the most prevalent symptom of COVID-19, although other symptoms include cough, lethargy, malaise, and shortness of breath. The virus's strong transmission capability has sparked global worry, as has the possibility of increased morbidity and mortality. The elderly and patients with commodities are more likely to become infected, and they are also more likely to develop major complications, such as acute respiratory distress syndrome (ARDS) and cytokine storm (**Ding, et al, 2021, Guo, et al., 2020 &Huang, et al., 2020**).

Role of nurse
Currently, therapeutic management is primarily supportive, with a strong emphasis on preventing viral transmission. WHO has advised a set of preventive steps to stem the spread of the disease, which the Egyptian government has implemented (**WHO, 2020**). The public's understanding of how to avoid getting the virus and its transmission to their family and others is critical to the effectiveness of these measures which supported as a primary nurses' role (**Zhong, et al, 2020**)

Pregnant women are a unique group of people because of their particular immunologic and physiologic changes, which may put them at a higher risk of serious morbidity or death from Covid-19 than the general population. Furthermore, there may be an increased risk of negative pregnancy outcomes, such as premature birth, among COVID-19-positive pregnant women **(CDC, 2020) & (Royal College of obstetricians and gynecologists).** As a result, pregnant women should take the same education by Nurse-Midwife to follow the preventive measures as other patients **(UCSF Women's Health Resource Center, 2020).**

In Egypt, these precautionary measures have been implemented to prevent the virus from spreading further throughout the country. Because Egypt is one of the largest countries in the Arab world, Africa, and the Middle East, with over 100 million residents, the Egyptian government has also participated in media efforts to distribute knowledge of these preventive measures to the general population. This large population may be linked to a significant risk of disease spread and mortality, particularly among the elderly and those suffering from chronic illnesses **(Abdelhafiz, et al, 2020).**

Significance of the study

Thousands of individuals have died as a result of the coronavirus epidemic that has spread through countries all over the world. To stop the spread of the disease and its related mortality, several preventive strategies have been suggested. However, the level of understanding and practise of these COVID-19 infection prevention methods among pregnant women, who are a susceptible group, must be evaluated **(Morsy & Mostafa, 2020)**

Various research studies have clearly demonstrated the value of improving residents' COVID-19 knowledge; therefore health education programs play a significant role in enhancing residents' COVID-19 knowledge. COVID-19 knowledge is also useful for establishing a positive attitude and adhering to safe practises in order to facilitate COVID-19 outbreak management among pregnant women **(Zhong, et al., 2020 & Morsy & Mostafa, 2020)**

Because there is no proven cure for Covid-19 at this time, control measures are the primary intervention to prevent the virus from spreading in both health care settings and the general public **(Li, 2020).** Public awareness of how to deal with highly contagious respiratory disorders is critical for limiting infection spread, particularly in middle- and low-income countries. The public's knowledge, attitudes, and practises (KAP) have a significant impact on these measurements **(Zhong, et al, 2020).**

So, in light of these measures, the present study aimed to assess the awareness (knowledge, perceptions), attitude, and self-protective measures against Coronavirus (COVID-19) among pregnant women and evaluate the effect of a health educational intervention programme on pregnant women's knowledge, perceptions, attitudes, and self-protective measures (practices) toward the prevention of Coronavirus (COVID-19).

General objective

Implement educational program for pregnant women about Coronavirus (COVID-19).

Aims of the study:

- To assess the awareness (knowledge, perceptions), attitude and self-protective measures against Coronavirus (COVID-19) among pregnant women at Women's Health Hospital, Assiut University.
- To evaluate the effect of implemented program for pregnant women about the coronavirus (COVID-19).

Research Hypothesis:

H1. The educational program will has significant effect on improving pregnant women's awareness (knowledge and perception), attitude and practice regarding (COVID-19) pandemic.

Patient and Methods

Research design:

Quasi-experimental research design was used for the current study (pre and posttest).

Patient and study setting:

The study was conducted at the antenatal outpatient clinic and emergency clinic (pregnant women with high-risk pregnancy followed it when the antenatal outpatient clinic was closed for the corona virus) at Woman's Health Hospital, Assiut City, Egypt. The antenatal outpatient clinic founded in the first floor of hospital, works five days per week while the emergency clinic works all days of week. It serves all cases from rural and urban areas from Assiut.

Study subjects:

Pregnant women were randomly selected using a simple random sample technique and a purposive sample of 300 pregnant women was used. The researchers selected the first six women attending the antenatal outpatient clinic and women have low-risk complaints at the emergency clinic and accepting to participate in the study.

Sample size:

The current study was conducted on a total of 300 pregnant women. The study sample was calculated by Epi-Info 7.2.0.1 using the sample size equation for estimation of single proportion. The total number of pregnant women who were studied in the selected courses during data collection was 300 women. With

a precision level of 5%, a confidence level of 95%, and a p value of 0.05

N = [DEFF*Np (1-p)]/ [(d²/Z²₁₋ₐ/₂*(N-1) + p*(1-p)]

$$N = [DEFF*Np (1-p)]/ [(d^2/Z^2_{1-\alpha/2}*(N-1) + p*(1-p)]$$

DEFF (Design effect) = 1
N (population) = 820
P (Hypothesized %) = 30%+/-5
d (tolerated margin of error) = 0.05
Z (level of confidence) = 1.96
α (Alpha)= 0.05
N = [1*1000*30%+/-5 (1-30%+/-5)/ [(0.05)²/ (1.96)²1-0.05*(1000-1) + 10%+/-5 (1-30%+/-5)].

$$N = [1*1000*30\%+/-5 (1-30\%+/-5)/ [(0.05)^2/(1.96)^2 1-0.05*(1000-1) + 10\%+/-5 (1-30\%+/-5)].$$

N= 300 women

Dropout cases
During the follow up and the implementation of educational program dropped out around less than 10% of cases due to in availability of telephone numbers and the numbers of cases in antenatal follow-up dropped to 277 cases.

Tools of the study:
Five tools were used for this study:

Tool I: A Structured interview questionnaire.
This tool was designed and used by the researchers to collect data about the participants' personal data, such as age, level of education, occupation, husband's education, resident as well as their obstetric history, medical diseases and so on.

Tool II and Tool III: Knowledge and perception assessment tools:
Based on an online-international survey and cross-sectional Egyptian survey. The online-international survey was developed using **(WHO, 2020) and (CDC, 2020)** course material to assess awareness (knowledge and perception) related to COVID-19. The developed draft survey instrument was made accessible through a link and was distributed to 10 experts from different geographic regions to comprehensively assess the content domains of the questionnaire.

The cross-sectional Egyptian survey questionnaire was designed in Arabic and the native language in Egypt, and it covered the knowledge and perception regarding COVID-19.

Scoring System of Knowledge
The online-international survey and cross-sectional Egyptian survey questionnaire were divided into **Part one:** ask about the source of information using (4 statements/4-point Likert scale: Least used (1), Sometimes (2), More often (3) and Most used (4).

Part two included (11 multiple-choice questions) to assess knowledge focusing on COVID-19 etiology, incubation period, signs and symptoms, mode of transmission, risky people for infection, complications, treatment and prevention measures used. Followed by the calculation of a total cumulative knowledge score for each participant.

Questions were given "1" point for (correct) responses and "0" points for unanswered questions or (wrong) answers. The total knowledge of correct answers was (30). The total knowledge score was calculated as the following: Poor knowledge <60% of the total knowledge score (<18 score). Fair knowledge of 60-75 percent of total knowledge (18-23) Good knowledge > 75% of total knowledge score (> 23 score).

Scoring System of Perception
Included (13 items/true or false questions) to assess perceptions about COVID-19, each question was labeled as good (scored as "1") or poor perception (scored as "0"). The total perception score was ranged from 0 to 13 and calculated as the following: Poor perception <60% of total perception score (8 score) and Good perception ≥ 60% of total perception score (>8 score).

Tool IV: **Attitude assessment tool:**
A five point Likert scale statements (Strongly agree, agree, not sure, do not disagree, strongly do not disagree) to assess (11) items was designed by the researchers after reviewing related literatures to evaluate the study subjects attitude toward COVID -19 infection & prevention .

Scoring System of attitude:
The current study Likert scale was scored as the following (5) strongly agree, (4) for agree, (3) for not sure, (2) for do not disagree, and (1) for strongly do not disagree. The total attitude score was (60). The total attitude score was calculated as the following: Negative attitude ≤ 60% of total attitude score (36 score) and Positive attitude > 60% of total practice score (>36score).

Tool IIV: Practice assessment tool:
Concerning the practise of self-protective measures regarding prevention of COVID -19, it was developed following a review of the literature on the World Health Organization recommendations**.** This questionnaire had nine main practice topics to reduce COVID - 19 infections among pregnant women, such as avoiding handshakes and hugs, hand washing times and frequency, mask wearing , avoiding touching eyes, nose, and mouth, environmental cleaning, social distance, avoiding crowded places, staying at home and isolation in case of having symptoms.

Scoring System of Practices:
The study subjects were asked to select if they do the practice rarely, sometimes and usually. The practice questionnaire was scored as the follows: (1) for rarely done, (2) for sometimes done, and (3) for usually done. The total self-protective measures practice score was (27). The total self-protective measures score was calculated as the following: Unsatisfactory self-protective measures practice ≤

60% of total practice score (16 score) and satisfactory self-protective measures practice > 60% of total practice score (>16 score).

Validity and reliability of the study tools:

A preliminary phase was conducted to assess the validity and reliability of the questionnaire before its use. Initially, the cross-sectional Egyptian survey questionnaire was assessed by three Egyptian experts in the field of epidemiology and research in Egyptian universities. They were asked to assess the degree to which items in the questionnaires are relevant and can correctly measure the knowledge and attitude of the Egyptian public regarding COVID-19.

The reliability was determined by Cronbach's Alpha test, which revealed that each of the tools consisted of relatively homogenous items, as indicated by the moderate to high reliability of each tool. It was (0.708) for the knowledge tool, (0.861) for perception, (0.743) for attitude tool, and (0.806) for practice about self-protective measures.

Operational Design

This included the pilot study and data collection phase.

Pilot study: A pilot study was conducted on a sample of 10% (30 women) of the participant women attending the antenatal clinic, at woman's Health Hospital, Assiut University, to test the simplicity, clarity and applicability of the tools, ascertain the relevance and content validity of the tools, as well as to estimate the time needed to answer them. It also helped to test the feasibility and suitability of the study settings. According to the results of the pilot study, the tools were clear and applicable, relevant and valid. However, few words were modified and no problems interfered with the process of data collection and included the number of study samples.

The Educational Program

It has been designed by the researchers depending on **(WHO, 2020) & (CDC, 2020)**

Assessment stage: The researchers designed an educational plan to promote women's awareness. It depended on pre-test to evaluate women's awareness (knowledge and perception), attitude and practice about COVID-19. Then the schedule and the instructional instruments were developed.

Planning stage: This stage involved the organization of achieving the program, such as: preparing the place for the lecture, meeting, brochure, etc.

Teaching place: The program conducted at the antenatal clinic and emergency clinic at separated room beside the examination room.

Time of meeting: It is determined based on the convenient time of a participant and the coordination between the researchers and pregnant women.

Teaching techniques and substances: The researchers used plain teaching styles like: lecture, discussion. The media handouts regarding covid-19 were designed by the researchers and given to all participants in the study after finishing the instructional plan.

Lecture included: introduction about COVID-19, etiology, incubation period, signs and symptoms, mode of transmission, risky people for infection, complications, and treatment and prevention measures used.

Implementation and evaluation stage: The educational program was accomplished in one session for one hour; after that, pregnant women were given a brochure containing main information about COVID-19, as part of the program. The evaluation (posttest) for women's information, positive attitude and follow preventive measures was done through the telephone number and some women when I saw them on the next visit.

Procedure

The researchers alternately met the pregnant women for three days in week, from 8 am to 12 pm. The researcher informed the participant that their participation is voluntary. The confidentiality and anonymity of the participants were assured by the researchers. The data collection and program implementation took about one hour for two or three participants together in a separated room.

During meeting, the researchers personally inform pregnant women and illustrate the purpose of the work, the researchers stressed that each woman follows precaution measures to avoid COVID 19 infection as (wearing mask and maintain social distance. Pretest was conducted for each woman separated before implementing the educational program then collects two or three women to implement the educational program and was guided by an Arabic brochure with pictures for low-educated women. It was designed by the researchers, guided by national and international review.

A follow-up to evaluate the effect of program (posttest) was performed after Three - four weeks after the meeting of the (pretest) to assess the improving women' awareness, positive attitude and follow preventive measures.

The field of work was executed for about nine months from August 2020 to April 2021 due to low follow up cases and the closure of the antenatal clinic during a period of spread of the disease in Upper Egypt from January to March 2021. The cases from the emergency clinic were continued when the

health conditions of women allowed and agreed to participate in the study.

Administrative Design:

Administrative phase:

Before implementation of the study, the necessary approval was obtained from the director of Women's Health Hospital. The researchers explained the aims of the study and requested permission to use the premise for data collection.

Ethical issues:

The research proposal was approved by the ethical committee in the Faculty of Nursing, Assiut University. There was no risk for study subjects from conducting the research. The study followed common ethical principles in clinical research. Informed consent was obtained from the pregnant

women who were willing to participate in the study after explaining the nature and purpose of the study. Confidentiality and anonymity was assured. Study subjects had the right to refuse to participate or withdraw from the study without any rationale at any time and study subjects' privacy was considered during data collection.

Statistical Analysis

Date entry and data analysis were carried out using IBM-SPSS version 22 statistical software. The qualitative variables were described using frequency and percentages, and quantitative variables were described using mean and standard deviation. The Chi-square and Mcnemar test was used. P value <0.05 was considered significant for continuous variables.

Results

Table (1): Distribution of the studied women according to their personal data:

Personal data	Female N = 277	
	No.	**%**
1- Age/Years (Mean ± SD)	**27.3±5.7 (17-41)**	
Less than 20	75	27.1
▪ 20-35	122	**44.0**
▪ > 35	80	28.9
2- Level of education		
▪ Illiterate & read and write	33	11.9
▪ Basic education	49	17.7
▪ Secondary education	110	**39.7**
▪ University	85	30.7
3- Occupation		
▪ House wife	190	**68.6**
▪ Employee	87	31.4
4- Residence		
▪ Rural area	175	**63.2%**
▪ Urban	102	36.8 %
5- Husband education		
▪ Illiterate & read and write	9	3.2
▪ Basic education	34	12.3
▪ Secondary education	82	29.6
▪ University	152	**54.9**
* Total	**277**	**100%**

Table (2): Distribution of the studied women according to their Obstetric history

Obstetric history	Female N = 277	
	No.	**%**
Gravidity		
1. Primigavida	54	19.5
2. Multigravida	193	**69.7**
3. Grandmulti	30	10.8
Gestational age		
First trimester	56	20.2%
Second trimester	214	**77.2%**
Third trimester	7	2.6%
Follow up in antenatal visit		
Regular	143	**51.6**
Irregular	134	48.4

Obstetric history	Female N = 277	
	No.	%
Current maternal complain		
None	169	**61.1%**
If yes	108	38.9%
1. Gestational Diabetes mellitus	33	**13.4**
2. Chronic hypertension	27	11
3. PIH or Gestational hypertension	21	8.6
5. PROM	6	2.4
6. Antepartum hemorrhage	12	4.9
9. Others	9	3.6
Total	**277**	**100%**

Others=women with multiple factors such as anemia, RHD, epileptic attacks, respiratory disease.
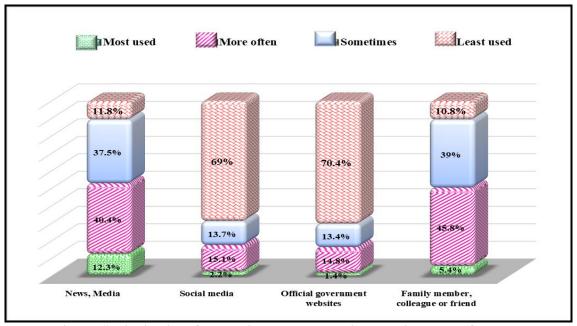

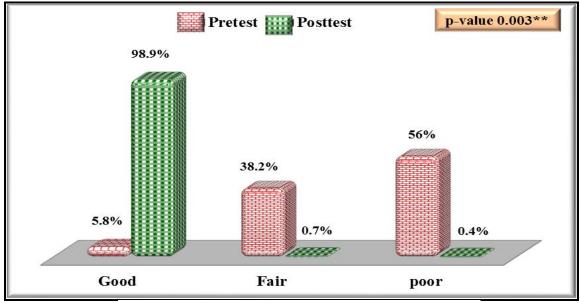**Figure (1) Distribution of the studied women according to their sources of knowledge**

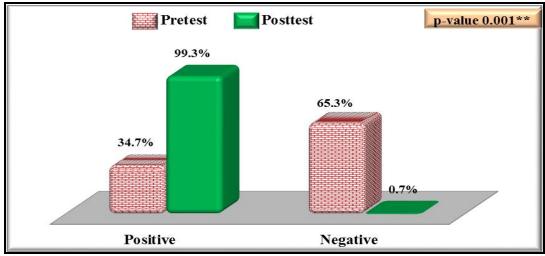**Figure (2): Total knowledge about Covid 19 in pre and posttest:**

Figure (3): Total perception of pregnant women regarding Covid 19 in the pre and the post-test:
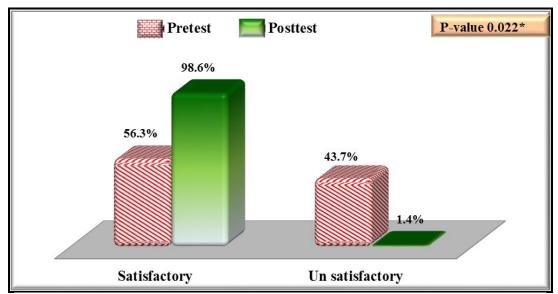

Figure (4): Total practices of pregnant women regarding Covid 19 in the pre and the posttest:
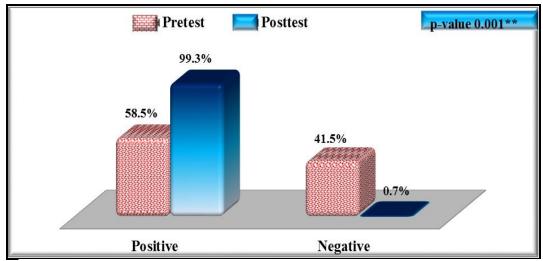

Figure (5): Total attitude of pregnant women regarding Covid 19 in the pre and the post-test

Table (3): Mean and SD score of studied women regarding knowledge, perception, practices and attitude of Covid 19 in pre and posttest:

Variable	Pretest		Posttest		P-value
	Mean	SD	Mean	SD	
Total knowledge	13.75	6.19	29.42	2.67	0.001**
Total perception	7.87	3.46	12.80	0.69	0.001**
Total practices	17.31	2.23	25.57	3.09	0.001**
Total attitude	41.88	10.09	54.66	8.05	0.001**

Statistically significant difference

Table (4): Relationship between total knowledge of the studied women regarding Covid19 and personal data

Personal data	Total knowledge						P-value
	Good		Fair		Poor		
	N	%	N	%	N	%	
1) Age /Years							
• Less than 20	0	0.0	24	32.0	51	68.0	
• 20-35	7	5.7	47	38.5	68	55.7	0.009**
• More than35	9	11.3	35	43.8	36	45.0	
2)Level of education							
• Illiterate or read & write	0	0.0	3	9.1	30	90.9	
• Basic education	0	0.0	9	18.4	40	81.6	0.001**
• Secondary education	0	0.0	30	35.3	55	64.7	
• University	16	14.5	64	58.2	30	27.3	
3) Occupation							
• House wife	10	5.3	62	32.6	118	62	
• Employee	6	6.9	44	50.6	37	44	0.009**
4) Residence							
• Rural area	11	6.3	72	41.1	92	52.6	0.331
• Urban	5	4.9	34	33.3	63	61.8	
5) Husband education							
• Illiterate or read & write	0	0.0	3	33.3	6	66.7	
• Basic education	0	0.0	3	8.8	31	91.2	
• Secondary education	6	7.3	24	29.3	52	63.4	0.001**
• University	10	6.6	76	50.0	66	43.4	

Statistically significant difference

Table (5): Relationship between total perception of the studied women regarding Covid19 and Personal data

Personal data	Total perception				P-value
	Good		Poor		
	N	%	N	%	
1) Age /Years					
• Less than 20	34	45.3	41	54.7	
• 20-35	41	33.6	81	66.4	**0.042***
• More than35	21	26.3	59	73.8	
2) Level of education					
• Illiterate or read and write	9	27.3	24	72.7	
• Basic education	17	34.7	32	65.3	**0.770**
• Secondary education	32	37.6	53	62.4	
• University	38	34.5	72	65.5	
3) Occupation					
• House wife	74	38.9	116	61.1	**0.027***
• Employee	22	25.3	65	74.7	
4) Residence					
• Rural area	54	30.9	121	69.1	**0.082**
• Urban	42	41.2	60	58.8	
5) Husband education					
• Illiterate & read and write	2	22.2	7	77.8	
• Basic education	11	32.4	23	67.6	
• Secondary education	16	19.5	66	80.5	**0.002****
• University	67	44.1	85	55.9	

Statistically significant difference

Table (6): Relationship between total practices of the studied women regarding Covid19 and Personal data

Personal data	Total practices				P-value
	Satisfactory		Unsatisfactory		
	N	%	N	%	
1) Age /Years					
• Less than 20	28	37.3	47	62.7	**0.001****
• 20-35	77	63.1	45	36.9	
• More than35	51	63.8	29	36.3	
2)Level of education					
• Illiterate or read and write	12	36.4	21	63.6	
• Basic education	21	42.9	28	57.1	**0.001****
• Secondary education	46	54.1	39	45.9	
• University	77	70.0	33	30.0	
3) Occupation					
• House wife	103	54.2	87	45.8	**0.296**
• Employee	53	60.9	34	39.1	
4) Residence					
• Rural area	98	56.0	77	44.0	**0.889**
• Urban	58	56.9	44	43.1	
5) Husband education					
• Illiterate & read and write	6	66.7	3	33.3	
• Basic education	16	47.1	18	52.9	**0.406**
• Secondary education	51	62.2	31	37.8	
• University	83	54.6	69	45.4	

Statistically significant difference

Table (7): Relationship between total attitude of the studied women regarding Covid19 and Personal data

Personal data	Total attitude				P-value
	Positive		Negative		
	N	%	N	%	
1) Age /Years					
• Less than 20	49	65.3	26	34.7	
• 20-35	55	45.1	67	54.9	**0.001****
• More than35	58	72.5	22	27.5	
2)Level of education					
• Illiterate or read and write	20	60.6	13	39.4	
• Basic education	25	51.0	24	49.0	**0.692**
• Secondary education	52	61.2	33	38.8	
• University	65	59.1	45	40.9	
3) Occupation					
• House wife	110	57.9	80	42.1	**0.769**
• Employee	52	59.8	35	40.2	
4) Residence					
• Rural area	101	57.7	74	42.3	**0.734**
• Urban	61	59.8	41	40.2	
5) Husband education					
• Illiterate & read and write	9	100.0	0	0.0	
• Basic education	14	41.2	20	58.8	**0.001****
• Secondary education	31	37.8	51	62.2	
• University	108	71.1	44	28.9	

*Statistically significant difference

Table (1): Illustrate personal data of participating women, their age ranged from 17 to 41 years. Most of them (44.0%) are in the age group (20-35) years, with a mean age of 27.3±5.7years. The majority of women (68.6%) were housewives and lived in rural resident (63.2%) More than two thirds of them having secondary education followed by university education constituted (39.7% & 30.7% respectively) of the studied women, and more than two thirds of their husbands education had university education followed by secondary education constituted (54.9% & 29.6% respectively).

Table (2): Demonstrate that nearly of two third of women (69.7%) had multigravida followed by (19.5%) primigravidas women and most of them in their second trimester. Related to current maternal diseases, more than half of studied women (61.1%) have a low-risk pregnancy while more than one third of women (38.9%) follow up for high risk pregnancy and the most common complains are gestational diabetes mellitus (13.4%), chronic hypertension (11%), PIH or gestational hypertension (8.6%), antepartum hemorrhage (4.9%) and others.

Figure (1): This figure illustrates the sources of pregnant women's knowledge, which reveals that the more often and sometimes used news media, as television (40.4% & 37.5% respectively), followed by family members, colleagues or friends and healthcare workers as the main sources of knowledge about COVID-19 among pregnant women (48.8% & 39.0% respectively).

Figure (2): Shows a statistically significant difference between the pre and post program tests, with knowledge improving from (56% & 38.2%) for poor and fair knowledge in the pretest to (98.9%) good knowledge in the posttest.

Figure (3): Indicates a statistically significant change in pregnant women's perceptions following an educational program from negative (65.3%) to positive (99.3) at P-values 0.001**

Figure (4): Shows that there was a statistically significant difference found in the practises of self-protective measures improved from (98.6) in the posttest more than (43.7) unsatisfactory practices in the pretest, with P-values = 0.022*.

Figure (5): This indicates that there was a statistically significant difference in attitude among study participants following the posting of educational guidelines, with a p-value of 0.001**.

Table (3): Illustrate that there a highly statistically significant difference among total knowledge, perception, practices and attitude of pregnant women about Covid-19 after implementation of educational program between pre and posttest at p-value < 0.001**

Table (4): Shows that there is a highly statistically significant difference between total knowledge and a women's age, educational level, occupation and husband's education.
Table (5): Reveals that there is a statistically significant difference between the total perception of studied women and the women's age, occupation and husband's educational level.
Table (6): Demonstrate that there is a statistically significant difference between the total self-protective measures of studied women and women's age and those educational levels.
Table (7): Denote that there is a statistically significant difference between the total attitude and the women's age and the husband's educational level.

Discussion:

The fight against COVID-19 is still going strong. People's willingness to accept lifestyle changes given to them by health care practitioners across the country is determined by their knowledge, attitudes, and practises about COVID-19 **(Allagoa, et al., 2021)**.
Health education is an attempt to communicate a health message in such a way that people, groups, or individuals can obtain information about better health and change their behavior **(Mawaddah & Widiyastuti, 2021).** In the line of this health message, the current study's aims are to evaluate pregnant women's awareness (knowledge, perceptions), attitude, and self-protective measures against Coronavirus (COVID-19), as well as to implement and evaluate an educational programme for pregnant women about Coronavirus at Assiut University's Women's Health Hospital about COVID-19.
The study's findings revealed that the mean age of the women studied was 27.3±5.7years, with nearly half of them falling into the 20-35 year age group. The majority of the women were housewives who lived in rural resident, with more than two-thirds of them having secondary education followed by university education, which is consistent with findings of **Mohamed, et al., (2020)** Who conducted his study to assess pregnant women's knowledge, attitude, and practise regarding Corona virus prevention in Egypt, reported that more than half of the study subjects were between the ages of 25 to <30 years, with a mean age of 27.84±3.75, more than half of the study subjects had secondary education, and more than two-thirds of the study subjects lived in rural areas and did not work.
The current study found that the media, such as television, was the most common source of information about COVID-19 among pregnant women, followed by family members, colleagues or

friends, and health care personnel. This result could be due to the population lockdown and lower numbers of prenatal visits, which was in harmony with **Sambhav, (2020),** who stated that social media is becoming one of the most popular online activities in COVID-19 for gathering information about the world and The current study found that the media, such as television, was the most common source of information about COVID-19 among pregnant women, followed by family members, colleagues or friends, and health care personnel. This result could be due to the population lockdown and lower numbers of prenatal visits, which was in harmony with **Sambhav, (2020),** who stated that social media is becoming one of the most popular online activities in COVID-19 for gathering information about the world and similarly to **Mawaddah & Widiyastuti (2021)** stated that the media is a health education resource that is utilized to facilitate the reception of health messages for the community.
These findings contradicted those of **Abdel Hafiz, et al., (2020),** who conducted a study to assess the Egyptian public's knowledge, perceptions, and attitude toward the COVID-19 disease. They stated that all participants claimed to have heard about COVID-19, with the most commonly stated sources of knowledge being social media such as Facebook, Whatsapp, and others, and also contradicted a study by **Helmy, et al., (2021)** found in their study that three-quarters of pregnant women got their pregnancy information from health care professionals.
The present study found that all participating women, including illiterate women, were aware of the ongoing COVID-19 infection. This is consistent with the findings of **Nwafor, et al., (2020),** who found that all study participants were aware of the global COVID-19 infection pandemic, and with **Zhong, et al., (2020),** who assessed knowledge, attitudes, and practises toward COVID-19 among Chinese in China and found that the majority of respondents were aware of COVID-19. This highlights the importance and effectiveness of the mass media in the fight against COVID-19 and indicates the efficiency of the messages delivered by various media outlets.
Based on total knowledge and total perception of COVID-19, the findings of the actual study revealed that about one-third of studied women have fair knowledge and positive perception, which could be attributed to the fact that more than two-thirds of studied women have secondary education followed by university education. As a result of these findings, which are consistent with those of **Elayeh, et al., (2020)** in the Jordanian population, who illustrated that the studied sample had adequate information about COVID-19 pre-implementation the program.

These results were in conformity with the results of an Egyptian study conducted by **Helmy, et al., (2021),** also reported that increase women's awareness about corona virus may be due to the higher level of education of the most studied sample in his study.

These results are compatible with those of an Egyptian study done by **Helmy, et al., (2021),** who stated that the high level of education of the most studied sample in his study may have contributed to increased women's awareness of the corona virus. This may be attributed due to fear from COVID-19 as a pandemic and killer disease impact on the health of future baby and healthy family.

On the opposite side, this result incompatible with **Sirchan, et al., (2020)** who done a study in Northern Thailand about Knowledge, attitude and preparedness to respond to the 2019 novel coronavirus (COVID-19) among the bordered population during the early period of the outbreak, who noticed that the majority (74.1%) of the women had poor knowledge about COVID-19.

Correspondingly, the total knowledge level of the pregnant women toward COVID-19 improved significantly after the educational program with (p-value 0.003**) and (p-value 0.001**) for total perception, these results in same context with **Helm, et al., (2021),** who declared that a high improvement in knowledge about COVID-19 post-implementation program and in the same light with **Goudah, (2021)** who revealed that increase level of awareness between Pregnant women regarding COVID-19 as a results of counseling about important points to follow in order to prevent exposure to infection. This reflects the importance of the educational program which increased the pregnant women's' awareness in promoting health, especially during infectious diseases and pandemics crisis.

According to the effect of the educational program on pregnant women's practice toward covid-19, there was statistically significance difference between pregnant women's practice pre and post educational program (p<0.022*). This has the same consequence as educational program helping to improve or modify their practices and recognizing the importance of self-protection. These findings are supported by **Miller, (2020) & Madappuram & Kamel, (2020)** who suggested that women's knowledge be improved by health education, which could lead to changes in their attitudes and practises around COVID-19, Aligned with **Fikadu, (2021)** who indicated that women's practice on COVID-19 prevention has enhanced. This may be due to Pregnant women should be educated on preventative measures to reduce the severity and complications of COVID19 associated illnesses as well as reduce the risk of

transmission of the disease for the fetus and her family.

The current study pointed that more than half of women have positive attitude toward covid-19 in pre educational program; these results refer to parallel relation between women's knowledge, perception, practice and attitude in the same study due to high level of women's education mentioned above, these findings are in harmony with **Helmy, et al., (2021),** Egypt and **Zhong, et al., (2020),** both of whom stated that positive attitudes of participants reflect the importance of general attitude and the management of this crisis is primarily dependent on people's adherence to the recommended measures taken to prevent the transmission of the disease.

This finding contradicts a study conducted in Istanbul, Turkey by **Yassa, et al., (2020)** on near-term pregnant women's attitudes toward, concern about, and knowledge of the COVID-19 pandemic, which noticed that the most pregnant women had reported various degrees of worry and negative attitude toward becoming infected with COVID-19. However, educational program improve women's attitudes, with a statistically significant difference between pre and post educational guidelines at p-value <0.001**. This explains that the educational program was effective in modification the attitudes of low-educated pregnant women and reinforce high-educated women to continue to follow the recommended measures for all family and community safety.

The total knowledge score and practices were found to be highly significant with women's educational level. These results are comparable to those of **Apanga & Kumbeni, (2021**) who concluded that educated women are more likely to access information on COVID-19 and comprehend the various messages being communicated on COVID-19 and more likely to understand their importance.

The present study demonstrated a significant relationship between women's age and their overall level of knowledge, practises, and attitudes, these results compatible with **Chen, et al., (2020)** investigate the clinical characteristics and outcomes of older patients with coronavirus disease 2019 and with **Verity, et al., (2020)** reported that increasing age was associated with increased knowledge and practices than younger age. This may be a reflection that older women are more health conscious and adhering to precautions against COVID-19 than young women.

At the end, the result of the actual study illustrate that there is a highly statistically significant difference in total knowledge, perception, practices and attitudes of pregnant women about COVID-19 after implementation of an educational program between

pre and posttest at p-value < 0.001**, Confirming the value and importance of educational programs provided by various resources including brochure and program session to increasing level of knowledge, practices and attitudes, this view validated by all studies in Egypt and other countries investigated the effect of educational program in changing people's knowledge, perception, practices and attitudes concerning covid-19 as a global crisis **Apanga and Kumbeni, (2021), Abdel hafiz, et al, (2020), Anikwe , et al, (2020), Erfani, (2020), Helmy , et al, (2021), Mawaddah and Widiyastuti, (2021), Mohamed , et al, (2020) & Sabry, et al, (2021)**.

Limitation of the study: The difficulty of taking pregnant women under the condition of spreading the corona virus due to the lack of follow-up cases, the irregularity of the work of the antenatal clinic, and taking cases from the emergency clinic. Due to the difficulty of subsequent communication with the woman and the unavailability of a phone number to contact the woman in order to complete the posttest, 23 cases were dropped.

Conclusion

According to the findings of the current study, this supported the study's aims,

Health educational guidelines are significantly improving pregnant women's knowledge, perception, attitude, and practice regarding prevention of COVID 19.

Recommendations:-

In the light of the findings of the present study, **the researcher suggested the following recommendations:**

- Health education programs to improve COVID-19 knowledge are helpful for encouraging an optimistic attitudes and maintaining safe practices.
- Heath educational intervention regarding prevention for COVID-19 should be provided for all pregnant women at all MCH centers until the total management of COVID-19 virus.
- Further research studies are needed to assess the effect of COVID-19 on pregnant women.

References:

- **Allagoa D. O, Oriji P.C, Obagah L, Tekenah E. S, Dambo N & Atemie G. (2021):** Knowledge, Attitudes and Practices towards Covid- 19 among Pregnant Women in a Tertiary Hospital in South-South, Nigeria, Vol 1 No 1: International Seminar of Gender Equity Maternal and Child Health.
- **Apanga P. & Maxwell Tii Kumbeni M. (2021):** Adherence to COVID-19 preventive measures and associated, factors among pregnant women in Ghana, Tropical Medicine and International Health.
- **Abdelhafiz A., Mohammed Z., Ibrahim M., Ziady H., Alorabi M., Ayyad M., & Sultan, E. (2020):** Knowledge, Perceptions, and Attitude of Egyptians towards the Novel Coronavirus Disease (COVID-19). Journal of Community Health, 1-10.
- **Anikwe C, Ogah C, Anilwe I, Bartholomew C & Cyril C, (2020):** Coronavirus disease 2019: Knowledge, attitude, and practice of pregnant women in a tertiary hospital in Abakaliki, southeast Nigeria, international Journal of Gynecological & Obstetrics, 29 June,151, pp: 197-202.
- **Bhagavathula A., Aldhaleei W., Rahmani J, Mohammadjavad. A. & Deepak Kumar Bandari D., (2020):** Knowledge and Perceptions of COVID-19 among Health Care Workers: Cross-Sectional Study, JMIR Public Health and Surveillance 6(2):e19160, United Arab Emirates University, Tehran, Iran and Telangana, India.
- **Chen T, Dai Z, Mo P, Li X , Ma Z , Shihui S, Xiaoping C, Mingqi L, Ke Liang , Shicheng G, Yongxi & Xiong Y, (2020):** Clinical characteristics and outcomes of older patients with coronavirus disease 2019, (COVID-19) in Wuhan, China: a single-centered, retrospective, study. J Gerontol A Biol Sci Med Sci. 75: 1788.
- **Centers for Disease Control and Prevention (CDC), (2020):** CDC updates COVID-19 transmission webpage to clarify information about types of spread 2020; Available at https://www.cdc.gov/media/releases/202 0/s0522-cdc-updates-covidtransmission.
- **Ding W, Jianmei Lu, Yan Zhou, Weizhong Wei, Zhihong Zhou & Min Chen, (2021):** Knowledge, attitudes, practices, and influencing factors of anxiety among pregnant women in Wuhan during the outbreak of COVID-19: a cross-sectional study, BMC Pregnancy and Childbirth 21:80, https://doi.org/10.1186/s12884-021-03561-7.
- **Erfani A, Shahriarirad R, Keivan Ranjbar , MirahmadizadehA & Mohsen Moghadami, (2020):** Knowledge, Attitude and Practice toward the Novel Coronavirus (COVID-19) Outbreak: A Population-Based Survey in Iran, A Population-Based Survey in Iran. Bull World Health Organ. E-pub: 30 March, doi: http://dx.doi.org/10.2471/BLT.20.256651.
- **Eurosurveillance Editorial Team., (2020):** World Health Organization declares novel coronavirus (2019-nCoV) sixth public health emergency of international concern. Euro Surveill 2020 Feb; 25(5):200131e, 10.2807/1560-7917.es.2020.25.5.200131e].
- **Egyptian PM., (2020):** Egypt's coronavirus figures still within range. Retrieved April 17,

from https://www.egypttoday.com/Article/2/83291/ PM-Egypt%E2%80%99s-coronavirus-figures-still-within-range.

▪ **Elayeh E., Aleidi S, Ya'acoub R & Haddadin R N, (2020):** Before and after case reporting: A comparison of the knowledge, attitude, and practices of the Jordanian population towards COVID-19, Plos one, 15(10).

▪ **Fikadu Y, Yeshaneh A, Melis T, Mesele M, Walellign A & Muche A, (2021):** COVID-19 preventive measure practices and knowledge of pregnant women in Guraghe zone hospital, International journal of women's health, 13(39), 50.

▪ **Goudah H., Adel A & Elshenoufy H. (2021):** Maternal Awareness about Covid -19 among Pregnant Women and their Children with Counseling during the Pandemic to Reduce Women and Child Infection, National Research Centre, 12(1), 31.

▪ **Guo, Y., Cao, Q. & Hong, Z.., (2020):** The origin, transmission and clinical therapies on coronavirus disease 2019 (COVID-19) outbreak - an update on the status. Military Medical Research, 7(1), 11.

▪ **Helmy H.H, Abdelhady F.S, & Ibrahim R.E, (2021):** Effect of Tele-health Nursing program Regarding Covid-19 among Pregnant Women, Original Article Egyptian Journal of Health Care, 2021 EJHC Vol.12 No.1

▪ **Huang C., Wang Y. & L X, (2020)**: Clinical features of patients infected with 2019 novel coronavirus in Wuhan China. The Lancet, 395(10223), 497–506.

▪ **Li, J. Y., You, Z. & Wang, Q., (2020):** The epidemic of 2019-novel-coronavirus (2019-nCoV) pneumonia and insights for emerging infectious diseases in the future. Microbes and Infection, 22(2), 80–85.

▪ **Mawaddah F & Widiyastuti D., (2021):** The effect of health education on pregnant women's knowledge level about covid-19 in main clinic cideng medical center regency of Cirebon.

▪ **Morsy H., Mostafa M & Abd El Monem, (2020):** Knowledge, Practice and Attitudes of Preventive Measures against Coronavirus Infection among Pregnant Women in Egypt, Saudi Journal of Nurses and Health Care, June; 3(6): 156-166.

▪ **Mohamed A I, Elsayed D M, Abosree T H and Eltohamy N A, (2020):** Pregnant Women's Knowledge, Attitude and Self-Protective Measures Practice regarding Corona virus prevention: Health Educational Intervention, Egyptian Journal of Health Care, EJH vol. 11 no. 4.

▪ **Madappuram, N and Kamel, H (2020):** Covid19 and Pregnancy. Annals of neonatology journal

2020; 2 (2):3 ISSN: 2636-3596, DOI:10.21608/ANJ.2020.29120.1011

▪ **Miller, R (2020):** Transmission and risk factors of COVID-19. Cleveland Clinic Journal of Medicine, 2020; Available at https://www.ccjm.org/content/early/202_0/_05/_12/ ccjm.87a.ccc029.

▪ **Nwafor J., Aniukwu J., Anozie B., & Ikeotuonye, A. (2020):** Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting.

▪ **Sabry F, Mohammed N, Ahmed A, Ghanem A, Abd El-aty N & Hussein N, (2021):** Effect of What Sapp Educational Program Reminder on Pregnant Women's Knowledge , Attitude and Practice Regarding COVID -19 pandemic**,** Egyptian Journal of Health Care, EJH Vol. 12 No. 3.

▪ **Sambhav S. (2020):** Role of mass media and communication during pandemic covid-19, international journal of created research thoughts, 8(5), p3788.

▪ **Srichan P, Apidechkul T, Tamornpark R, Yeemard F, Khunthason S, Kitchanapaiboon S, Wongnuch P, Wongphaet A & Upala P, (2020):** . Knowledge, attitude and preparedness to respond to the 2019 novel coronavirus (COVID-19) among the bordered population of northern Thailand in the early period of the outbreak: a cross-sectional study. WHO South East Asia J Public Health 9: 118–125. [PubMed] [Google Scholar]

▪ **Royal college of obstetricians and gynecologists, (2020):** Coronavirus (COVID-19) infection in pregnancy information for healthcare professionals. RCOG, London.

▪ **UCSF Women's Health Resource Center., (2020):** FAQ: Coronavirus and Pregnant Patients, University of California San Francisco, Retrieved https://www.ucsfhealth.org/services/womens-health-resource-center.

▪ **Verity R, Okell LC, Dorigatti I, Winskill P, Charles W, & Natsuko Imai, (2020):** Estimates of the severity of coronavirus disease 2019: a model-based analysis. Lancet Infect Dis 2020: 20: 669–677.

▪ **World Health Organization (2022):** WHO, prevalence of corona virus in Egypt. https://covid19.who.int/region/emro/country/eg.

▪ **Wang C, Horby PW & Hayden FG., (2020):-** A novel coronavirus outbreak of global health concern. Lancet; 395(10223):470–73. [Published Online First: 2020/01/28] pmid: 31986257.

▪ **World Health Organization (2020):** Country & Technical Guidance -Coronavirus disease (COVID-19).   https://www.who.int/emergencies/

diseases/novel   -corona
avirus-2019/technical-guidance.

▪ **World Health Organization (2020):** Novel coronavirus (COVID-19), situation URL: https://covid19.who.int/ [accessed 2020-03-12].

▪ **Yassa M., Birol P., Yirmibes C., Usta C.,Haydar A., Yassa A., Sandal K., Tekin A & Tug N, (2020):** Near-term pregnant Women's attitude toward, concern about and knowledge of the COVID-19 pandemic, The Journal of Maternal-Fetal & Neonatal Medicine;DOI: 10.1080/14767058.2020.1763947.

▪ **Zhong, B., Luo, W., Li, H., Zhang, Q., Liu, X., Li, W., & Li, Y. (2020):** Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak: a quick online cross-sectional survey Wuhan, Hubei province, China, International journal of biological sciences, 16(10), 1745-1752.