

Effect of What Sapp Educational Program Reminder on Pregnant Women's Knowledge , Attitude and Practice Regarding COVID -19 pandemic

Fatma Ahmed Mohammed Sabry⁽¹⁾, Amal Ahmed Abdelhafez Mohamed⁽²⁾, Naglaa Mohammed Ameen Ghanem⁽³⁾, Naglaa Saad Abd El-aty⁽⁴⁾, Nadia Hussein Ahmed⁽⁵⁾

(1) Lecturer of Obstetric and Gynecological Nursing Department, Faculty of Nursing, Sohag University

(2) Assistant professor of Obstetric and Gynecological Nursing Department, Faculty of Nursing, Minia University.

(3) Assistant professor of Community Health Nursing Department, Faculty of Nursing, Minia University.

(4) Assistant professor of Community Health Nursing Department, Faculty of Nursing, Assiut University

(5) Assistant professor of Obstetric and Gynecological Department, Faculty of Nursing, Assiut University

Abstract

Background: Pregnant women is one of the most group who are at high risk for COVID-19 infection. To protect them should keep them away from exposure for infection and enhance their knowledge, attitude and practice about preventive measures towards COVID-19 pandemic. **Aim of the Study:** To evaluate the effect of whatsapp educational program reminder on pregnant women's knowledge, attitude and practice regarding COVID -19 pandemic. **Research Design:** Quasi experimental one group pre, post-test research design was conducted in this study. **Setting:** The present study was started at the Antenatal Outpatient Clinic at Sohag University Hospital , Sohag General Hospital and (MCH) Maternal and child health center (Dar Salama Abdallah) to choose sample and take their telephone numbers, then complete the study and following women through whatsapp. **Subjects:** A convenient sample from 100 pregnant women was enrolled in the study. **Tools:** First tool: structured interview questionnaire, second tool: knowledge assessment sheet, third tool: attitude assessment sheet and fourth tool: practice assessment sheet regarding COVID -19 , The questionnaire was designed through Google forms regarding the COVID-19, and the link of the survey was presented to the women by WhatsApp groups. **Results:** A statistically significant improvement in pregnant women's knowledge, attitudes and practices levels toward COVID-19 after conducting whatsapp educational program reminder. **Conclusion:** WhatsApp educational program reminder positively affects pregnant women' levels of knowledge, attitudes and practices. **Recommendation:** Incorporates the educational program within outpatient clinics, providing a printed copy of the educational brochure in outpatient clinics for other pregnant women and their relatives.

Keywords: Attitude, COVID-19, Knowledge, Practice, Pregnant women, WhatsApp educational program reminder.

Introduction

Globally, the use of mobile phones for enhancing access to health care and. The mobile instant messaging applications including WhatsApp Messenger, provide new and enable opportunities for health research across and provide time and place, potentially addressing the challenges of maintaining communications and participations involved in research with migrant and mobile populations, WhatsApp has about 1.5 billion users worldwide (Kauta et al.,2020). As regard the prevalence of COVID 19 worldwide and increase the risk to all individuals, the use of WhatsApp Messenger to inform the latest

recommendations of the World Health Organization, public and regional health centers, health care providers, and researchers can have a significant impact on public health. The WhatsApp can also be used to useful communicate with members of the medical staff to resolve the questions and problems, and avoid frequent visits to health centers that are high-risk areas and overcrowded. WhatsApp can also be contacted by using voice and video calls, which can probably decrease the psychological pressure of the pregnant women and isolation to some extent (Li et al., 2020).

Coronavirus disease by 2019 (COVID-19) is a sensible recent well-known with acute viral

respiratory infection caused by the most newly discovered coronaviruses member. Its explosion began in Wuhan, China, in December 2019. COVID-19 became pandemic as announced via World Health Organization (WHO) on 11th of March 2020 (WHO, 2020). COVID-19 has been established in 154,098,279 cases worldwide, with 3,224,709 deaths and 131,412,537 recovered cases, according to the World Meter. (World Meter, 2021). In Egypt, the Ministry of Health and Population on 14 February 2020, declared the first infection of COVID-19 (Medhat, 2020). There were 750 verified cases and 56 deaths among health-care professionals in October 2020. (Erdem, 2021).

Corona virus is characterized by rapid transmission. According to Centers for Disease Control and Prevention (CDC) recommendations, COVID-19 transmitted mainly through close contact from a person to another (within almost 6 feet) with an infected person by respiratory droplets during coughing or sneezing or when touching a surface or any object that is infected with the virus and touching person's eyes, nose or mouth. In most infected patients, the SARS-CoV-2 resulting in none at all or a mild to moderate symptoms that are alleviated within a few weeks. However, it can cause severe respiratory syndrome or death, particularly in older people or patients with chronic health diseases (Centers for Disease Control and Prevention, 2020)

According clinical manifestations, most pregnant women will have mild to moderate flu-like symptoms as cough, sore throat, and fever. Few women may have dyspnea or shortness of breath. Pregnant women, especially who had associated chronic medical diseases (diabetes, asthma, etc.) may present with pneumonia and marked hypoxia. Pregnant women may also present with the same features such as fatigue, malaise, body ache and/or gastrointestinal symptoms like nausea and diarrhea (Madappuram ., 2020). COVID19 is mainly reported in terms of clinical signs, on vital parameters (temperature, pulse oximetry saturation) and radiological settings (X-ray, chest CT scan). Laboratory findings could frequently show lymphopenia and high LDH. Nasopharyngeal and oropharyngeal swab,

enabling isolation of the virus, and confirm the diagnosis (Wang et al., 2020).

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 an 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 (Schwartz & Graham, 2020) . Recently Sweden and the US investigations have added that both pregnant and postpartum women are at high risk of severe complications accompanied with COVID-19 (Collin ,2020) &(Ellington,2020) . In the study of 8207 cases of COVID-19 in the obstetric women, the Centers for Disease Control and Prevention (CDC) reported a higher risk of ICU admission and mechanical ventilation compared to non-pregnant women (CDC, 2020). Health education programs play an important role in improving COVID-19 knowledge and also are encouraging an optimistic attitudes and maintaining safe practices (Zhong et al., 2020).

Pregnant women with COVID -19 are at increased risk for preterm birth (delivering the baby before 37 weeks) and might be at increased risk for other undesirable outcomes related to pregnancy compared to pregnant people without COVID-19. Undesirable pregnancy outcomes, such as pregnancy loss, have been reported (WHO, 2020). The maternity healthcare providers and facilities hence need to prepare for the situation with a view to prevent the consequences of the infection on the women and their new-born (Miller, 2020). Preliminary research reported that the infection is not transmitted from the mother to child by placental transfer or through secretions in the genital tract. In two reports including a total of 18 pregnant women with suspected or confirmed COVID-19 pneumonia, all of the new-borns, who were delivered via caesarean section, tested negative for virus, and there were no traces of the virus in the mother's amniotic fluid, cord blood or breast milk (chen

et al., 2020). Although there are some reports of new-borns testing positive, the mode of transmission in those cases is not clear as of now (liu et al., 2020). The most proper prevention measure to control the spread of COVID-19 infection 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. Hand wash can protect a person 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. Pathologists should work to promote more frequent and regular hand washing by improving facilities and using definite behavior-change techniques (WHO, 2020). Face mask application by the healthy population in the community to eliminate the risk of spread of respiratory droplets remains argument. So the impact of public-wide mask application to control coronavirus disease should be assessed (COVID-19) (Cheng, et al. 2020). It is argument but gradually recommended for the public to wear a face mask to avoid the spread of the COVID-19 pandemic (Eikenberry, et al., 2020). The purpose of the general public mask wearing is to decrease community transmission from infected persons, who can be pre symptomatic or asymptomatic but remain spread the virus (Greenhalgh, et al., 2020)

Significance of the study

In addition to major changes in people's daily lifestyles, social media has provide communication and participation between patients and health care providers through maintaining fast multimedia communication, health education, social support, and proper health decisions, so that WhatsApp has been used in some cases and problems such as drug therapy problems, drug, nutritional and dietary supplements, emotional changes, lifestyle behaviors, physical symptoms, commitment to treatment, medical and obstetrical emergencies, oral health promotion and issues of dentistry. As the coronavirus disease rapidly spread all over the world, increasing death rate. Due to coronavirus is considered pandemic in Egypt as part of constant worldwide, so that, there is an urgent need to improve pregnant women'

knowledge, attitude, and practice. The emerging pandemic coronavirus (COVID-19) is considered a specific and unusual phenomenon. There are, however, no a lot of studies about the impact of educational program on pregnant women' knowledge, practices and attitudes regarding COVID-19 in Upper Egypt especially Sohag. Therefore, the present study represents the first effect of whatsApp educational program reminder toward COVID -19 conducted in pregnant women in a city in Sohag-Egypt. WhatsApp educational program reminder depend on repeating and remembering messages for pregnant women through photos, videos, power points to enhance and develop their knowledge, attitude and practice toward COVID-19. Additionally, assessing pregnant women' knowledge is important to determining gaps, weakness and strengthening to eliminate efforts and facilitating outbreak management of COVID-19 in Egypt and controlling the disease transmission among the pregnant women.

Aim of the study:

- 1- Assessing pregnant women's knowledge, attitude and reported practices regarding covid-19 pandemic
- 2- Evaluate the effect of whatsApp educational program reminder on pregnant women's knowledge, attitude and practice regarding covid-19 pandemic

Research Hypotheses:

- 1- whatsApp educational program reminder will has positive effect on improving pregnant women's knowledge regarding covid-19, the total knowledge level score will be higher post-intervention compared to pre-intervention among pregnant women.
- 2- whatsApp educational program reminder will has positive effect on improving pregnant women's attitude regarding covid-19, the total attitude level score will be higher post-intervention compared to pre-intervention among pregnant women
- 3- whatsApp educational program reminder will has positive effect on improving pregnant women's reported practice regarding covid-19, the total practice level

score will be higher post-intervention compared to pre-intervention among pregnant women .

Subjects and Methods

Technical design:

Research design:

A quasi-experimental research design pre-post-test was used in this study, such design is important to the nature of the study issue, having one or more group subjects observed on pre and post manipulations

Setting:

The sample started at the Antenatal Outpatient Clinic at Sohag University Hospital , Sohag General Hospital and (MCH) Maternal and child health center (Dar Salama Abdallah) to choose sample and take their telephone numbers , then complete the study and following pregnant women through whatsApp educational program reminder . These places had higher women's attendance rate from rural and urban regions in Sohag city and provide free services to women who are resident in Sohag city.

Subjects

A purposive sample of 100 pregnant women was recruited from the previously selected settings. Study started from beginning of April 2021 to the end of June 2021.

Sample size:

Sample size was calculated based on a power analysis of 0.95($\beta=1-0.95=0.5$) at alpha .05 (one-sided) with large effect size (0.5) was used as the significance, 0.001 was used as the high significance.

Inclusion criteria included:

Pregnant women who agree to participate in the study , aged from 18 to 40 years, who are in the first or second and or third trimesters, women who educated and able to deal with smartphone and whatsApp application, stable, non-critical conditions.

Exclusion criteria included:

- Women who refuse to participate in the study

Tools of data collection:

Tool I: Structured interviewing schedule: which included 3 parts

Part I: Socio demographic characteristics: which included (code, age, educational level, occupation, residence monthly income, water supply, electricity, good ventilation, family size and type of sanitation, as well as husband's demographic data).

Part II: Medical and family history of chronic disease such as (diabetes, hypertension, anemia, renal disease, and allergy.

Part III: Reproductive history which included (gravidity, parity, abortion, gestational age, number of living children, previous use of contraceptive methods, type of previous delivery, regulatory antenatal follow-up

Tool II: knowledge assessment sheet according covid-19: Questions to assess the women's level of knowledge about covid-19. It was included 20 questions This questionnaire area was developed following review of literatures on the (WHO,2020) & (CDC ,2020).

- 1- Did you hear about COVID – 19?
- 2- What is your source of information about COVID – 19?
- 3- What are the side effects of covid-19?
- 4- What are the signs and symptoms of covid-19?
- 5- What are the complications of covid-19?
- 6- What are the treatment of covid-19?
- 7- What are the risk factors of covid-19?
- 8- What are effect of covid-19 on mother?
- 9- What are effect of covid-19 on fetus?
- 10- What are incubation period of covid-19?
- 11- What are isolation period of covid-19?
- 12- What are mode of transmission of covid-19?
- 13- What are effects of covid-19 during labor?
- 14- What is your information about permission of protective measures in Egypt.
- 15- What is your information about availability of protective measures in Egypt

- 16- Where protective measures can be available?
- 17- Did you discuss covid-19 methods with health care provider.
- 18- When protective measures are generally used?
- 19- What are the types of protective measures?
- 20- Are alcohol used as protective measures?

A scoring system: a correct answer was scored 1, the incomplete answer was scored 0.5 and incorrect answer was scored 0. The scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed. Women's total level of knowledge has been classified as follows,

- Women had poor knowledge < 50% of total knowledge score (1-9.5)
- Women had moderate knowledge 50% - 75% of total knowledge score (10-15)
- Women had good knowledge >75% of total knowledge score (15.5-20)

Tool III: Attitude assessment sheet according covid-19: Questions to evaluate women's attitude toward covid-19. It was included 10 items. items was designed by the researchers after reviewing related literatures (**Zhang, et al.,2020**), (**Chen et al.,2020**)

- 1) Covid-19 can easily prevented
- 2) Covid-19 will finally be successfully controlled
- 3) I am worry to be affected with COVID-19
- 4) There is no evidence that COVID-19 transmitted to fetus from mother
- 5) There is no evidence that COVID-19 may cause congenital anomalies for fetus
- 6) Women with COVID-19 can breastfeed her baby, by following precaution during breast feeding
- 7) Frequent hand washing reduce COVID-19 infection
- 8) Covid-19 might be harmful to the body.
- 9) Protective measures could be easily accessible.
- 10) Protective measures could be available to only the infected person.

A scoring system: rated on a three point like scale as positive attitude scored 1, uncertain attitude scored 0.5 and negative attitude scored 0.

- Negative attitude < 50% of total attitude score (1-4.5 degree)
- Uncertain 50% - 75% of total attitude score (5-7 degree)
- Positive attitude while >75% of total attitude score (7.5-10 degree)

Tool IV: Practice assessment sheet according covid-19: Questions to evaluate women's practice toward covid-19. It was included 6 questions.

- 1) Did you use alcohol?
- 2) Did you wear face mask?
- 3) Did you wash your hand per day?
- 4) How many times you use this measures?
- 5) Did you keep home ventilated?
- 6) Did you apply social distance?

A scoring system : For the practice items, a correct behavior was scored 1 and incorrect behavior was scored 0. The scores of the items were summed-up and the total divided by the number of the items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed.

- Satisfactory practice if the percent score was 60%
- Unsatisfactory less than 60%.

Validity of the tools:

The content validity was tested for clarity, comprehensiveness, appropriateness, and relevance and reviewed by five experts in the obstetrics and gynecology nursing field and the community health nursing field. Modifications were done according to the panel judgment to ensure clarity of sentences and appropriateness of the content.

Reliability of the tools:

The reliability of the tools was assessed through Cronbach's alpha test $\alpha = 0.89$. The tools' reliability was estimated by using the Pearson correlation coefficient test to compare variables. The Pearson correlation coefficient for the variables ranged between (P. < 0.5) and (P. < 0.001), which indicated a highly

significant positive correlation between variables of the subjects.

Operational Design:

The operational design for this study included three phases named by preparatory, implementation and evaluation phase.

It was designed to evaluate the effect of WhatsApp educational program reminder on pregnant women's knowledge, practice and attitude regarding covid-19.

A-Preparatory phase:

It was based on the assessment data was obtained during the online questionnaires, literature review, through learning, covid-19. brochure was written in Arabic language, printed out regarding the sample size, and given after implementing the health educational program.

Ethical considerations:

Before starting the research, ethical approval was obtained from the scientific research ethical committees of the faculties of nursing, Sohag University, Sohag General Hospitals and Maternal and child health center (Dar Salama Abdallah). The researchers met both medical and nursing directors of the selected settings to achieve the purpose of the study and take their approval. Written consent was obtained from the pregnant women to participate in the study after explain the objective of the study to them. The researchers informed the pregnant women that, the study was voluntary, they were allowed to not participate and they had the right to withdraw from the study at any time, without giving any reason. Moreover, they were assured that their information would be confidential.

Pilot study

A pilot study was carried out on 10% of the sample (10) pregnant women to observe the clarity and testing of the feasibility of the research process needed for modifications to develop the final form of the tools. Pregnant women involved in the pilot study were excluded from the study. The researchers were done modifications for some items in the form of Arabic translation to make them more suitable for pregnant women's perception. The

pilot sample was excluded from the main research sample.

Implementation phase:

An official permission letter was issued by the Dean of the Faculty of Nursing to the directories of antenatal clinics of Sohag University, Sohag General Hospitals and Maternal and child health center (Dar Salama Abdallah).

The study conducted from the beginning of April 2021 to the end of June 2021, the researchers used the online Google form spreadsheet to design the online questionnaire and begin the research. The researchers joined the link of online questionnaire and collect telephone numbers of the studied sample in the first interview with the pregnant women during their visiting to Antenatal outpatient clinic to take routine care for pregnancy. Before filling the online questionnaire, pregnant women were informed about the objectives, nature and expected outcomes of the study. All the data which collected were gathered to evaluate the effect of the WhatsApp educational program reminder on pregnant women's knowledge, practice and attitude regarding COVID -19. The online questionnaire used pre-educational program to assess the pregnant women's knowledge, attitude, and reported practice toward COVID-19, then, repeated in other time during follow-up after two month to evaluate the effect of the WhatsApp educational program. The online questionnaire was designed in English language and translated into Arabic language.. All questions and items which included in program were based on the latest recommendations according the WHO. The educational program included simple and clear information about COVID-19 and its preventive measures. It also included the preparation of education materials, i.e. Photos, videos about proper hand washing and presentation through PowerPoint about COVID-19 and its preventive measures for protection, and the health education Arabic brochure was designed by the researchers, including educational intervention regarding COVID-19 that was introduced to pregnant women in WhatsApp groups. The brochure was presented to pregnant women. This brochure contained all the information needed to know

and apply about COVID-19 such as photos that clarified the information. The evaluation took place two month after the educational intervention, to examine the pregnant women ' knowledge, attitude, and reported practice using a pre-posttest online questionnaire

Session 1: All researchers began with a discussion about the previous session's content then the learning outcomes of the next session. The session was performed by the researchers using the Arabic language that appropriate for women's understanding. The researchers explained the importance of ante-natal care visits and illustrated follow up importance & provide referral in sever problems and complications. Start assessed for knowledge , attitude and practices of women regarding COVID -19 and preventive measures for protection (pre-test) .

Session 2: The theoretical part was contained knowledge about COVID -19 and preventive measures for protection such as definition, signs and symptoms, causes, complications, nursing care and prevention of these problems. Other examples of the topics covered are the anatomical and physiological changes that occur in respiratory system for pregnant women, the importance of avoidance COVID -19 for pregnant women and the fetus. It was implemented through, Photos, videos ,posters, power point presentations.

Session 3: The practical part was contained information about the correct technique of hand washing, correct technique of wear mask , correct technique of use alcohol, frequency of hand washing per day, frequency of baths per week , amount of fluid intake per day. It was implemented through lectures, posters, educational films.

The Evaluation phase:

After two month from implementing the health educational program about COVID -19 during pregnancy, evaluation of research sample knowledge , attitude and practice, was done using the same format of tool that was

used in the pre-test to evaluate the effect of the whatsApp health educational program

Statistical Analysis:

The content of each questionnaire was analyzed, classified, and then coded by the researchers. Using SPSS software version 21, the data were tabulated and analyzed. Excel is used for figures. Descriptive statistics were used to present information in the form of frequencies, percentages for qualitative variables, and quantitative variables were described utilizing means and standard deviations. Paired T-test was utilized to measure the knowledge of pregnant women before and after the program, and analyze the differences. To evaluate the inter-relationships among quantitative variables, Pearson correlation analysis was used At P-value.

Results

Table (1) Shows the distribution of the women regarding to their socio-demographic characteristics. According age it was noticed that more than half (60.0%) of the studied women their age between (25< 30yrs) and the mean age \pm SD of the women was (26.97 \pm 2.76 years). Regarding residence, it was observed that more than two third (79.0%) of the women were living in rural areas. As regard mother's education level it is obvious that more than half of the studied women (60.0%) had university level education. According mother's occupation it was observed that more than two third (75.0%) of the women was housewife. Also nearly half of women were primigravida, and at gestational age of 20-<30 weeks

Table (2) reveals the distribution of the women regarding to their obstetrical history. According number of gravida, it was noticed that near half (46.0%) of the studied women their were primigravida. Regarding gestational age of women, it was observed that near half (47.0%) of the women were from 20 -< 30 weeks . As regard mother's regular attendance antenatal care visits, it is obvious that more than half of the studied women (65.0%) were attended for antenatal units to take care as a regular.

Figure (1) Clears the distribution of the women regarding to effect of educational

program on their level of knowledge toward covid-19, there were highly statistically significance different ($p < 0.001$) between the women according the levels of knowledge pre and post educational program. The majority (75.0%) of the women had a poor level of knowledge about covid-19 pre educational program compared with more than two third (93.0 %) of women had a good level of knowledge post educational program.

Figure (2) illustrates distribution of the women regarding to effect of educational program on their attitude toward covid-19, there were highly statistically significance different ($p < 0.001$) between the women according their attitude pre and post educational program. The majority (70.0%) of the women had a negative attitude about covid-19 pre educational program compared with more than two third (90.0%) of women had a positive attitude post educational program.

Figure (3) Reveals distribution of the women regarding to effect of educational program on their practice and self-protective toward covid-19, there were highly statistically significance different ($p < 0.001$) between the women's practice regard self-protective against covid-19 pre and post educational program. The majority (72.0%) of the women followed incorrect practice about covid-19 pre educational program compared with more than two third (85%) of women follow a correct practice post educational program.

Table (3) shows the distribution the effect of educational program on women's compliance with Preventive measures against covid-19, there were highly statistically significance different ($p < 0.001$) between the women's compliance with Preventive measures against covid-19 pre and post educational program, a majority (70%) of women didn't wash hands frequently pre educational program compared with the majority (80%) of them

following hand washing frequently per day post educational program. A majority (72%) of women don't wear face mask as regular pre educational program compared with the majority (82%) of them following wear face mask as regular post educational program. The A majority (71%) of women don't apply social distance pre educational program compared with the majority (75%) of them apply social distance post educational program.

Table (4) Reveals the relationship between the knowledge and attitude of women regard COVID-19. There were highly statistically significance different ($p < 0.001$) between the women knowledge and their attitude COVID-19, the majority (60%) of the women who had poor knowledge also had negative attitude toward COVID-19 pre educational program compared with the majority (88%) of the women who had good knowledge also had positive attitude toward COVID-19 post educational program

Table (5) Reveals the relationship between the knowledge and practice of women regard COVID-19. There were highly statistically significance different ($p < 0.001$) between the women knowledge and their practice COVID-19, the majority (62%) of the women who had poor knowledge also had unsatisfactory practice toward COVID-19 pre educational program compared with the majority (82%) of the women who had good knowledge also had satisfactory practice toward COVID-19 post educational program

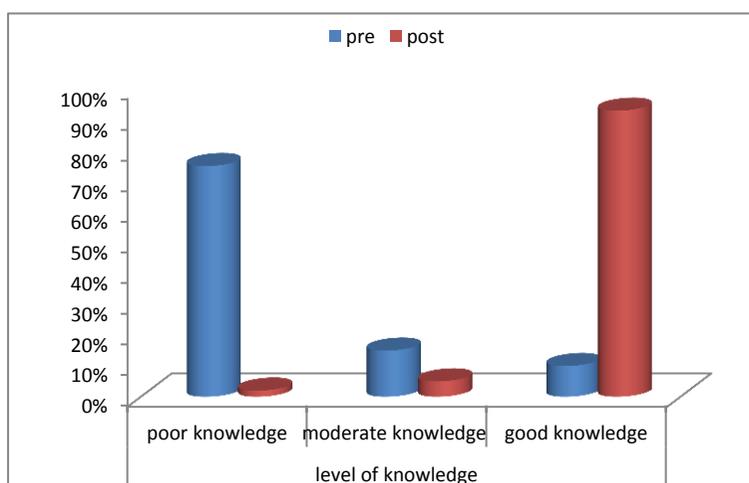
Table (6) As regarding women's evaluation of prepared educational program, the majority (97%) of them reported that program answer all of their questions , and more than three quarter of them (88%) reported that program was useful in prevention COVID-19, the majority (80%) of them reported that program reduce anxiety of them

Table (1): Distribution of the women according to their socio demographic characteristics (n=100)

Socio- demographic characteristics	(N=100)	%
1. Age		
• Less than 20 years	10	10.0%
• 20 < 25 years	15	15.0%
• 25 < 30	60	60.2%
• 30-35	10	10.0%
• More than 35	5	5.0%
Mean age ± SD	26.97±2.76	
2. Residence		
• Urban	21	21.0%
• Rural	79	79.0%
3. Mother's educational level		
• Illiterate	5	5%
• Read and write	9	9%
• secondary	26	26%
• University or higher	60	60%
4. Mother's occupation		
• House wife	75	25%
• Employed	25	75%

Table (2) Distribution of the women according to their obstetrical history (n=100)

Obstetrical history	(N=100)	%
1- Gravida		
• Primigravida	46	46.0%
• 2-3	30	30.0%
• >3	24	24.2%
2- Time of labor		
• Nulliparous	46	46.0%
• 2-3	41	30.0%
• >3	13	
3- Gestational age		
• Less than 20 years	10	10%
• 20- < 30 years	47	47%
• 30-40	43	43%
4- Regular attendance of antenatal visits		
• Yes	65	65%
• No	35	35%

**Figure (1):** Distribution the effect of educational program on women's level of knowledge toward covid-19

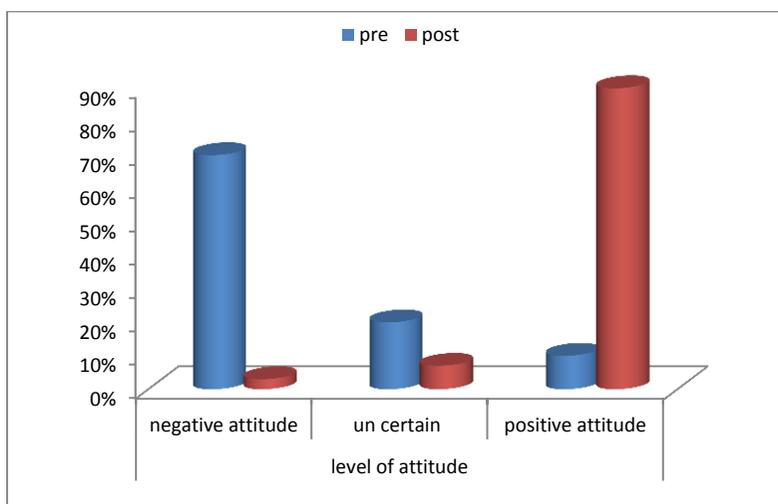


Figure (2): Distribution the effect of educational program on women’s attitude toward covid-19

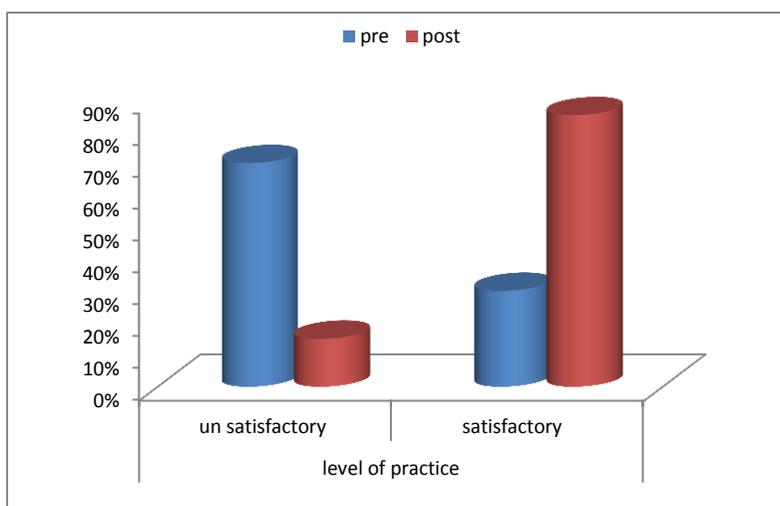


Figure (3): Distribution the effect of educational program on women’s level of practice toward covid-19

Table (3): Distribution the effect of educational program on women’s compliance with preventive measures against covid-19

Preventive measures	Studied pregnant women				P Value
	Pre N=(100)		Post N=(100)		
	No.	%	No.	%	
Hand washing					
Yes	30	30.0	80	80.0	<0.001**
No	70	70.0	20	20.0	<0.001**
Wearing mask					
Yes	28	28.0	82	82.0	<0.001**
No	72	72.0	18	18.0	<0.001**
Social distance					
Yes	29	29.0	75	75.0	<0.001**
No	71	71.0	25	25.0	<0.001**

Table (4): Relationship between the knowledge and attitude toward COVID_19 among the women (n=100)

Variables	Pre						Post				Chi square test	
	Total No	Positive Attitude 30		Negative Attitude 70		Total No	Positive Attitude 90		Negative Attitude 10		X ²	P value
	100	No.	%	No.	%	No.	%	No.	%			
Level of Knowledge												
< 50% "Poor"	70	4	4.0%	60	60.0%	2	0	0.0%	2	2.0%	204.633	<0.001**
50-75% "Moderate"	20	16	16.0%	7	7.0%	5	2	2.0%	4	4.0%		
> 75% "Good"	10	10	10.0%	3	3.0%	93	88	88.0%	4	4.0%		

Table (5): Relationship between the knowledge and practice toward COVID_19 among the women (n=100)

Variables	Pre						Post				Chi square test	
	Total No	Satisfactory practice 28		Unsatisfactory practice 72		Total No	Satisfactory practice 85		Unsatisfactory practice 15		X ²	P value
	100	No.	%	No.	%	No.	%	No.	%			
Level of Knowledge												
< 50% "Poor"	70	4	4.0%	62	62.0%	2	1	1.0%	2	2.0%	90.168	<0.001**
50-75% "Moderate"	20	14	14.0%	7	7.0%	5	2	2.0%	5	5.0%		
> 75% "Good"	10	10	10.0%	3	3.0%	93	82	82.0%	8	8.0%		

Table (6): Distribution women's evaluation toward WhatsApp educational program regarding covid-19 prevention guidelines (n=100)

women's evaluation about WhatsApp educational program toward covid-19 prevention	(N=100)	%
1- Program answer all of your questions		
• Yes	97	97.0%
• No	3	3.0%
2- Program help in reducing your anxiety		
• Yes	80	80.0%
• No	20	20.0%
3- Program prepared in the way that help		
• Yes	95	95%
• No	5	5%
4- Program prepared with easily language		
• Yes	97	97%
• No	3	3%
5- Program are useful for prevention of COVID 19		
• Yes	88	88.0%
• No	12	12.0%

Discussion

In this study, knowledge and attitude and practice toward COVID-19 were evaluated among pregnant women residing in the city of Sohag, Egypt, between April and June 2021. According level of knowledge. Pregnant women are particularly liable to infectious diseases that can cause both maternal and fetal negative outcomes, compared with the non-pregnant women. During pregnancy, women experience a series of immunological transformations that allow the immune system to tolerate and support the growing fetus while still maintaining antimicrobial defense and tissue repair. (Coxon et al., 2020).

Regarding socio demographic data of this study, more than half of women aged 25 to < 30 years with a mean age of 26.97 ± 2.76 years, also more than half of women had university education, while more than two thirds of them were lived in rural area and weren't employ. These findings were consistent with Nwafor et al. (2020), who done your study about "Knowledge and practice of preventive measures against COVID-19 infection among pregnant women in a low-resource African setting", noticed that the mean age of the women was 24.6 ± 6.3 years, ranged from 18 to 42 years, more than one third had high education and more than half from rural area, also nearly half of women were primigravida, and at gestational age of 20-<30 weeks. But

these findings different with **Yassa, et al (2020)**, who done study about Near term pregnant women's attitude toward, concern about and knowledge of the COVID-19 pandemic in Turkey, reported that median gestational age of the women were 35 ± 11 weeks

Accordinging level of knowledge, the present study revealed that the majority (75.0%) of the women had a poor level of knowledge about covid-19 pre educational program, this result agreed 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 in the early period of the outbreak, who noticed that the majority (74.1%) of the women had poor knowledge about COVID-19.

As regarding the effect of educational program on pregnant women knowledge regarding COVID 19, this study showed that the highly statistical significance difference between women's knowledge pre and post educational program ($p<0.001$). The majority (75.0%) of the women had a poor level of knowledge about covid-19 pre educational program compared with more than two third (93.0%) of women had a good level of knowledge post educational program. These finding agreed with a survey by **Zhong et al. (2020)** conducted in China about Knowledge, attitudes, and practices towards COVID-19 among Chinese residents during the rapid rise period of the COVID-19 outbreak which suggesting that the majority (70%) of the pregnant women had acceptable levels of knowledge of COVID-19 post educational program. who revealed that heath education regarding infectious disease prevention is highly effective. Also agree with study by (**Clements,2020**) in the United States, about Knowledge and behaviors toward COVID-19 among US residents during the early days of the pandemic which suggesting that the majority of the pregnant women had acceptable levels of knowledge of COVID-19 post educational program.

Accordinging women's attitude, the present study revealed that the majority (70.0%) of the women had a negative attitude regard covid-19

pre educational program, this findings agree with study by (**Yassa et al., 2020**) in Istanbul, Turkey about Near-term pregnant women's attitude 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 about becoming infected with COVID-19.

Concerning the effect of educational intervention on pregnant women attitude toward COVID 19, there was a highly statistical significant difference was found in women's attitude between pre and post educational program, the majority (70.0%) of the women had a negative attitude regard covid-19 pre educational program compared with more than two third (90.0%) of women had a positive attitude regard covid-19 post educational program. This might be due to educational program was effective in modification pregnant women` attitude because enhance knowledge and practice is highly associated with change attitude positively.

According the effect of educational program on pregnant women's practice toward covid-19, there was highly statistical significance difference between women's practice pre and post educational program ($p<0.001$), the majority of women (72.0%) of the women followed incorrect practice about covid-19 pre educational program compared with more than two third (85%) of women follow a correct practice post educational program. This might be due to that educational program help to improve pregnant women behaviors as wearing mask, hand washing, using alcohol, recognizing the importance of self-protection, and recognizing that COVID 19 may be avoided through following protective measures. These findings supported by **Miller. (2020) & Madappuram& Kamel (2020)** who recommended that improving women' COVID-19 knowledge through health education, which may also result in improvements in their attitudes and practices towards COVID-19.

As regard hand washing pre educational program that only (30.0%) of women practiced frequent hand washing, as regard mask wearing, that only (28.0%) of women practiced wear mask frequently, as regard apply the social

distance, that only (29.0%) of women practiced social distancing of at least 1 meter. These findings agree with **Nwafor et al. (2020)**, who noticed that only 26.8% participants practiced frequent hand washing with soap and water while 20.4% practiced social distancing of at least 1 meter between them and others, and 32.7% of the participants used facemask in public.

As regard hand washing, mask wearing after educational program, more than three quarters of the pregnant women had highly satisfactory practices, in addition less than three quarters of them had highly satisfactory reported practices regarding social distance. These findings agreed with **Madappuram & Kamel (2020)**, who added that the greatest tool to prevent COVID-19 infection in pregnant women is social distance and maintaining hygiene.

As regarding women's evaluation of prepared educational program, the majority of them reported that program answer all of their questions and were useful in prevention COVID-19, these findings may be due to that program was prepared with simple Arabic language and had a proper photos, videos for clarification and done with a favorite way by using smartphones and WhatsApp.

Conclusions

Based upon the results of the current study and the study aim and hypothesis, it was concluded that: WhatsApp educational program reminder positively affects pregnant women's levels of knowledge, attitudes and practices. WhatsApp is low-cost and appropriate to operate, has high penetration globally and importantly, enables mobile users to share their knowledge and information with others.

Recommendation:

From the previous findings the following recommendations are suggested:

- Incorporates the educational program within outpatient clinics, providing a printed copy of the educational brochure in outpatient clinics for other pregnant women and their relatives.

- WhatsApp using provide multiple opportunities for developing new approaches to health systems research in the future. However, the field of health systems research applying WhatsApp as a tool is in its infancy, and real ethical concerns exist. We urge researchers to be cognizant of the risks associated with the use of WhatsApp, to systematically document their use of the application, and to share how they address ethical challenges and concerns around data security.

References

- Centers for Disease Control and Prevention, 2020:** Characteristics of Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2 Infection by Pregnancy Status — United States, January 22–June 7, 2020. Available at: <https://www.cdc.gov/mmwr/volumes/69/wr/mm6925a1.htm>. Accessed July 26, 2020. [PMC free article] [PubMed] [Google Scholar]
- Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al,(2020):** Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet*. 395: 507-13.
- Cheng, V. C., S. C. Wong, V. W. Chuang, S. Y. So, J. H. Chen, S. Sridhar, K. K. To, J. F. Chan, I. F. Hung, P. L. Ho and K. Yuen (2020):** "The Role of Communitywide Wearing of Face Mask for Control of Coronavirus Disease
- Clements JM, 2020.** Knowledge and behaviors toward COVID-19 among US residents during the early days of the pandemic: cross-sectional online questionnaire. *JMIR Public Health Surveill* 6: e19161. [PMC free article] [PubMed] [Google Scholar]
- Collin J, Byström E, Carnahan A, Ahrne M (2020):** Pregnant and postpartum women with SARS-CoV-2 infection in intensive care in Sweden. *Acta Obs Gynecol Scand*. 2020 May 9;99(7):819–22.

- Coxon K, Turienzo CF, Kweekel L, Goodarzi B, Brigante L, Simon A, Lanau MM, 2020.** The impact of the coronavirus (COVID-19) pandemic on maternity care in Europe. *Midwifery* 88: 102779. [PMC free article] [PubMed] [Google Scholar]
- Eikenberry, S. E., M. Mancuso, E. Iboi, T. Phan, K. Eikenberry, Y. Kuang, E. Kostelich and A. B. Gumel (2020):** "To Mask or Not to Mask: Modeling The Potential for Face Mask Use by The General Public to Curtail the COVID-19 Pandemic." *Infect Dis Model* 5: 293-308
- Ellington S, Strid P, Tong VT, Woodworth K, Galang RR, Zambrano LD, et al (2020):** Characteristics of Women of Reproductive Age with Laboratory-Confirmed SARS-CoV-2. *Weekly / June 26, 2020 / 69(25);769–775 Morbidity and Mortality Weekly Report (MMWR).* available at <https://www.cdc.gov/mmwr/volumes/69/wr/mm6925a1.htm>
- Erdem, H., & Lucey, D. R. (2021):** Healthcare worker infections and deaths due to COVID-19: A survey from 37 nations and a call for WHO to post national data on their website. *International Journal of Infectious Diseases*, 102, 239.
- Greenhalgh, T., M. B. Schmid, T. Czypionka, D. Bassler and L. Gruer (2020):** "Face masks for The Public during The covid-19 Crisis." *Bmj* 369: m1435
- Kauta NJ, Groenewald J, Arnolds D, Blankson B, Omar A, Naidu P, et al (2020):** WhatsApp mobile health platform to support fracture management by non-specialists in South Africa. *Journal of the American College of Surgeons*. 2020; 230(1):37-42
- Li L, Zhang Q, Wang X, Zhang J, Wang T, Gao T-L, et al (2020):** Characterizing the propagation of situational information in social media during covid-19 epidemic: A case study on weibo. *IEEE Transactions on Computational Social Systems*. 2020;7(2):556-62.
- Liu H, Wang LL, Zhao SJ, Kwak-Kim J, Mor G, Liao A, 2020:** Why are pregnant women susceptible to viral infection: an immunological viewpoint? *J Reprod Immunol* 139: 103122. [PMC free article] [PubMed] [Google Scholar]
- 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
- Medhat, M. A., & El Kassas, M. (2020):** COVID-19 in Egypt: Uncovered figures or a different situation?. *Journal of global health*, 10(1).
- Miller, R (2020):** Transmission and risk factors of COVID-19. *Cleveland Clinic Journal of Medicine*, 2020; Available at <https://www.ccm.org/content/early/2020/05/12/ccjm.87a.ccc029>. Accessed on 5/7/2020.
- Nwafor JI, Aniukwu JK, Anozie BO, Ikeotuonye AC, Okedo-Alex IN, (2020):** Pregnant women's knowledge and practice of preventive measures against COVID-19 in a low-resource African setting. *Int J Gynaecol Obstet* 150: 121–123. [PubMed] [Google Scholar]
- Schwartz D A & Graham AL(2020):** Potential Maternal and Infant Outcomes from Coronavirus 2019-nCoV (SARS-CoV-2) Infecting Pregnant Women: Lessons from SARS, MERS, and Other Human Coronavirus Infections. *Viruses* 2020; 12(2), 194; [https:// doi. org/ 10.3390/v1202019 4](https://doi.org/10.3390/v12020194).
- 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]
- Wang D, Hu B&Hu C (2020):** Clinical characteristics of 138 hospitalized patients with 2019 novel corona virus-infected pneumonia in Wuhan, China. *JAMA* 2020. *JAMA - J Am Med Asso*, 323 (2020), pp.

1061 1069. <https://doi.org/10.1001/jama.2020.1585>]

World Health Organization (2020): Myth Busters. Geneva, Switzerland: WHO; Available at: https://www.who.int/images/default-source/health-topics/coronavirus/myth-busters/web-mythbusters/mythbuster-4.png?sfvrsn=e163bada_8. Accessed February 5, 2020. [Google Scholar]

World Health Organization (2020): Q&A on Coronaviruses (COVID-19). Geneva, Switzerland: WHO; Available at: <https://www.who.int/news-room/q-a-detail/q-a-coronaviruses>. Accessed February 5, 2020. [Google Scholar]

World Health Organization (2020): Situation Reports. Geneva, Switzerland: WHO; Available at: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/>. Accessed February 5, 2020. [Google Scholar]

WorldMeters. COVID-19 Coronavirus Pandemic, Coronavirus Cases (2020): Available at: https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1?%20%5C%20%22 (accessed on 4 February, 2021)

Yassa M, Birol P, Yirmibes C, Usta C, Haydar A, Yassa A, Sandal K, Tekin AB, Tug N, (2020): Near-term pregnant women's attitude toward, concern about and knowledge of the COVID-19 pandemic. *J Maternal-Fetal Neonatal Med* 33: 3827–3834. [PubMed] [Google Scholar]

Zhong BL, Luo W, Li HM, Zhang QQ, Liu XG, Li WT, 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. *Int J Biol Sci* 16: 1745–1752. [PMC free article] [PubMed] [Google Scholar]