



**Effectiveness of online antenatal educational classes on pregnancy outcome**

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**ABSTRACT**

**Background:** Prenatal education is a core component of perinatal care and services provided by health institutions for the well-being of the women and fetus to promote a positive pregnancy, childbirth and postpartum outcome, **Aim:** This study aimed to evaluate the effectiveness of online antenatal educational classes on pregnancy outcome. **Study design:** A quasi-experimental research design (study and control group) was utilized. **Setting:** The study was carried out in antenatal clinic and labour unit at Women Health Hospital, Assiut University. **Sample:** A purposive sample was utilized. **Study subjects:** The study subjects included 100 primigravida and primiparous women (50 in study group and 50 in control group) according to inclusion criteria. **Tools:** Three tools were used, a structure interview questionnaire, Follow up checklist during labour and postpartum period to assess maternal and newborn outcomes, **Results:** The results of the present study highlighted that there was a statistical significant differences between two groups regarding occurrence of pregnancy complications, mode of delivery, intra-partum complications, newborn outcomes, postpartum complications and continuation of postpartum family planning methods, **Conclusions:** The present study concluded that online or mobile health intervention has the potential to increase the utilization of antenatal and postnatal care compared to the routine approach and the technology method effective in an improvement in maternal and newborn outcomes. **Recommendations:** Integrate social media educational program in nursing protocol for pregnant women.

**Keywords:** Antenatal education, Pregnancy outcomes, online classes

## Introduction

A proper antenatal and postnatal checkup provides necessary care to the mother and baby, which help in timely identification, management, and referral to appropriate facilities to promote a healthy baby's delivery to a healthy mother to reduce the burden of maternal and neonatal mortality (Yadav, et al, 2022). According to the WHO, nearly 808 women died every day due to preventable causes of pregnancy and childbirth, such as hemorrhage, hypertension, infections, and indirect causes, due to the interaction between preexisting medical conditions and pregnancy, and 94% of them are from low- and middle-income countries (WHO, 2020).

Online communication describes as "interactive computer-mediated technologies that promote the creation or exchange of information, personal experiences, opinion, interests, and other kinds of expression via virtual communities and networks" (Obar and Wildman, 2020). Innovative techniques to improving health behaviour are not restricted to face-to-face contacts; can also make use of mobile health services, which can be tailored to the needs of the user and can serve as effective in reduce cost of patient treatment (Dewi et al., 2019).

Pregnancy is a critical phase in a woman's life during which life-threatening complications can arise at any time, and many women die as a result of these issues. During the COVID-19 epidemic, social media usage exploded to the point where it is now a standard aspect of modern healthcare

education and treatment (Wong et al, 2021). Childbirth education classes have developed in recent decades as obstetrical practices to improve pregnancy outcomes (Mueller et al., 2020). Following childbirth, primiparous women frequently encounter a variety of parenting issues, which have detrimental consequences for both mothers and infants (Ricchi et al., 2020 and Zhang et al, 2021).

Studies have demonstrated that women with fear of childbirth who experienced special psycho-education courses during pregnancy had a lower rate of cesarean deliveries due to patients' requests, better chances of initiating breastfeeding, and are less complications compared to those who did not attend such educational interventions (Gluck et al., 2020).

Nurses play an important role in the transmission of knowledge among health care providers and clients, because women are constantly using social media, nurses can use it as a new communication tool for pregnant women to share knowledge and information and educate them without posing any difficulties or constraints (Zedan et al., 2020). There is a need to restructure pregnancy-related health education programmes offered by primary health care practitioners and through social media to improve understanding among women of childbearing age in order to reduce pregnancy-related issues and improve postnatal outcomes (Rasheed et al., 2018).

## Significant of study

Millions of women in poor countries have short- and long-term morbidities as a result of pregnancy and childbirth. Due to a lack of antenatal care and access to health care units, Egypt's current maternal mortality rate is projected to be 37 deaths per 100,000 live births (Page et al, 2021 and World Data Atlas, 2021). By increasing the acceptability and accessibility of existing maternity and child health services, mobile technology have effectively enhanced perinatal health outcomes (Yadav et al, 2022)

Gabarron et al., 2021 & Miremberg et al., 2018, identified online educational programmes as a component of social media and effective educational channels for providing health education, boosting health among all individuals, and improving maternal well-being during pregnancy. As a result, raising pregnant women's understanding is critical in preventing difficulties during pregnancy, labour, and the postpartum period.

### Aim of the study:

To evaluate the effectiveness of online antenatal educational classes on pregnancy outcomes

### Research hypothesis

**H0:** No improvement in pregnancy outcomes after implementation of online antenatal educational classes.

**H1:** There are improvements in pregnancy

outcomes after implementation online antenatal educational classes.

### Subjects & Methods:-

Subjects and methods of this study were displayed into four designs technical, operational, administrative, and statistical design.

#### Technical Design

#### Research Design

In this work, a quasi- experimental research approach was used.

Like a true experiment, a quasi-experimental design aims to establish a cause-and-effect relationship between an independent and dependent variable. However, unlike a true experiment, a quasi-experiment does not rely on random assignment. Instead, subjects are assigned to groups based on non-random criteria (Thomas, 2020)

#### Study Setting

The study was conducted at antenatal outpatient clinic and labour unit at Women Health Hospital, Assiut University, Egypt. The Women's Health Hospital serves the entire region of Upper Egypt. It is a building that has a six floor, five for governmental admission and one for private service and the first floor is the clinic which works five days per week.

#### Sample type:

A purposive sample was used in this research.

#### Sample size:

The sample size was estimated to be 100 primigravida and primiparous women who

divided into two groups, study and control group, 50 pregnant women for each group.

### **Sample size calculation:**

It was estimated using the sample size equation for estimation of single proportion with 80 percent power, a value of 2.5 at the acceptable limit of precision (D) at 95 percent confidence level (C1) and  $p = 0.05$ , with predicted prevalence 10 percent and worst acceptable 25 percent. As a result, the sample size was calculated to be 100 women (50 primigravida and primiparous women in the study group and (50 primigravida and primiparous women in the control group) + 10% of women to guard against non-response rate, which was chosen using the Simple random procedure. Randomization was done by using computer-generated random table. After acceptance of eligible women to participate in the study, they were assigned with simple random technique (first day for study group and second day for control group).

### **Study Subjects:**

A total of 100 primigravida and primiparous women in their second and third trimesters were chosen by a simple random sampling to receive health promotion and continue follow up. The inclusion criteria included primigravida and primiparous women in their second and third trimesters, a singleton pregnancy, the ability to read and write, and access to the WhatsApp programme, as well as consent to participate. To rule out from study include the effect of other factors on study outcomes as pregnant

women with any medical issues during pregnancy, such as gestational diabetes, preeclampsia, hypertension, coronary heart disease, or psychiatric problems, were excluded.

### **Tools of Data Collection:**

The researchers created a systematic interview questionnaire after examining past research and consisted of **three tools**:

#### **Tool (1): it comprises four parts.**

**Part one:** included personal data as: name, age, telephone number supported with Whats App, residence, educational level, occupation.

**Part two:** included data related to medical history as: the history of diabetes, hypertension, renal disease, cardiac disease, hepatic disease, and any other diagnosed medical disease.

**Part three:** included data related to obstetric history as: gravidity and number of abortion.

**Part four:** included data related to current antenatal condition as: expected date of delivery, gestational age with weeks and occurrence of any pregnancy complications.

#### **Tool (2): Follow up checklist to obtain the following data at labour unit related to maternal and fetal outcomes included:**

-Type of delivery, indications for cesarean delivery if present, Presence of any intra-partum complications and neonatal birth weight and admission NICU.

**Tool (3): Follow up questionnaire to ask the women about the following after 40 days postpartum through telephone included:**

Ask the women about initiation of breast feeding immediately after delivery and continuation of breast feeding, presence of maternal or newborn postpartum complications and initiation of family planning method.

**Validity of the study tools:**

Questionnaire was examined and reappraised by a panel of 5 experts in the field of maternity and newborn health nursing and obstetrics and Community health nursing at Assiut University. The panel reviewed the instruments for clarity, relevance, comprehensiveness, understanding and applicability.

**Reliability of the study tools:**

The researchers ran a reliability test on the study tools to see if the scales were consistent internally. It was carried out as part of the pilot project prior to the collection of data from 10% of the participants. Cronbach's alpha was found to be 0.765.

**Administrative Design**

Before implementation of the study; an official approval containing brief explanations of the purpose of study was signed from the Dean of the Faculty of Nursing-Assiut University and was obtained from the director of woman's Health Hospital for permission to carry out the study.

**Ethical consideration:** The research proposal was approved by Ethical Committee of the Faculty of Nursing at Assiut University. There was the minimum risk on the study participants during application of the research. The study followed common ethical principles in research; informed consent was received from the study sample who accepted to participate in the study after explaining the nature and aim of the study. Confidentiality and anonymity were assured, and study subjects had the right to refuse the participation or withdraw from the research at any time without giving reasons.

**Operational design**

It was displayed in two phases, pilot study and data collection phase.

**A pilot study** was done on 10% of the participants in the study sample (10 pregnant women according inclusion criteria). The purposes of the pilot study were to ensure the clarity of items, to test for the comprehension, applicability and relevance of the tools, to identify obstacles and problems that could occur during data collection and to estimate the time required for study sample collection. Minimal modification was done which included from the study.

**Data collection phase.**

Data collection of this study was taken eight months started from the beginning of June 2021, and completed by the end of January 2022. This

was achieved in three phases, pre intervention, intervention and post intervention.

### **The online antenatal educational classes**

It had been designed by the researchers depending on the pertinent literary text. The goal of this program is to improving primigravidas and primiparous women's awareness about pregnancy, labour and postpartum period to enhancing maternal and fetal outcomes and reducing complications.

#### **I-Pre-intervention assessment phase:**

The primary method of data collection was a single face-to-face interview with each woman in the study and control groups. Before beginning the study, an exploratory visit to a prenatal clinic was made to determine the best time to collect data for each unit. In addition, personal conversation with nurses and physicians was conducted in order to explain the study's goal and obtain the best possible cooperation.

After describing the study's goal and receiving informed consent from women who met the study's requirements, they were included in the study. The entire history was recorded in the structured questionnaire, which included personal information, medical history, obstetric history, and information on the present pregnancy. Every query was directed at the case, and the answers were kept track of.

#### **II-Intervention phase:**

##### **For control group:-**

The woman received routine antenatal care at antenatal clinic (the routine antenatal care given for all pregnant women in Women Health hospital included only ask for women complain, medical management, measure for blood pressure and payment ultrasonography required without any health education instruction from doctor or nurses). The researchers informed the woman that she was received telephone call for postpartum follow up.

##### **For study group:-**

The researchers asked the woman to give her a telephone number that have what's App to contact with her through antenatal what's App group which was designed by researchers. Each woman involved to study group was added to antenatal what's App group and received routine antenatal care at antenatal clinic as control group.

##### **Implementation stage:-**

After reviewing relevant current Arabic and English literature, simple and focus health education session designed for women in study group and were sent through what's App group in two days weekly (take about two month), including voice messages, text messages, figures and videos about antenatal care, birth process and postpartum care which was designed in the Arabic language to address gaps in pregnant women's knowledge and promote delivery outcome.

##### **What's App health education content included:-**

**Session 1:** importance of antenatal care during pregnancy, **Session 2:** maintaining a balanced lifestyle, health impacts of exposure to second hand smoking, **Session 3:** health impacts of not following regular antenatal care on pregnant women's and their fetus, **Session 4:** danger signs during pregnancy, **Session 5:** benefits of simple exercises during pregnancy, **Session 6:** nutrition during pregnancy (sources of iron, sources of calcium, drinks that enhance iron absorption, drinks that inhibit iron absorption, the required vitamins and minerals supplements in pregnancy, Importance of taking folic acid in subsequent pregnancy and health impacts of high caffeine intake), **Session 7:** sleep and rest during pregnancy (the amount of sleep, rest needed during pregnancy and the most preferable position for sleep during pregnancy), **Session 8:** healthy behaviors that pregnant women should do during pregnancy, **Session 9:** Signs of labor and care in the delivery room; common labor and delivery issues, **Session 10:** Different modes of labor such as cesarean and instrumental deliveries or “natural labor, **Session 11:** pain management (epidural anesthesia, analgesics, narcotics) and discussion on the pros and cons of each pain-relief method; types of birthing interventions, **Session 12:** the role of the birthing companion during labor; initial bonding experience with the newborn, **Session 13:** breastfeeding; the beginning of parenthood; and issues in the postpartum period (Preparation and importance of breast feeding, position, breast complications), **Session 14:** Postpartum family planning methods.

### 3-Post intervention phase (Evaluation phase)

Firstly, great to any questions through the group or by telephone for any women especially primigravida and primiparous women more irritable women than multigravida for lack of experiences.

Finally, to evaluate the effect of the what's App health education session on pregnancy outcomes, all women in two groups study and control groups were followed up at delivery unit or through telephone to complete follow up checklist and 40days after delivery through telephone to complete follow up questionnaire and all knowledge collected in booklet in Arabic language and sent to the What's App group for subsequent pregnancy or sent to any other pregnant women.

### Statistical design

Statistical Package for Social Sciences (SPSS) version 26 was used to organize, categorize, code, tabulate, and analyze the obtained data. Numbers, percentages, averages, and standard deviation were used to present the data. To demonstrate the relationship between variables, the Chi-square test was utilized. The mean was compared using the T-test. When the p-value is less than 0.05, it is considered statistically significant.

### Results

**Table (1):** Distribution of studied sample according to their personal data the table indicated that 52.0 and 56.0 percent of the women in the study and control groups were between the ages of

25 and 35 years, respectively, and the mean age SD of the women was (25.95.7 years and 29.26.5 years). In terms of where the women lived, it was discovered that the majority of them lived in rural areas (80.0%). In terms of women's education, 46.0 percent had a secondary education. 90.0 percent of the women were housewives, according to their occupation.

**Table (2):** showed that about two-thirds of pregnant women in both groups were primigravidas, with mean gestational ages of (25.31.3 & 25.8+1.6), and that 68.0 percent of women in the study group and 50% of women in the control group were in the second trimester.

**Table (3)** showed how women are distributed based on maternal and newborn outcomes, with p-values of 0.010 and 0.015, respectively, it was discovered that there was statistically significant difference between the study and control groups in terms of manner of delivery and occurrence of intrapartum problems. According to newborn outcome, there was no difference between the study and control groups in terms of birth weight, but there was statistically significant difference

between the study and control groups in terms of problems such as ICU hospitalization with p-value (0.012) complication-free group, compared to 72 percent in the control group.

**Figure (1):** Clarified that there was statistical significance difference between study and control groups with p-value (0.009).

**Table (4):** Illustrated that there was statistical significance difference between study and control group regarding occurrence of postpartum complications with p-value 0.003. According to initiation of breast feeding immediately after delivery, it was noticed that there was no difference between study and control group, but there was significant difference between study and control group regarding continuation of breast feeding and using of postpartum family planning with p-value (0.021 and 0.043) respectively.

**Figure (2):** reported that there was statistical significant difference between study and control group with p-value (0.001) as regard to occurrence of postpartum complications between study and control group.

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

| Personal data             | Study group     |      | Control group   |      | p-value      |
|---------------------------|-----------------|------|-----------------|------|--------------|
|                           | N (50)          | %    | N (50)          | %    |              |
| <b>Age group:</b>         |                 |      |                 |      |              |
| < 25 year                 | 21              | 42.0 | 14              | 28.0 | <b>0.154</b> |
| 25-35 year                | 26              | 52.0 | 28              | 56.0 |              |
| > 35 year                 | 3               | 6.0  | 8               | 16.0 |              |
| <b>Age mean± SD</b>       | <b>25.9±5.8</b> |      | <b>29.2±6.5</b> |      | <b>0.193</b> |
| <b>Educational level:</b> |                 |      |                 |      |              |
| Read & Write              | 6               | 12.0 | 10              | 20.0 | <b>0.369</b> |
| Primary school            | 3               | 6.0  | 6               | 12.0 |              |
| Preparatory school        | 12              | 24.0 | 9               | 18.0 |              |
| Secondary school          | 23              | 46.0 | 16              | 32.0 |              |
| University                | 6               | 12.0 | 9               | 18.0 |              |
| <b>Residence:</b>         |                 |      |                 |      |              |
| Urban                     | 10              | 20.0 | 15              | 30.0 | <b>0.248</b> |
| Rural                     | 40              | 80.0 | 35              | 70.0 |              |
| <b>Occupation:</b>        |                 |      |                 |      |              |
| Housewife                 | 45              | 90.0 | 47              | 94.0 | <b>0.461</b> |
| Employer                  | 5               | 10.0 | 3               | 6.0  |              |

Table (2) Distribution of studied sample according to obstetric data and current pregnancy:

| Obstetric data                                | Study group     |      | Control group   |      | p-value        |
|---|-----------------|------|-----------------|------|----------------|
|   | N (50)          | %    | N (50)          | %    |                |
| <b>Gravidity and Parity:</b>                  |                 |      |                 |      |                |
| Primigravida                                  | 38              | 76.0 | 44              | 88.0 | 0.118          |
| Primiparous                                   | 12              | 24.0 | 6               | 12.0 |                |
| <b>Abortion:</b>                              |                 |      |                 |      |                |
| One   | 10              | 83.0 | 2               | 33.5 | 0.349          |
| More than one                                 | 2               | 17.0 | 4               | 66.5 |                |
| <b>Gestational week:</b>                      |                 |      |                 |      |                |
| 24-25   | 34              | 68.0 | 25              | 50.0 | 0.067          |
| >25-28  | 16              | 32.0 | 25              | 50.0 |                |
| <b>mean± SD</b>                               | <b>25.3±1.3</b> |      | <b>25.8+1.6</b> |      | 0.172          |
| <b>Occurrence of pregnancy complications:</b> |                 |      |                 |      |                |
| None  | 46              | 92.0 | 36              | 72.0 | <b>0.009**</b> |
| Preterm labour                                | 2               | 4.0  | 3               | 6.0  |                |
| Decreases fetal movement                      | 2               | 4.0  | 11              | 22.0 |                |

**Table (3): Distribution of studied sample according to maternal and fetal outcomes (intrapartum checklist):**

| Maternal outcomes                  | Study group |       | Control group |      | p-value        |
|------------------------------------|-------------|-------|---------------|------|----------------|
|                                    | N (50)      | %     | N (50)        | %    |                |
| <b>Maternal outcomes</b>           |             |       |               |      |                |
| <b>Type of delivery</b>            |             |       |               |      |                |
| Spontaneous Vaginal Delivery       | 29          | 58.0  | 14            | 28.0 | <b>0.010**</b> |
| Cesarean section                   | 19          | 38.0  | 32            | 64.0 |                |
| Induced Vaginal Delivery           | 2           | 4.0   | 4             | 8.0  |                |
| <b>Indication of CS</b>            |             |       |               |      |                |
| Non reassuring FHR                 | 7           | 37.0  | 7             | 22.0 | <b>0.939</b>   |
| Non progressive labor              | 4           | 21.0  | 5             | 15.5 |                |
| Mal-presentation                   | 6           | 31.5  | 11            | 34.5 |                |
| Pregnancy complications            | 2           | 10.5  | 9             | 28.0 |                |
| <b>Intra-partum complications:</b> |             |       |               |      |                |
| None                               | 50          | 100.0 | 46            | 92.0 | <b>0.015**</b> |
| Bleeding                           | 0           | 0.0   | 3             | 6.0  |                |
| Prolonged labor                    | 0           | 0.0   | 1             | 2.0  |                |

Conti. Table (3):

| Newborn outcome                    | Study group          |       | Control group       |      | p-value        |
|------------------------------------|----------------------|-------|---------------------|------|----------------|
|                                    | N (50)               | %     | N (50)              | %    |                |
| <b>Birth weight :</b>              |                      |       |                     |      |                |
| < 2500 gm                          | 5                    | 10.0  | 6                   | 12.0 | <b>0.456</b>   |
| 2500-3500 gm                       | 43                   | 86.0  | 39                  | 78.0 |                |
| >3500 gm                           | 2                    | 4.0   | 5                   | 10.0 |                |
| <b>Mean and SD of birth weight</b> | <b>2927.0± 415.7</b> |       | <b>2897.0±540.6</b> |      | <b>0.425</b>   |
| <b>Apgar score:</b>                |                      |       |                     |      |                |
| From 7 -10                         | 50                   | 100.0 | 41                  | 82.0 | <b>0.002**</b> |
| Less than 7                        | 0                    | 0.0   | 9                   | 18.0 |                |
| <b>Admission to ICU:</b>           |                      |       |                     |      |                |
| Yes                                | 0                    | 100.0 | 6                   | 12.0 | <b>0.012**</b> |
| No                                 | 50                   | 0.0   | 44                  | 88.0 |                |

\* Statistical significant at  $p \leq 0.05$

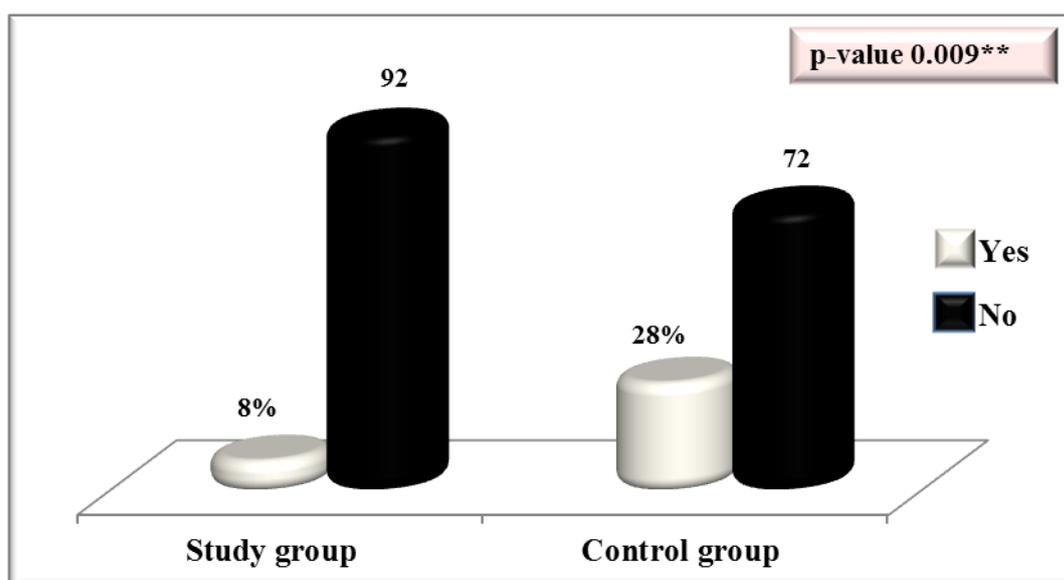


Figure (1) Occurrence of pregnancy complications in study and control group:

**Table (4) Distribution of studied sample according to postpartum follow up data:**

| Follow up data                   | Study group |      | Control group |      | p-value        |
|----------------------------------|-------------|------|---------------|------|----------------|
|                                  | N (50)      | %    | N (50)        | %    |                |
| <b>Postpartum complications:</b> |             |      |               |      |                |
| None                             | 44          | 88.0 | 26            | 52.0 | <b>0.003**</b> |
| Bleeding                         | 2           | 4.0  | 4             | 8.0  |                |
| Fever                            | 0           | 0.0  | 3             | 6.0  |                |
| Urinary tract infection          | 0           | 0.0  | 4             | 8.0  |                |
| Blood transfusion                | 3           | 6.0  | 2             | 4.0  |                |
| Breast complications             | 0           | 0.0  | 5             | 10.0 |                |
| Wound infection                  | 1           | 2.0  | 4             | 8.0  |                |
| Admission to I.C.U               | 0           | 0.0  | 2             | 4.0  |                |
| <b>Immediate breast feeding</b>  |             |      |               |      |                |
| Yes                              | 47          | 94.0 | 41            | 82.0 | <b>0.065</b>   |
| No                               | 3           | 6.0  | 9             | 18.0 |                |
| <b>Continue breast feeding</b>   |             |      |               |      |                |
| Yes                              | 47          | 94.0 | 39            | 78.0 | <b>0.021*</b>  |
| No                               | 3           | 6.0  | 11            | 22.0 |                |

Conti. Table (4):

|  |    |      |    |      |               |
|--|----|------|----|------|---------------|
| <b>Using postpartum family planning method</b> |    |      |    |      |               |
| Yes  | 41 | 82.0 | 32 | 64.0 | <b>0.043*</b> |
| No   | 9  | 18.0 | 18 | 36.0 |               |
| <b>If no, cause of not use:</b>                |    |      |    |      |               |
| Forgotten the date                             | 0  | 0.0  | 3  | 6.0  | <b>0.629</b>  |
| Pregnancy desire                               | 3  | 33.3 | 2  | 4.0  |               |
| husband travel                                 | 0  | 0.0  | 0  | 0.0  |               |
| Postpartum complication                        | 1  | 11.1 | 2  | 4.0  |               |
| No interest                                    | 1  | 11.1 | 1  | 2.0  |               |
| Neonatal death                                 | 1  | 11.1 | 2  | 4.0  |               |
| Husband desire                                 | 3  | 33.3 | 6  | 12.0 |               |
| Admitted to ICU                                | 0  | 0.0  | 2  | 4.0  |               |

\* Statistical significant at  $p \leq 0.05$

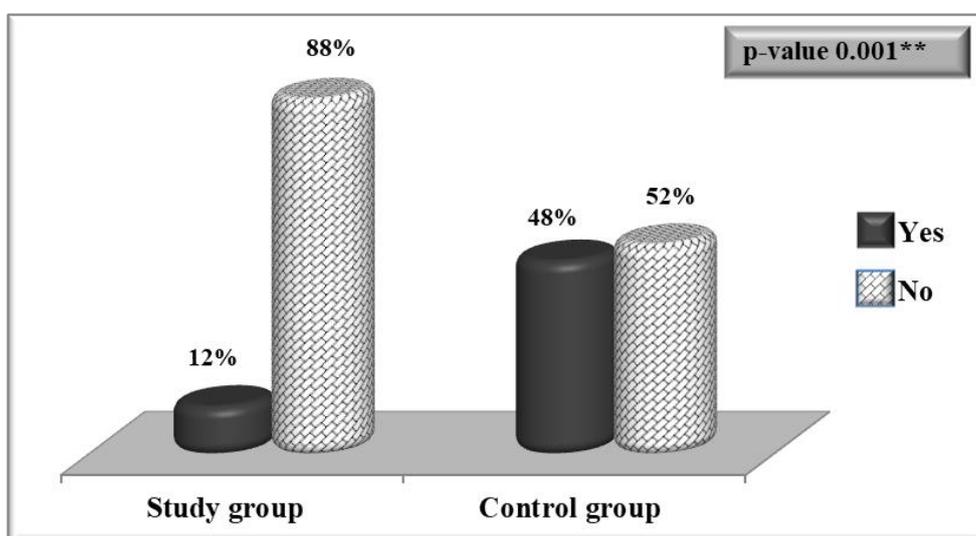


Figure (2) Occurrence of postpartum complications in study and control group:

## Discussion

Fear of childbirth is a common problem during late pregnancy especially among primigravida, and it may complicate labor and lead to postpartum depression and difficulties in the mother–infant relationship. Childbirth education aims to prepare women for the stress of pregnancy, delivery, and postpartum period (**Gluck et al, 2020**). The current study aimed to evaluate the effectiveness of online antenatal educational classes on pregnancy outcome.

The aim of the study was to evaluate the effectiveness of online antenatal educational classes on pregnancy outcome.

Hypothesis testing: Study results revealed improvements in pregnancy outcomes among study group after implementation online antenatal educational classes.

The study's findings revealed that the average age of the women in the study group was 25.95.6 years, whereas the average age of the women in the control group was 29.26.5 years, with over half of them falling into the 25-35 year age category. The bulk of the women in both groups were housewives from rural areas, with approximately half having completed secondary school. The level of education has an impact on health literacy and the use of technology equipment.

As regards, the current problems occur during pregnancy of studied women. The present study

showed that there were statistical significant differences between study and control group, which control group who received routine antenatal care more complain than women in study group who received online educational program. These findings agree in a meta-analysis that synthesized the findings of 15 randomized control trial (RCT) studies conducted in various countries and regions and provides evidence on the effectiveness of these technology-based interventions in providing health care services to pregnant and postpartum women (**Chan & Chen, 2019**).

The previous finding also in harmony with many studies related the positive effect of using Web-based information during pregnancy; they reported that the minority of the studied women take healthy diet, take enough antenatal visit, enough rest and sleep for positive health-wellbeing in maternal and fetal outcomes (**Overdijkink et al., 2018 and Watson et al., 2017**). These also consistent with (**Zedan et al, 2020**) who concluded that, the use of social media as an educational method during pregnancy give an actual chance for helping women learn how to cope effectively with pregnancy journey and childbirth process.

Concerning to intra-partum and post-partum complications, the current study represent statistical significant differences between study and control group, which women in the control group have more intra-partum and post-partum complications than study group, these results in

agreement with **Taneja and colleagues, (2021)** who concluded that women receive intensive care around Birth with positive effect on improving intra-partum and post-partum complications while These study findings were in disagreement with **Gururani et al., (2016)** they assessed minor disorder of pregnancy and its home management. They reported that the majority of the studied women had perineal tears and bleeding. The difference of the studied result may be due to decrease practicing kegal's exercise and low educational level of the studied women and unhealthy life style.

The current study reported that more than half of women in study group have normal vaginal delivery and only about one third of them have cesarean delivery compared control group two third of women have cesarean delivery and only less than one third of them have normal delivery, these findings in harmony with **Ricchi and colleagues (2020)**, who stated that the number of caesarean sections among women who attended childbirth education classes was found to be lower than among women who did not attend and in the same line with **Gluck and colleagues (2020)**, who demonstrates that women who attended childbirth education had a higher rate of normal vaginal delivery and lower rate of instrumental delivery.

While, the previous study findings were dissimilarity with that of **Narasimhulu and colleagues (2016)** & **Wallwiener and colleagues (2016)**, They assessed patterns of internet use by pregnant women, and reliability of pregnancy

related searches, reported that nearly all of the studied women had normal delivery and also in consisted with **Yohai and colleagues (2017)**, who reported that no significant differences were found with regard to the mode of delivery, rate of episiotomy, use of analgesics and neonatal outcomes between control and study groups.

The present study demonstrated a significant relationship among study and control group related initiation and continuation of breast feeding which the majority of women in study group continue breast feeding for emphasize on important and correct methods for feeding through online program compared with about two third in control group continuation breast feeding, these results compatible with **Herval, and Colleagues, (2019)** reported that the provision of health education during pregnancy has been shown to be an important aspect and associated with a broad variety of maternal and newborn outcomes including reduced prematurity and low birth weight, and increased rates of initiation and continuation of breastfeeding.

In terms of newborn outcomes, the current study found a substantial difference between the study and control groups, with the study group performing much better in terms of new born admission to the Neonatal Intensive Care Unit (NICU), whereas the control group had no newborns admitted to the NICU this was in line with **Ellis and Roberts (2020)**. According to studies conducted by **Ashour & Colleagues, (2021)**, **Riley & Colleagues, (2020)** and

**Bradford & Colleagues, (2019)** They concluded that mobile health has increased the percentage of safe childbirth and reduced the ratio of maternal and neonatal complications as mobile health has empowered specialists to measure the compliance of medics to standards of the treatment when treating patients.

In contradiction with the current study findings, **Bush et al., (2017)** who studied the impact of a mobile health application on user engagement and pregnancy outcomes among Wyoming Medicaid members and found that supportive pregnancy apps are an emerging field, and little information is available on their effectiveness in attracting users and impacting birth outcomes.

The present study pointed to significant effect of early use of postpartum family planning methods in study group more than in control group. These results in the same line with **Jones & Colleagues, (2020)** who reported that women received electronic family planning education were more likely to uptake family planning services compared to control group, and in harmony with **Abd-Elaziz & Colleagues, (2018)**, who demonstrated that antenatal counseling provides an important opportunity to improve maternal understanding of postpartum family planning and good opportunity to make an appropriate choice of postpartum family planning method.

Finally, the results of the actual study support the hypothesis, emphasizing the importance of an online or mobile educational intervention during the antenatal period for improving maternal and

fetal outcomes, which is supported by meta-analysis studies to increase and strengthen the evidence for mobile health's effectiveness in antenatal and postnatal care compared to the standard approach, especially in low- and middle-income countries, and help in reducing maternal mortality **Yadav & Colleagues, (2022)**, **Sakamoto & Colleagues, (2022)**, **Chan & Chen (2019)**, **Saronga & Colleagues, (2019)**, **Feroz & Colleagues, (2017)**, and **Colaci & Colleagues, (2016)**.

## Conclusions

The finding of the present study highlighted that there was a statistical significant differences between two groups regarding occurrence of pregnancy complications, mode of delivery, intrapartum complications, newborn outcomes, postpartum complications and continuation of postpartum family planning methods. Also, according to these findings can be concluded that an online or mobile health intervention has the potential to boost prenatal and postnatal care usage when compared to a traditional strategy, and the technological method is successful in improving mother and fetal outcomes.

## Recommendations:

**Based on the findings of the current study the following recommendations were suggested:**

Integrate social media educational program in nursing protocol for pregnant women.

Developing and implementing a mobile web-based pregnancy health care educational program for mothers.

Further study to explore the effect of social media educational programs' on a diverse areas as postnatal, high risk, gynecology and family planning.

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