

Effect of Health Educational Program on Knowledge, Attitude, and Reaction of Pregnant Women Regarding Obstetric and Newborn Danger Signs

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ABSTRACT

Context: Globally, every minute, at least one pregnant woman dies from obstetric complications. Also, the majority of neonatal deaths occur during the first week of life. These mortality rates can be reduced by increased knowledge, positive attitude, and appropriate reaction regarding obstetric and newborn danger signs.

Aim: of the study was to examine the effect of health education program on knowledge, attitude, and the reaction of pregnant women regarding obstetric and newborn danger signs.

Methods: A quasi-experimental research (pre/post-intervention) design was utilized to achieve this study's aim. A purposive sample of 70 pregnant women was recruited according to inclusion criteria. This research was conducted in the Antenatal Outpatient Clinic at Benha University Hospital. Two tools were used for data collection. They were a Structured Interviewing Questionnaire and a Modified Likert Scale to assess women's attitude.

Results: 77.1% had poor knowledge pre educational program compared by 92.9% post educational program intervention. Regarding attitude, 52.9% had a negative attitude preprogram compared to 87.1% had a positive attitude post-program with a statistically significant difference between the two phases regarding all knowledge elements. The majority of them (83.3%) had an appropriate reaction (seeking medical help) after the educational program than a few of them pre educational program.

Conclusion: The implementation educational program significantly improved pregnant women's knowledge, attitude, and reaction regarding obstetrics and newborn danger signs. The study recommended developing antenatal classes for all pregnant women about key danger signs, appropriate decisions, and reactions in obstetric and newborn danger signs. Further research regarding replicating this study on a large representative probability sample is highly recommended to achieve more generalization of the results.

Keywords: Health educational program, obstetric and newborn danger signs, knowledge, attitude, and reaction

1. Introduction

Obstetric danger signs are the major health problems and a cause of high mortality rates among women in developing countries (Nurji *et al.*, 2017). World Health Organization (WHO) reports that about 300 million women in developing countries suffer from short- and long-term illnesses due to pregnancy and childbirth complications. Approximately 529,000 mothers die every year from maternal causes, of which 99 percent die in developed countries (Eittah, 2017). In Sub-Saharan Africa, one in 16 women dies of pregnancy-related causes during women's lifetime, compared to just 1 in 2,800 women in developed regions (Bhumi & Chajhlana, 2018).

Maternal mortality has both direct and indirect causes; direct obstetric deaths, which accounts for 72% of all the deaths, are caused by complications related to pregnancy, delivery, and the postpartum period; and indirect obstetric deaths is caused by pre-existing medical conditions that are made worse by pregnancy or delivery (Phanice & Zachary,

2018). A significant proportion of maternal deaths is caused by obstetric hemorrhage 28%, mostly during or just after delivery, followed by unsafe abortion complications 19%, pregnancy-induced hypertension 17%, infection 11%, and obstructed labor 11% (WHO, 2017).

A pregnant woman may experience some signs and symptoms which signal danger. Danger signs in pregnancy are signs that a pregnant woman will see or those symptoms that a woman will feel, which indicates that something is going wrong with the woman during pregnancy (Jindal, 2017). Danger signs are not the real complications in obstetrics, but warning signs and symptoms that women encounter during pregnancy, childbirth, and postpartum are easily identified by non-clinical personnel. Knowing these warning signs and symptoms are critical for pregnant women and health care providers to rule out severe complications and quickly start treatment (Krishna & Venkat, 2017; Dessu *et al.*, 2018).

During pregnancy, the most prevalent danger signs include sudden gush of fluid from the vagina before 37

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weeks' gestation, vaginal bleeding, abdominal pain. Besides, decrease or absent fetal movement, persistent vomiting, epigastric pain, significant edema of the face and hands, severe persistent headache, blurred vision or dizziness, chills with a fever greater than 38.0°C, and painful urination or reduce urine output (Morhason-Bello et al., 2016; Keenan-Lindsay & Leifer, 2020). Key obstetric danger signs during labor and childbirth are severe vaginal bleeding, prolonged labor, convulsions, and retained placenta. During the postpartum period, key danger signs are severe vaginal bleeding following childbirth, loss of consciousness after childbirth, and fever (Damme, 2015).

The newborn's key danger signs are focused on those signs that indicate problems most likely to occur during the first seven days of the newborn's life since almost two-thirds of neonatal deaths occur during the first week following birth (Krishna, & Venkat, 2017). Some of the repeatedly reported newborn danger signs included a history of difficulty feeding, the movement only when stimulated, the temperature below 35.5°C, or temperature above 37.5°C, respiratory rate of more than 60 breaths minute, severe chest in drawing, and convulsion history. Assessing these signs can contribute to high overall sensitivity and precision for predicting a newborn's need for hospitalization in the first week of life (Nigatu et al., 2015).

Women's knowledge of obstetric complications' dangerous signs is profoundly essential for maximizing professional treatment use during childbirth and finding emergency obstetric services. Lack of awareness of the warning signs during pregnancy, childbirth, and postpartum can hinder women's willingness to engage in healthy motherhood initiatives fully. Given that awareness of dangerous signs of obstetric complications is the essential first step in accepting appropriate and timely referral to obstetric treatment, women and their families must be aware of the dangerous signs of obstetric complications to react appropriately (Amenu et al., 2016).

The nurses play a crucial role in promoting an awareness of the public health issues for pregnant women and their families, besides helping the pregnant woman recognize complications of pregnancy and where to seek medical assistance. The nurse should instruct the women to report any danger signs during pregnancy promptly and promptly seek treatment (Rashad & Essa, 2010).

2. Significance of the Study

Pregnancy is a very tender period from conception to the postpartum period, in which unexpected life-threatening complications can occur at any period. In developing nations, maternal and neonatal mortality is an ongoing global public health issue (Kiataphiwasu & Kaewkiattikun, 2018). In Egypt, the maternal mortality ratio is reported to be 45 per 100000 live births, according to the World Health Organization (WHO, 2013). One of the significant participating factors for maternal deaths is inadequate awareness of the danger signs of pregnancy among women, families, and birth attendants in developing countries. These deaths can be reduced by empowering women with

knowledge on obstetrics and newborn danger signs, promote the appropriate reaction and positive attitude, counseling on the obstetric danger signs or its unpredictable complications, and its appropriate management is crucial (Abdurashid et al., 2018). Therefore, improving maternal awareness is very important about obstetric and newborn danger signs and would improve early detection of problems and help seek timely obstetric care, and decrease maternal and neonatal morbidity and mortality.

3. Aim of the study

This study aimed to examine the effect of health education program on the knowledge, attitude, and reaction of pregnant women regarding obstetric and newborn danger signs.

3.1. Research objectives

- To assess the level of knowledge, attitude, and the reaction of obstetric and newborn danger signs among antenatal care clinic attendant pregnant women.
- To design, implement, and evaluate a health education program's effect on obstetric and newborn danger signs.

3.2. Operational definitions

- *Danger signs*: are defined as a condition that increases the pregnant woman's chances or her newborn dying or has poor health.
- *Knowledge*: Knowledge of obstetric and newborn danger signs means the necessary information that pregnant women have to realize regarding obstetric and newborn danger signs.
- *Attitude*: It is an opinion of studied pregnant women regarding obstetric and newborn danger signs.
- *Reaction*: An action taken in response to something (the pregnant women taking action if any one or more obstetric and newborn danger signs appear). It is classified into an appropriate reaction when the women immediately seeking medical help (go to the doctor or any medical centers) and inappropriate reactions when used traditional means.

3.3. Research hypothesis

Health educational program would improve the knowledge, attitude, and reaction of pregnant women regarding obstetric and newborn danger signs compared to their pre-intervention level.

4. Subjects & Methods

4.1. Research design

A quasi-experimental research design was used to conduct the research (one group pre/post-test). A quasi-experimental design is an empirical interventional study used to estimate an intervention's causal impact on the target population without random assignment. Quasi-experimental research shares similarities with the traditional experimental design or randomized controlled trial, but it specifically lacks the element of random assignment to treatment or control (Dinardo, 2008).

4.2. Research setting

This research was conducted in the Antenatal Outpatient Clinic at Benha University Hospital located on the ground floor, including one room divided into examination and diagnostic areas. Besides, the waiting area where researchers interviewed the studied women to implement the health educational program (pre and post educational program).

4.3. Subjects

A purposive sampling technique was used to recruit studied pregnant women. This research was a time-based study of 8 months, 70 pregnant women with inclusion criteria attending the previously mentioned antenatal care setting.

Inclusion criteria

- Primigravida.
- Pregnant women in the first, second, and third trimester of pregnancy.
- Pregnant women who were mentally and physically capable of being interviewed.
- Pregnant women who agreed to participate in the research.

Exclusion criteria

- Multigravida.
- Pregnant health worker.
- Pregnant women who did not give oral consent.
- Pregnant women with a mental health problem.
- Pregnant women unable to hear or communicate.
- Critically ill pregnant women.

4.4. Tools of the study

Two tools were used in this study.

4.1. A Structured Interviewing Questionnaire

The researcher developed it after reviewing related literature *Sandberg et al. (2014); Lameck (2017); Nurgi et al. (2017)*. It was written in simple Arabic language in the form of closed and open-end questions and divided into four parts:

Part 1: Socio-demographic characteristics of studied pregnant women, including age, marital status, residence, education level, occupation, income, and source of information.

Part 2: Past, present obstetric and medical history, including gestational weeks, and antenatal visits, walking distance to the hospital. Medical history of co-morbid disease, including diabetes mellitus, heart, kidney disease, and hypertension.

Part 3: Knowledge of the studied pregnant women regarding obstetric danger signs (pregnancy, labor, and postpartum) and newborn danger signs (the same tool used pre and post-intervention). Knowledge questions consist of 5 open-end questions focusing on the information given, the meaning of danger signs, danger signs during pregnancy, danger signs during labor, danger signs during postpartum, and newborn danger signs during the first week.

Scoring system

An entirely correct answer was scored (2), an incomplete correct answer was scored (1), and an incorrect answer or do not know was scored (0). The total knowledge classified as

$\geq 75\%$ was considered a good level of knowledge, while $50\% < 75\%$ was considered average, and less than 50% considered poor.

Part 4: Reaction regarding obstetric and newborn danger signs. It was designed to assess the women's reaction to obstetric and newborn danger signs. Only two questions were used, what danger signs they experienced and measure they took when facing obstetric danger signs. The same tool was used in pre and post educational program. Those respondents who are reacting by seeking medical care first when they faced obstetric danger signs were classified as having an appropriate reaction. Those who used traditional means such as: Asking advice from family and searched at the internet or stayed home were taken as an inappropriate reaction, and when pregnant women were reacting more than 60% appropriate reactions, it considered an appropriate reaction while the women reacting more than 60% inappropriate reactions, it considered inappropriate reaction.

4.2. Attitude Assessment Scale

It was adapted from *Nurgi et al. (2017)* and modified by the researchers under the panel's guidance. The researchers implemented the scale to assess the studied pregnant women's attitude regarding obstetric and newborn danger signs (the same tool used pre and post-intervention). The scale consisted of 7 statements from a three-point (Likert type scale) about several issues constructed to measure attitude. The attitude aspect includes; it is crucial for women to know obstetric and newborn danger signs, to know about obstetric and newborn danger signs is important because women will seek medical care, to know about obstetric and newborn danger signs is important because the danger signs will not go away by theirs.

Scoring system

The Scoring system is designed to assess the summarized extent of the attitude of studied pregnant women. Each statement scored as following: Those who responded agree scored (3). Those who responded "uncertain" scored (2). Those who responded disagree were scored (1). Then the total attitude score for each respondent was computed on SPSS. The total score of attitudes was considered the following: Positive attitude $\geq 75\%$, uncertain attitude $60\% < 75\%$, and $< 60\%$ negative attitude.

4.5. Procedures

The tools used in the current study were validated by an expert panel consisting of five Obstetrics and Gynecologic Nursing, as well as Obstetricians' Experts. A panel' experts have examined the content validity of the study tool. They commented on the clarity, correctness, and appropriateness of the content. Adjustments were made according to the panel judgment.

The reliability was achieved by the Cronbach alpha test, which revealed moderate to high reliability. The internal consistency of women's knowledge was 0.876, while the internal consistency of women's attitude was 0.707.

All ethical issues were considered; the study's aim has been explained to each pregnant woman before applying the tools to gain their confidence and trust. The right to withdraw at any time without giving any reason and with no consequences was guaranteed. Pregnant women were assured that their responses would be confidential, and information that might reveal identity would not be recorded.

Official approval to conduct this research was obtained from the Dean of Faculty of Nursing, Benha University, to the Benha University Hospital Director. The researchers interviewed and obtained verbal consent from each pregnant woman in the study before starting the data collection.

Once the ethical and official approval had been obtained, the pilot study commenced testing the study tools' clarity, applicability, and time needed. It was conducted on 10%(7) of pregnant women from the total collection (four weeks from the first to the end of December). Modifications and omissions of certain information were done based on the pilot study results, and then the final forms were created, so the subjects of the pilot study were removed from the study sample.

Fieldwork: was run through four phases, namely assessment planning, implementation, and evaluation. Data collection lasted for eight months from the beginning of February 2019 till the end of September 2019.

Assessment phase: It involved the pre educational program data collection for baseline assessment. The researchers explained to pregnant women the aim of research and procedures, invited them to participate in the study, and obtaining the client consent. The researcher read and explained each item of the study tool to the women and filled a structured interviewing questionnaire, including personal characteristics, take obstetrics and medical present, and past history, then evaluate their knowledge about obstetric and newborn danger signs and recorded reactions to danger signs if present. The researchers visited the research setting two days (Sunday, Monday) per week from 9.00 A.M. to 12.00 P.M, and each day approximately 1 or 2 pregnant women with inclusion criteria. The sheet took about 20 to 30 minutes to be completed preprogram.

Planning phase: Based on the needs identified from the assessment phase and given related literature (*Shehu & Akintoye, 2009*), the researchers designed the educational program in a printed Arabic booklet prepared in simple Arabic language and supported by pictures, and a PowerPoint presentation was prepared. The educational program's general objective was to improve pregnant women's knowledge, attitude, and reaction regarding obstetrics and newborn danger signs. Through upgrade pregnant women's knowledge and change their attitude and enhance the appropriate reaction.

Specific objectives: At the end of the educational program session, each pregnant woman included in the study should be able to:

- Define the meaning of danger signs.
- Mention danger signs during pregnancy.
- Mention danger signs during labour.
- Mention danger signs during postpartum.
- Mention newborn danger signs during the first week.

Implementation phase: Implementation of the educational program took 35 weeks. The educational program involved four scheduled sessions; the first session: Introduction about physiological change during pregnancy, the meaning of danger signs, and the list of danger signs during pregnancy. The second session included an introduction about normal labour and danger signs during labour. The third session contained an introduction about postpartum physiological change and danger signs during postpartum. The fourth and last session included an introduction about newborn care and newborn danger signs. The duration of each session ranged from 45-60 minutes.

It was challenging to gather all pregnant women simultaneously, so the program was implemented in small groups in the antenatal care clinic. Each group consisted of two or three pregnant women every week, according to their attendance. These sessions were repeated to each group of pregnant women until all groups finished. Different teaching methods were used included a lecture and group discussions.

Teaching media were used, including an educational booklet distributed to all pregnant women on the first day of the educational program and audio-visual aids (Powerpoint presentation), and a poster regarding obstetric and newborn danger signs. At the beginning of the first session, an orientation to the educational program and its aims took place. Feedback was given at the start of each session about the previous one. The researcher asked if any pregnant woman experience danger signs during pregnancy and the importance of taking the appropriate reaction (visit physician) if present danger signs through different phases (pregnancy, labour, and postnatal), and emphasis about early visit physician regarding any newborn danger signs as yellow color of skin or eye (jaundice), poor sucking or feeding cold or high temperature and convulsion.

Evaluation phase: The evaluation of the effect of the health education program was done immediately after its implementation educational program in Antenatal Care Outpatient Clinic through applying the same tool used in the pretest and follow up reaction regarding postpartum and newborn danger signs by home visit or telephone after the first-week postpartum period.

4.6. Data analysis

The data were organized, coded, fed to a personal computer, and analyzed using appropriate statistical methods and tests. Mean and standard deviation for quantitative variables. Chi-square test for qualitative data and correlation tests were used. Data presented in suitable tables and figures using appropriate statistical techniques and tests of significance. The level of significance is considered at $p \leq 0.05$

5. Results

Table 1 shows the socio-demographic characteristics of studied pregnant women. It was clear that 45.7% of the studied pregnant women's age was less than 20 years, with the mean age of 22.68 ± 4.89 . Also, it reveals that 92.9% of pregnant women were married. 62.9% lived in a rural area.

Besides, 48.6% of the studied pregnant women had secondary education, and 35.7% had a university education. Moreover, 65.7% of the studied sample was a housewife, and 78.6% had sufficient income.

Figure 1 illustrates that 41.4% of studied pregnant women's sources of information regarding obstetrics and newborn danger signs are the doctor followed by nurse 32.9% while the least source of information is 10% on the internet.

Table 2 clarifies the obstetrics, medical past, and present history of studied pregnant women, 50% of them in the second trimester, and 74.3% had regular antenatal visits. Besides, 67.1% of them walk distance more than one hour to the hospital, and more than half had a history of medical diseases (diabetes, heart disease, kidney disease, hypertension).

Table 3 shows a highly statistically significant difference between pre and post educational program regarding the meaning of danger signs, danger signs during the postpartum period, and danger signs of the newborn during the first week. Otherwise, there were statistically significant differences between the two groups' pre and post educational program regarding danger signs during pregnancy and danger signs during labor.

Figure 2 portrays that 77.1% of the studied pregnant women had poor knowledge pre educational program, while 92.9% had good knowledge post educational programs.

Table 4 reveals a highly statistically significant difference between pre and post educational program regarding the attitude of obstetric and newborn danger signs.

Figure 3 displays that 52.9% of studied pregnant women had a negative attitude pre educational program compared by 87.1% of them had a positive attitude post educational program.

Figure 4 illustrates that from total size (70) of studied pregnant women, 31 (44.3%), 36 (51.4%) of them had present danger signs pre and post educational program respectively (during post-program there is increased in danger signs due to the progression of pregnancy, labor, postpartum and the presence of the newborn babies than preprogram).

Table 5 shows the comparison of the studied pregnant women's reactions pre and post program and reveals that the majority had inappropriate reaction preprogram compared to post-program with a statistically significant difference between the appropriate and inappropriate reaction post-program regarding danger signs of labour and the postpartum period.

Table 6 demonstrates the comparison of total women reactions pre and post-education programs. It illustrates a highly statistically significant difference between the two study phases p-value < 0.001.

Table 7 clarifies a significant association between age, marital status, educational level, and income with total knowledge score pre and post educational programs. It also shows a significant association between residence, occupation, and walking distance to hospital with total knowledge score pre educational program compare to an insignificant association post educational program.

Table 8 demonstrates a highly significant association between marital status, educational level, occupation, and walk distance to hospital with total attitude scored pre and post educational program. An insignificant association between age and total attitude score pre and post educational program p value >0.05 was revealed. This table demonstrates a significant association between residence and income with total attitude scored pre educational program compared to an insignificant association post educational program.

Table 9 shows a highly significant association between ages, residence, educational level, and occupation with reaction pre and post educational program. Meanwhile, significant association regarding marital status, income, and walk distances (highly significance) to hospital with reaction pre educational program compared to an insignificant association post educational program p value > 0.05.

Table (1): Frequency and percentage distribution of studied pregnant women's socio-demographic characteristics (N=70).

Socio-demographic characteristics	No	%
Age years		
≤20	32	45.7
21-30	25	35.7
>30	13	18.6
Mean ± SD	22.68±4.89	
Marital status		
Married	65	92.9
Divorce	4	5.7
Widowed	1	1.4
Residence		
Rural	44	62.9
Urban	26	37.1
Education		
Read & write	3	4.3
Secondary education	34	48.6
University education	25	35.7
Postgraduate	8	11.4
Occupation		
Housewife	46	65.7
Employee	24	34.3
Income		
Insufficient	12	17.1
Sufficient	55	78.6
Sufficient and saves	3	4.3

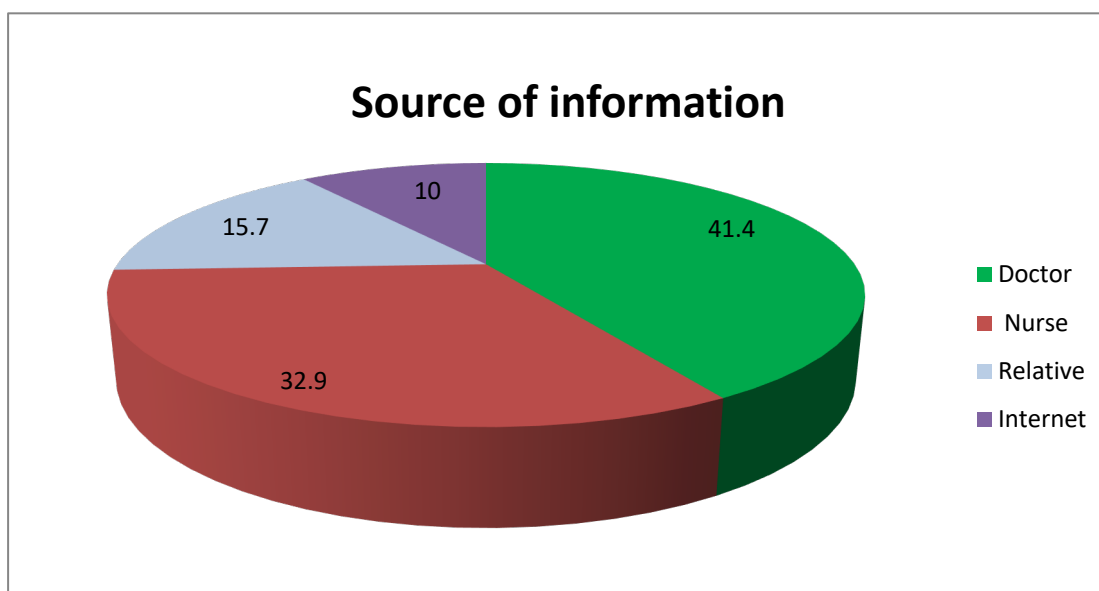


Figure (1): Percentage distribution of the studied pregnant women's information sources (N=70).

Table (2): Frequency and percentage distribution of the studied pregnant women's obstetric and medical past and present history (N =70).

Variables	No	%
Gestational weeks		
First trimester	25	35.7
Second trimester	35	50.0
Third trimester	10	14.3
Mean ± SD	17.80±7.14	
Antenatal visit		
Regular	52	74.3
Irregular	18	25.7
Walk distance to hospital		
>1hrs	47	67.1
<1hrs	23	32.9
Medical history of the disease		
Yes	40	57.1
No	30	42.9
Disease N=40		
Diabetes	4	10
Heart disease	3	7.5
Kidney disease	16	40
Hypertension	17	42.5

*The result not mutually exchange

Table (3): Comparison of studied pregnant women's knowledge regarding obstetric and newborn danger signs (N=70).

Knowledge items	Pre-program				Post-program				X ²	P-value
	Incomplete correct		Do not know		Complete correct		Incomplete correct			
	No	%	No	%	No	%	No	%		
Meaning of danger signs	29	41.4	41	58.6	49	70.0	21	30.0	21.22	0.000
Danger signs during pregnancy	32	45.7	38	54.3	44	62.9	26	37.1	5.88	0.015
Danger signs during labor	23	32.9	47	67.1	46	65.7	18	25.7	7.42	0.024
Danger signs during the postpartum period	30	42.9	40	57.1	53	75.7	17	24.3	12.53	0.000
Danger signs of the newborn during the first week	26	37.1	44	62.9	50	71.4	20	28.6	10.35	0.001

No women provide an entirely correct answer before the program implementation, and no women still did not know the answer after the program implementation.

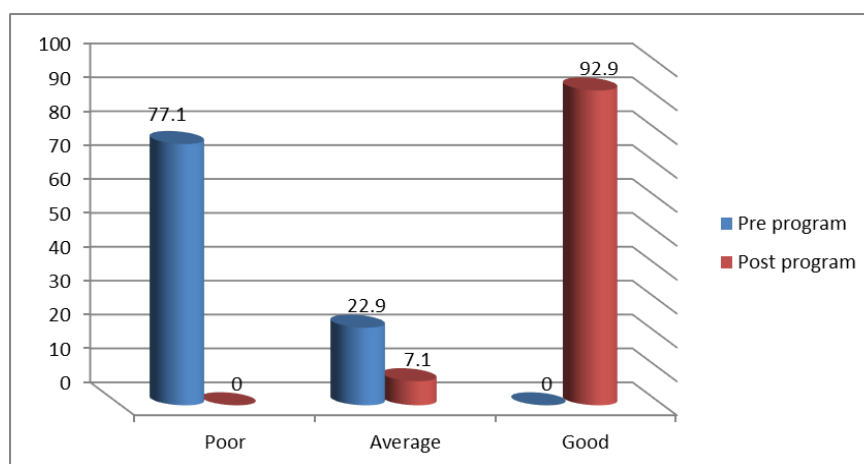


Figure (2): Percentage distribution of the studied pregnant women's total knowledge pre and post-educational program (N=70).

Table (4): Comparison of the studied pregnant women's attitude regarding obstetric and newborn danger signs (N=70).

Attitude statements	Pre-program						Post-program				X ²	P-value
	Agree		Neutral		Disagree		Agree		Neutral			
	No	%	No	%	No	%	No	%	No	%		
Important for women to know obstetric and newborn danger signs.	6	8.6	26	37.1	38	54.3	49	70.0	21	30.0	20.30	0.000
Obstetric and newborn danger signs are important because women will seek medical care.	10	14.3	32	45.7	28	40.0	63	90.0	7	10.0	11.66	0.003
Obstetric and newborn danger signs are important because the danger signs will not go away on their own.	11	15.7	25	35.7	34	48.6	55	78.6	15	21.4	20.21	0.000
Women can prevent danger signs during pregnancy.	5	7.1	35	50.0	30	42.9	59	84.3	11	15.7	17.40	0.000
Mothers who develop obstetric danger signs should seek medical advice.	18	25.7	38	54.3	14	20.0	60	85.7	10	14.3	46.66	0.000
Mothers who develop obstetric danger signs should not seek help from traditional birth attendants.	0	0.0	29	41.4	41	58.6	56	80.0	14	20.0	12.37	0.000
Mothers can early detect serious health problems of the newborn and seek medical advice.	0	0.0	25	35.7	45	64.3	52	74.3	18	25.7	13.46	0.000

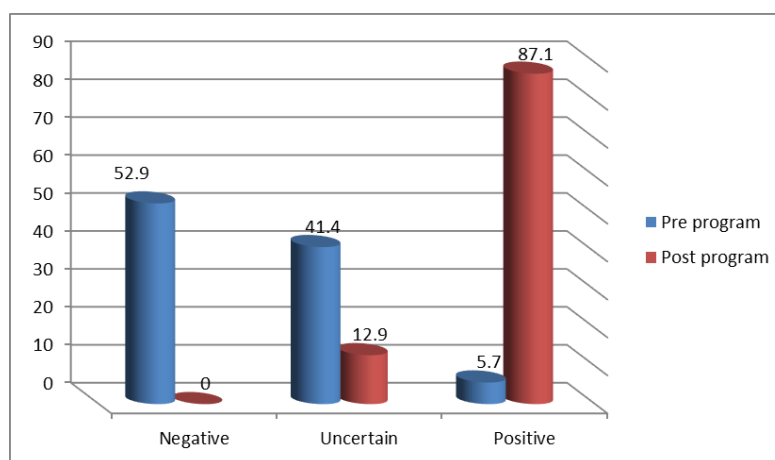


Figure (3): Percentage distribution of studied pregnant women's total attitude regarding obstetric and newborn danger signs pre and post-program (N=70).

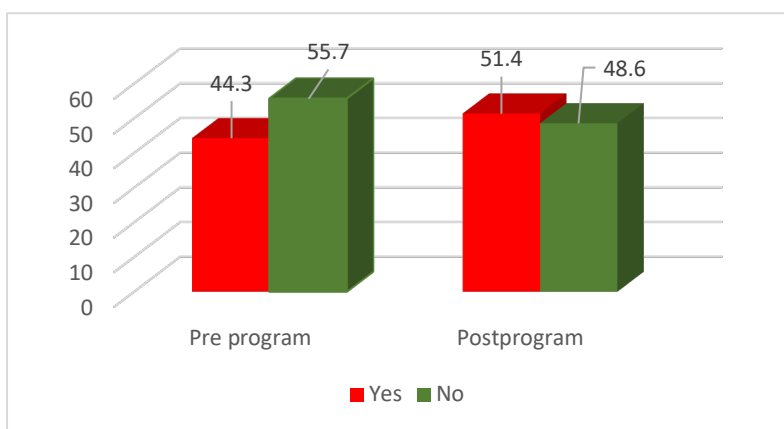


Figure (4): Percentage distribution of studied pregnant according to their present obstetric and newborn danger signs pre and post-program.

Table (5): Comparison between studied pregnant women regarding the reaction to obstetric and newborn danger signs.

Items	Preprogram N=31				x ²	p	Post-program N=36				x ²	p
	Appropriate reaction		Inappropriate reaction				Appropriate reaction		Inappropriate reaction			
	No	%	No	%			No	%	No	%		
Danger signs during pregnancy												
Vaginal bleeding	0	0.0	2	6.5	31.91	0.000	0	0.0	0	0.0	6.105	0.412
Leaking fluid birth canal	0	0.0	7	22.6			7	19.4	1	2.8		
Swollen hand and face	0	0.0	10	32.2			3	8.3	1	2.8		
Severe headache and blurred vision	0	0.0	7	22.6			9	25.0	0	0.0		
Severe vomiting	4	12.9	1	3.2			3	8.3	0	0.0		
Decrease fetal movement	0	0.0	6	19.3			7	19.4	3	8.3		
Severe abdominal pain	0	0.0	1	3.2			7	19.4	0	0.0		
Dysuria	0	0.0	3	9.7			4	11.1	1	2.8		
Danger signs during labor												
Vaginal bleeding	0	0.0	0	0.0	-	-	6	16.7	0	0.0	11.75	0.03*
Convulsion	0	0.0	0	0.0	1	2.8	0	0.0				
Severe headache	0	0.0	0	0.0	7	19.4	5	13.9				
Cord prolapse	0	0.0	0	0.0	1	2.8	0	0.0				
Premature rupture of membrane	0	0.0	0	0.0	15	41.7	0	0.0				
Cessation of uterine contraction	0	0.0	0	0.0	9	25.0	1	2.8				
Danger signs during postpartum												
Vaginal bleeding	0	0.0	0	0.0	-	-	4	11.1	0	0.0	12.18	0.016
Swollen hand and face	0	0.0	0	0.0	13	36.1	0	0.0				
Severe headache	0	0.0	0	0.0	9	25.0	6	16.7				
Offensive vaginal discharge	0	0.0	0	0.0	4	11.1	0	0.0				
Fever	0	0.0	0	0.0	5	13.9	0	0.0				
Newborn danger signs												
Jaundice	0	0.0	0	0.0	-	-	13	36.1	1	2.8	6.171	0.104
Poor sucking or feeding	0	0.0	0	0.0	9	25.0	5	13.9				
Cold or hot or high Temperature	0	0.0	0	0.0	6	16.7	0	0.0				
Convulsion	0	0.0	0	0.0	2	5.5	0	0.0				

* The values are over a total of participants who experienced a present danger sign in each stage and after having their newborns.

Table (6): Comparison of studied pregnant women regarding reaction pre and post-education program.

Reactions	Pre-program (no=31)		Post program (no=36)		X ²	P-value
	No	%	No	%		
Appropriate reaction	4	12.9	30	83.3	33.05	<0.001
Inappropriate reaction	27	87.1	6	16.7		

Table (7): Relation between socio-demographic characteristics and total knowledge score of studied pregnant women pre and post educational program (N=70).

Socio-demographic variables	Knowledge Pre-program				X ²	P-value	Knowledge Post program				X ²	P-value
	Poor		Average				Average		Good			
	No	%	No	%			No	%	No	%		
Age in (years)												
≤20	25	35.7	7	10.0	5.69	0.058	5	7.1	27	38.6	6.39	0.041
21-30	22	31.4	3	4.3			0	0.0	25	35.7		
>30	7	10.0	6	8.6			0	0.0	13	18.6		
Marital status												
Married	52	74.3	13	18.6	6.76	0.034	3	4.3	62	88.6	15.54	0.000
Divorce	1	1.4	3	4.3			1	1.4	3	4.3		
Widowed	1	1.4	0	1.4			1	1.4	0	0.0		
Residence												
Rural	38	54.3	6	8.6	5.71	0.017	3	4.3	41	58.6	0.019	0.89
Urban	16	22.8	10	14.3			2	2.8	24	34.3		
Educational level												
Read & write	3	4.3	0	0.0	17.3 9	≤0.00 1	3	4.3	0	0.0	42.33	0.000
Secondary education	31	44.3	3	4.3			0	0.0	34	48.6		
University education	18	25.7	7	10.0			1	1.4	24	34.3		
Postgraduate	2	2.8	6	8.6			1	1.4	7	10.0		
Occupation												
Housewife	40	57.1	6	8.6	7.32	0.007	5	7.1	41	58.6	2.80	0.094
Employee	14	20.0	10	14.3			0	0.0	24	34.3		
Income												
Low	12	17.1	0	0.0	13.6 9	0.001	5	7.1	7	10.0	26.02	0.000
Moderate	42	60.0	13	18.6			0	0.0	55	78.6		
High	0	0.0	3	4.3			0	0.0	3	4.3		
Walk distance to hospital												
>1 hrs	44	62.8	3	4.3	22.0 1	0.000	2	2.8	45	64.3	1.79	0.18
<1hrs	10	14.3	13	18.6			3	4.3	20	28.6		

Table (8): Relation between socio-demographic characteristics and total attitude among studied pregnant women pre and post educational program (No=70).

Socio-demographic variables	Attitude Pre-program						X ²	P-value	Attitude Post program				X ²	P-value
	Negative		Uncertain		Positive				Uncertain		Positive			
	No	%	No	%	No	%			No	%	No	%		
Age in (years)														
≤20	21	30.0	10	14.3	1	1.4	6.27	0.18	6	8.6	26	37.1	5.45	0.06
21-30	10	14.3	12	17.1	3	4.3			0	0.0	24	34.3		
>30	6	8.6	7	10.0	0	0.0			3	4.3	11	15.7		
Marital status														
Married	34	48.6	28	40.0	3	4.3	17.54	0.0002	6	8.6	59	84.3	14.69	.0001
Divorce	3	4.3	1	1.4	0	0.0			3	4.3	1	1.4		
Widowed	0	0.0	0	0.0	1	1.4			0	0.0	1	1.4		
Residence														
Rural	30	42.9	13	18.6	1	1.4	1.75	0.003	6	8.6	38	54.3	0.064	0.80
Urban	7	10.0	16	22.8	3	4.3			3	4.3	23	32.8		
Educational level														
Read & write	3	4.3	0	0.0	0	0.0	55.25	0.000	3	4.3	0	0.0	25.89	0.000
Secondary education	27	38.6	7	10.0	0	0.0			6	8.6	28	40.0		
University education	6	8.6	19	27.1	0	0.0			0	0.0	25	35.7		
Postgraduate	1	1.4	3	4.3	4	5.7			0	0.0	8	11.4		
Occupation														
Housewife	34	48.6	12	17.1	0	0.0	26.54	0.000	3	4.3	43	61.4	4.80	0.028
Employee	3	4.3	17	24.3	4	5.7			6	8.6	18	25.7		
Income														
Low	10	14.3	2	2.8	0	0.0	9.25	0.055	3	4.3	9	12.8	2.20	0.33
Moderate	27	38.6	24	34.3	4	5.7			6	8.6	49	70.0		
High	0	0.0	3	4.3	0	0.0			0	0.0	3	4.3		
Walk distance to hospital														
>1 hrs	31	44.3	16	22.8	0	0.0	14.70	0.001	3	4.3	44	62.8	5.35	0.021
<1hrs	6	8.6	13	18.6	4	5.7			6	8.6	17	24.3		

Table (9): Relation between socio-demographic characteristics and the studied women's reaction (N0=70).

Socio-demographic variables	Reaction Pre Program N=31				X ²	P-value	Reaction Post program N=36				X ²	P-value
	Inappropriate reaction		Appropriate reaction				Inappropriate reaction		Appropriate reaction			
	No	%	No	%			No	%	No	%		
Age in (years)												
≤20	18	58.1	0	0.0	23.88	0.000	1	2.8	20	55.5	13.14	0.001
21-30	8	25.8	0	0.0			5	13.9	4	11.1		
>30	1	3.2	4	12.9			0	0.0	6	16.7		
Marital status												
Married	24	77.4	3	9.7	7.27	0.026	5	13.9	27	75	0.82	0.662
Divorce	3	9.7	0	0.0			1	2.8	2	5.5		
Widowed	0	0.0	1	3.2			0	0.0	1	2.8		
Residence												
Rural	19	61.3	0	0.0	7.27	0.007	6	16.7	13	36.1	6.44	0.011
Urban	8	25.8	4	12.9			0	0.0	17	47.2		
Educational level												
Read & write												
Secondary education	2	6.4	0	0.0	23.21	≤0.000	3	8.3	0	0.0	17.01	0.001
University education	18	58.1	0	0.0			1	2.8	18	50.0		
Postgraduate	7	22.6	1	3.2			1	2.8	8	22.2		
	0	0.0	3	9.7			1	2.8	4	11.1		
Occupation												
Housewife	24	77.4	0	0.0	15.74	0.000	1	2.8	25	69.4	11.07	0.001
Employee	3	9.7	4	12.9			5	13.9	5	13.9		
Income												
Low	8	25.8	0	0.0	22.54	0.000	1	2.8	8	22.2	1.10	0.577
Moderate	19	61.3	1	3.2			5	13.9	19	52.8		
High	0	0.0	3	9.7			0	0.0	3	8.3		
Walk distance to hospital												
>1 hrs	22	71	0	0.0	11.22	0.001	6	16.7	21	58.3	2.40	0.121
<1hrs	5	16.1	4	12.9			0	0.0	9	25.0		

6. Discussion

Obstetric danger signs are not absolute complications in obstetrics; they are simply symptoms that are well-named by non-clinical staff. Identifying these warning signs and their association with pregnancy complications will improve mothers, spouses, and families' willingness to obtain prompt health care, taking appropriate measures to ensure safe delivery and postpartum care (Desalegn & Yadeshi, 2017). Also, early detection of newborn danger signs is an essential step towards improving newborn survival. Most of these newborn deaths happen at home, suggesting that few mothers know signs of newborn danger signs, and a majority of the neonates are not taken to health facilities when they are sick (Lawn et al., 2010).

The current study aimed to examine the effect of health education program on the knowledge, attitude, and reaction of pregnant women regarding obstetric and newborn danger signs. The study revealed acceptance of the research hypothesis, indicating that pregnant women's knowledge, attitude, and reaction were improved after implementing a health education program regarding obstetric and newborn danger signs.

Concerning the socio-demographic characteristics of the studied pregnant women, the present study showed that less than half of the studied pregnant women aged less than 20 years, most studied pregnant women were married while few were divorced, widowed, and more three-fifths lived in a rural area. Besides, less than half of the studied pregnant women had secondary education. Approximately two-thirds of studied pregnant women were housewives. More than three-quarters of them had sufficient income. This finding may be due to people in Egypt who live in villages prefer to marry at an early age and do not allow women to work; most women prefer to be housewives, so their family income is average because it depends on the husband only.

The current study findings are in the same line with Abas and Fakhredeen (2017), who studied knowledge of danger signs and symptoms of pregnant women visiting Baghdad city antenatal care centers and reported that the highest percentage (44.0%) of the study sample were at age group (15-24) years. The majority of women (85.8%) were housewives. It also congruent with Zepre and Kaba (2016), who study "Birth preparedness and complication readiness among rural women of reproductive age in Abeshige district, Guraghe zone, SNNPR, Ethiopia." They mentioned that the majority (96.6%) of the respondents were married.

In contrast, the remaining women were separated, divorced, or widowed. The occupational characteristics of respondents showed that more than half (53.9%) were housewives. Moreover, it congruent with *Mohamed (2019)*, who study "Effect of an educational program on pregnant women's knowledge about obstetric danger signs" and stated that 60% of the studied women living in rural areas and the educational level of 65% of them are secondary education with 52.5% had sufficient income, and 80% of women were housewives.

Moreover, it congruent with *Mohamed (2019)*, who study "Effect of an educational program on pregnant women's knowledge about obstetric danger signs" and stated that 60% of the studied women living in rural areas and the educational level of 65% of them had secondary education with 52.5% had sufficient income, and 80% of women were housewives.

The current study also revealed that more than two-thirds of studied pregnant women sources of information regarding obstetrics and newborn danger signs were the doctor and the nurse, while the least source of information was relative and the internet. This result may be due to primigravida's pregnant women were more interested in their health and the fetus's health. This result was in agreement with *Acharya and Poudel (2016)*, who study "knowledge regarding obstetric danger signs among antenatal mothers attending a tertiary level hospital" and reported that less than half of studied women obtain information from health personnel.

In the same line with *Aborigo et al. (2014)*, in their study entitled "obstetric danger signs and factors affecting health-seeking behavior among the Kassena-Nankani of Northern Ghana: A qualitative study." They mentioned that in Ghana, pregnant women who have been given information by the health care providers about danger signs during pregnancy through verbal communication, pictures that are available on the walls at the antenatal care clinics, and pictures on the back of antenatal care cards with all descriptions of the danger signs resulted in the pregnant women attend antenatal care clinic regularly.

Regarding obstetric and medical past and present history, the presented study clarified that half of the pregnant women in the second trimester and near three-fourths had regular antenatal visits and a walk distance of more than one hour to the hospital. This finding may be due to the young pregnant women becoming more interested in keeping regular antenatal care in their first pregnancy. This result congruent with *Mohamed (2019)*, who studied "Effect of an educational program on pregnant women's knowledge about obstetric danger signs" and mentioned that 60.8% of pregnant women visited ANC unit less than four times, although 52.5% had a distance between home and ANC unit one hour or less than one hour and 54.2% were in the second trimester.

Besides, it agrees with *Dessu et al. (2018)*. They studied "Assessment of knowledge on danger sign of pregnancy and associated factors among attendant pregnant women in Arbaminch Town Governmental Institutions, Southern Ethiopia." They showed that the pregnant women's

mean gestational age was 12 weeks \pm eight weeks, 48.5% in the second trimester during the interview time. Of the attendants, 31.6%, 29.3%, 28.8%, and 10.3% had attended once, twice, three-time and four antenatal care visits, respectively. Furthermore, it is in the same line with *Nurgi (2017)*, who said that 86.6% had ANC follow-up; those who had ANC follow up 53.2% had four and more visits.

The present study shows a statistically significant difference regarding knowledge of obstetrics danger signs at different periods (pregnancy, labour, postpartum period) post educational program compared to preprogram. This result may be referred to as the educational program's positive role in improving pregnant women's knowledge about obstetrics danger signs and the pregnant women's interest in the program, especially in her first pregnancy and their great concern regarding their health status and the health of their fetuses. Additionally, it may be due to the majority of the sample had secondary and university education that enhanced their ability of pregnant women to understand issues during the education program.

Moreover, the present study revealed that nearly two-thirds of studied pregnant women did not know the newborn danger signs preprogram compare to the post-program. More than two-thirds were knowledgeable about newborn danger signs with a significant difference. This finding may be referred to as a lack of educational programs about danger signs during pregnancy. This result disagrees with *Weiner et al. (2011)* in their study about antenatal education for expectant mothers that lead to a continued increase in infant care skills." They said that despite a high antenatal care attendance among study participants, they showed no increased knowledge of newborn danger signs after four visits or more. This finding was comparable to previous studies conducted in Laos and Malawi. They indicated that by providing structured education during the antenatal care period, the extent and quality of the information provided to pregnant women regarding their newborn danger signs needed significant improvement.

Concerning the attitude of studied pregnant women, the result revealed that more than half of studied pregnant women had a negative attitude preprogram compared to the majority had a positive attitude post-program, with a highly statistically significant improvement regarding all attitude statements. This finding may be because the studied sample was primigravida, and most of them had poor knowledge preprogram. This result was congruent with *Nurgi et al. (2017)* in their study entitled " Knowledge, attitude and practice of obstetric danger signs during pregnancy in Debre Berhan, Ethiopia" and stated that more than half of the study participants had a negative attitude towards obstetrics danger signs.

Similar to *Sufiyan et al. (2016)* in their study entitled "Knowledge, attitude and perception of pregnancy danger signs among women of childbearing age in Samaru community Northwestern Nigeria," who reported that most of the respondents, 161 (87.0%), have a poor attitude toward danger signs of pregnancy. In comparison, 17 (9.2%) had a fair attitude, and only 7 (3.8%) had the right attitude toward danger signs based on the scoring criteria.

The current study findings also consistent with *Selassie et al. (2019)*. They had conducted their study to evaluate Knowledge, attitude, and practice of recognizing newborn danger signs and related factors among mothers attending postnatal clinics at Dessie Referral Hospital, Northeastern Ethiopia. They found the poor attitude of mothers towards newborn danger signs in the study setting.

Regarding the presence and reaction of pregnant women to obstetrics and newborn danger signs, the current study clarified that from total studied pregnant women, about half complained from the presence of danger signs and that the majority of them had appropriate reaction post-program compared to preprogram. This result may be due to increasing knowledge about obstetrics and newborn danger signs post-program. This result is congruent with *Kabakyenga et al. (2014)*. They conducted their study to evaluate "Knowledge of obstetric danger signs and birth preparedness practices among women in rural Uganda." Also, similar to the study conducted in India, women had danger signs during pregnancy and were more likely to seek medical treatment (*Chandhiok et al., 2012*).

Also, the result consistent with *Sangal et al. (2012)*. They conducted their study to evaluate "Knowledge and practices regarding obstetric danger signs in women attending antenatal care clinic At Brd Medical College, Gorakhpur." They reported that approximately half of the pregnant women who had experienced the dangerous signs of bleeding, leaking per vagina, one or more signs of hypertension in pregnancy, and diabetes in pregnancy, sought care. In contrast, a lesser number sought care for urinary tract infection in pregnancy and fetal distress. However, the difference in seeking care for different danger signs is statistically unrelated to the danger sign. Education has a positive effect on seeking care for many obstetric danger signs if knowledge is obtained.

However, the current findings disagree with *Bogale and Markos (2015)*, who study "Knowledge of obstetric danger signs among childbearing age women in Goba district, Ethiopia: A cross-sectional study" and reported that the large proportions of pregnant women (73%) who do not know obstetric danger signs might delay in deciding to seek care. Also, in contrast with *Aborigo et al. (2014)*, who said that most of the sample prefers traditional therapies like herbs and cultural remedies to manage dangerous symptoms of pregnancy than medical intervention.

There is a significant association between age, marital status, educational level, and income with total knowledge score pre and post-program and significant association between residence, occupation, and walking distance to hospital preprogram compared to an insignificant association post-program. This finding may be because most studied pregnant women are educated at different levels, and all of them first pregnancy, which makes them interested in taking the appropriate reactions.

This result is congruent with *Lameck (2017)*, who studied "Knowledge of danger signs during pregnancy and health care seeking actions among pregnant women at ILEMBULA RCH clinic. The study revealed that the respondent's age, occupation, educational level, and marital

status are significantly associated with knowledge of danger signs during pregnancy, also in the same line with *Wahed (2016)*, in Bangladesh, pregnant women's educational level and knowledge of danger-signs were significantly correlated ($r = 0.296$, $p < 0.01$). Similarly, a study by *Kabakyenga et al. (2014)* conducted in rural Uganda stated the association between women's educational status and danger signs of pregnancy to be higher (OR=1.5; 95% CI = 1.0-2.3). This finding disagrees with *Thapa and Manandhar (2017)*, who study "Knowledge on obstetric danger signs among antenatal mothers attending a tertiary level hospital, Nepal" and stated that age is not significantly associated with overall knowledge on obstetric danger signs. This finding may be due to different socio-demographic characteristics of the study sample.

The current study also revealed a significant association between residence and income with total attitude preprogram, compared to an insignificant association between residence and income with total attitude score post-program. This finding may be due to differences in the residing areas and financial state of the study sample. This result consistent with *Nurgi et al. (2017)*, who reported that the respondent's monthly income was significantly associated with respondents' obstetric danger signs and attitude, but the association was insignificant after controlling for possible confounders.

Concerning the relation between socio-demographic characteristics and the reaction of the studied pregnant women, the present study reveals a highly significant association between age, residence, educational level, and occupation with reaction pre and post-program. Meanwhile, a significant relationship between marital status, income, walk distances to hospital, and reaction preprogram was compared to the insignificant relation post-program. This finding may be due to the health education program's positive effect and early intervention if any one or more obstetric and newborn danger signs appear.

This result congruent with *Eittah (2017)*, who studied "Pregnant woman's knowledge, reaction to danger signs of pregnancy and utilization of antenatal services." They reported a statistically significant relation regarding the level of education, occupation, and residence with their reaction to warning signs ($p=0.03$, 0.01 , and 0.02). Similarly, *Hailu and Berhe (2014)* study "Knowledge about obstetric danger signs and associated factors among mothers in Tsegedie District, Tigray Region, Ethiopia" and stated that women educational level had a positive relationship with the women's reaction to danger signs. In the same line, *Urassa et al. (2012)*; *Kabakyenga et al. (2014)* reported a significant measure for increased access to the service is the distance to the health center.

7. Conclusion

Based on the present study's findings, it could be concluded that there is a highly statistically significant difference between pre and post-educational intervention regarding knowledge, attitude, and the reaction of obstetric and newborn danger signs that support the current research

hypothesis. Regarding pregnant women's reaction, the study concluded that most of them had appropriate reactions after educational programs compared to little preprogram.

A significant association between age, marital status, educational level, and income with total knowledge score pre and post-intervention was revealed. There was an insignificant association between age with total attitude score pre and post-intervention. Significant association between age, residence, educational level, and occupation with reaction pre and post-program.

8. Recommendations

- Developing antenatal classes for all pregnant women about obstetric and newborn danger signs and the proper time to seek medical care as a routine during antenatal visits.
- Further research
 - Replication of this study on a large representative probability sample is highly recommended to achieve more generalization.

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