Effectiveness of Comprehensive Intervention Package on pregnant Women's Perception regarding Selected Aspects of Safe Motherhood

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Abstract

Background: knowledge and attitude about safe motherhood practices could help not only to reduce pregnancy related health risks but also helps in improving maternal and child health. **Aim:** of this research was to evaluate the effectiveness of comprehensive intervention package on pregnant women's perception regarding selected aspects of safe motherhood. **Design:** A quasi- experimental design was utilized. **Sample:** A purposive sample of (154 pregnant women) (One Group Pre-test Post-test design). **Setting:** The research was carried out in obstetrics & gynecology outpatient clinic at Benha university hospital. **Tools:** Data were collected through three main tools: A self-administered questionnaire to assess women's socio-demographic characteristics and obstetrical history, maternal knowledge questionnaire, modified likert scale to assess women's attitude. **Results**: showed that the mean age of studied sample 22.9±6.87 years. There was improvement with a highly statistically significant difference observed in women's knowledge and attitude regarding all aspect of safe motherhood at post-intervention phase compared with pre- intervention phase (p<0.001). A highly statistically significant positive correlation between total knowledge and total attitude regarding safe motherhood at pre-intervention phase (P≤ 0.001). While, there was a significant positive correlation between total knowledge and total attitude regarding safe motherhood at post-intervention phase (P≤ 0.05). **Conclusion:** The research concluded that research hypothesis is supported and the implementation of comprehensive intervention package succeeded in and had a considerable improvement in the knowledge and attitude regarding different aspects of safe motherhood among pregnant women. **Recommendation:** Applying educational intervention to improve women's perception about safe motherhood practices in different maternity health services to prevent further maternal and fetal mortality and morbidity.

Keywords: Comprehensive Intervention Package, Women's Perception, Safe Motherhood

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Introduction

Although there has been considerable improvement in maternal health globally, it is increasingly evident that important gaps and disparities remain. Where, improving maternal health and reducing mortality is specifically lagging behind improvement in other fields of health **(Wilmoth et al, 2012).** Maternal mortality in Egypt is still relatively high, and the country faces challenges in reducing it further. Recent evidence suggests that a woman's lifetime risk of dying from maternal causes in Egypt has dropped dramatically, from 82 in 100,000 in 1990 to 5.5 in 2008. The current level puts Egypt in about the middle among countries in the region. Maternal deaths, largely avoidable, are strongly associated with the absence of good knowledge and medical &nursing care before, during, or after delivery **(Mortada et al, 2015).**

Safe motherhood is conceptualized as a means of ensuring women's accessibility to needed knowledge and proper antenatal, natal and postnatal care through antenatal program in order to facilitate their safety and optimal health throughout pregnancy and childbirth. So, safe motherhood is a means of saving the lives of women and improving the health of millions of others **(Padaguggari et al, 2018).**

Globally, maternal mortality (MM) is still become major public health concern. The problem is very high especially in developing region. According to WHO systematic analysis, approximately 830 women die every day due to the complications of pregnancy and childbirth despite emphasis by the Millennium Development Goals (MDGs) **(WHO, 2016)**. Moreover, developing countries account for about 99% of an estimated half a million maternal deaths that occur each year. A review of the Millennium Development Goals suggests that limited progress is being made to

reduce maternal mortality especially across developing countries including Egypt **(Okhakhume and Okhakhume, 2019)**. Therefore, one crucial lesson learnt from the Safe Motherhood Initiative is that educational programs involvement is pivotal for sustained reduction of maternal mortality **(Geleto et al, 2019)**.

Most maternal mortality and morbidity are due to major medical causes such as hemorrhage (27.1%), hypertension during pregnancy (14%), sepsis, or infections (10.7%) and other obstetrical causes such as unsafe abortion complications, and obstructed labor **(Asresie et al, 2019)**. It follows from this that, in every minute of every day somewhere in the world a mother dies and diseased as result of complications arising during pregnancy, labour, Puerperium and unsafe motherhood **(Abera et al, 2015)**. Maternal deaths are caused by unequal access to finances, health education, basic health care, and other resources. These negative conditions set the stage for poor maternal health even before a woman becomes pregnant, and can worsen her health when pregnancy and childbearing begin **(Bobo et al, 2017)**.

Additionally, all national development plans and policies should include safe motherhood programs because the single most critical intervention for safe motherhood is providing health education to pregnant women and addressing the three delays that are important **(Patel et al, 2016)**. Three Delays for Safe motherhood: First Delay – Decision making at home, Second Delay – Transportation to Health Centers, Third Delay – Access to quality Services. The main reason for delay was lack of knowledge about the practices of safe motherhood, which may in turn be attributed to the high level of ignorance and illiteracy **(Getachew et al, 2017)**. Other barriers in safe motherhood are such as: Limited access to good health services for Ante natal, post-natal and delivery care and lack of women awareness, women's and family's beliefs, attitude, norms, and objection. So, educational health program should be geared up **(Zepre and Kaba, 2017)**.

Safe motherhood is aimed to a broad range of direct and indirect efforts to prevent and reduce maternal mortality, morbidity, disabilities, perinatal mortality, infant mortality and also to improve women's reproductive health through preventive and promotive activities and through engagement with educational and health care provider as well as by addressing avoidable factors that causes complications of pregnancy and childbirth **(Acharya et al, 2015)**. Globally, safe motherhood is a worldwide initiative whose aim is to reduce maternal morbidity and infant mortality and to improve women's reproductive health **(Akpan et al, 2017)**.

Components or pillars of safe motherhood include many aspects that care about a women's health at different phases of their life such as; Antenatal care, safe delivery including emergency obstetric care, postnatal care including family planning and neonatal care. Safe motherhood requires women's rights to be guaranteed and respected. These include their rights to good quality services and information during and after pregnancy and childbirth; their right to make their own decisions about their health freely, without coercion or violence, and with full information; and the removal of any barriers that contribute to maternal mortality and morbidity **(World Health Organization, 2015)**.

Health education to mothers is one of the strategies which many countries have adopted to improve maternal health, as health education influences one's nutrition and health care knowledge, behavior and attitude toward maternal and neonatal health care practices **(Ng'anjo et al, 2016)**. Ample evidence indicates that when women have greater knowledge through education, there is greater likelihood that they will have better pregnancy and delivery outcomes. This is likely because acquiring knowledge through education equips women to make appropriate decisions about their health including during pregnancy, childbirth and puerperium. A better informed woman is more likely to make appropriate decisions during obstetric emergencies. Therefore, Knowledge and awareness about safe motherhood practices could help reduce pregnancy related health risks and promote safer pregnancies, deliveries, and puerperium; and maintain neonatal health **(Tilahun and Sinaga, 2016)**.

The nurses play an important role in educating the mothers to prevent the complications. Education is referred system which can be utilized to improve knowledge and bring positive change in attitude of the mothers. The health of pregnant mother and her baby can be maintained through the best assessment and care for antenatal, intranatal and postnatal periods which is the main role of obstetric nurse; thereby achieving safe motherhood **(Thomas, 2017)**.

Justification of the problem:

Safe motherhood and reproductive health is a global issue in today's world. In many developing countries, complications of pregnancy and childbirth are the leading causes of death among women of reproductive age. More than one woman

dies every minute from such causes. Most of the maternal and neonatal deaths are attributable to the ignorance and illiteracy of the mother. Many could be avoided with changes in knowledge and attitude about health practices during antenatal, natal postnatal and newborn care. Therefore, maternal education should be a primary focus for intervention strategies for promoting safe motherhood **(Tilahun and Sinaga, 2016)**.

According to the World Health Organization report, globally, an estimated 10.7 million mothers died from 1990 to 2015 due to obstetric complications. This report showed that almost all global maternal deaths (99%) occurred in developing countries **(WHO, 2015)**. In Egypt, maternal mortality ratio (MMR) reached to 53 deaths per 100 000 live births in 2003, but it gradually declines to be 43.5 per 100 000 live births in 2015 **(Mahmouda and Omarb, 2018)**. According to Millennium Development Goals, maternal mortality rate is higher in upper Egypt than lower Egypt **(WHO, 2019)**, where; some Egyptian Governorates have high rates of MMR, that is, '60–65 deaths per 100 000 live births' in upper Egypt, whereas others have low rates of MMR '24–37 deaths per 100 000 live births' in lower Egypt. Moreover, 50% of newborns die each year due to pregnancy and childbirth. According to the global standards, MMR is still high in Egypt, so further efforts should be made to apply the main health strategies for reducing it **(Mahmouda and Omarb, 2018)**.

Aim of the research:

The aim of this research was to evaluate effectiveness of comprehensive intervention package on pregnant women's perception regarding selected aspects of safe motherhood. **This aim was achieved through:**

▪ Assessing the level of women's knowledge and attitude regarding selected aspects of safe motherhood.
▪ Designing and implementing a comprehensive intervention package.
▪ Evaluating the outcome of comprehensive intervention package regarding selected aspects of safe motherhood on women's knowledge and attitude regarding safe motherhood.

Research Hypothesis:

Knowledge of pregnant women will be improved and their attitude will be positively changed after implementation of a comprehensive intervention package.

Subjects and Method

Subjects:

Research design:

A quasi experimental design (One Group Pre-test Post-test design) was utilized to fulfill the aim of this research. The one-group, pretest/post-test design specified that: An observation (called a pretest) assessed before the intervention was introduced to the pregnant women, the intervention subsequently introduced, and finally, a second observation (called a post-test) was applied after the intervention was introduced. The differences between the pretest and post-test observations were used to estimate the effect of the intervention.

Setting:

The present research is carried out among pregnant women attending the obstetrics & gynecology outpatient clinics at Benha University Hospital. This hospital located in Benha City at Qalioubia Governorate. This particular setting was chosen because it is main hospital providing care for women with different social backgrounds and high risk women. The clinics started from 9am to 12pm. Also it's a clinical training setting for nursing students in the Faculty of Nursing. This hospital started to provide care since its opening in 1981; it provides free and economical service to all patients. The hospital receives large numbers of women each month who seek care for follow up during pregnancy from different areas (urban & rural area). According to Benha university hospital statistical center, 2018, flow rate of pregnant women (primigravida and multigravida women) were (1540) to seek care during pregnancy (from official records) **(Benha University Hospital Statistical Census Center, 2018)**.

Sample size, type and criteria:

A purposive sample of ten percent (10%) of flow rate was selected. Therefore, the sample size was (154 pregnant women) among those attended the above mentioned setting were recruited for the study. The studied sample was selected according to the following **inclusion criteria**: At 4-12 weeks of gestation, at least were able to read and write, free from obstetrical complication as (bleeding, gestational diabetes and pregnancy induced hypertension) or other chronic disorders affect pregnancy such as (heart disease, asthma or epilepsy), willing to participate in the research and available during the time of the research.

Tools of data collection:

Three main tools were used for data collection:

Tool (I). A self-administered questionnaire:

It was designed by the researchers after reviewing related literature **(Jahan, 2016) (Okereke et al, 2013) (Soe and Somrongthong, 2011) and (Indra, 20016).** It was written in an Arabic language. It was consisted of two parts:

• **Part 1-** Socio-demographic characteristics of pregnant women, it consisted of (6 items) which were: (age, residence, level of education, occupation, income and source of information).

• **Part 2-** Obstetrical history of women, it consisted of (3 items) which were: (number pregnancy, number of abortion and current gestational age)

Tool (II). Maternal Knowledge Questionnaire: (pre- posttest)

Maternal knowledge questionnaire was designed by the researchers after reviewing related literature, and was translated into Arabic language by the researcher. The 74- multiple choice questions designed to measure maternal knowledge regarding safe motherhood and its components. Each question has four options, with (one right answer, two wrong answer and I don't know). Maternal knowledge questionnaire was consisted of (4) sections; general maternal knowledge regarding **safe motherhood** (4 questions), maternal knowledge regarding **antenatal period** (16 questions), maternal knowledge regarding **intranatal period** (21 questions), maternal knowledge regarding **postnatal period** (20 questions) and maternal knowledge regarding **newborn care** (12 questions).

Scoring:

The correct answer was given as a score (1), the incorrect answers and don't know answer were given a score (0). The total score earned by the women reflect their knowledge regarding safe motherhood and its components. As well as, women' total knowledge score were classified as the following:

- Poor   (<50% correct answers)

- Average   (50% to <75% correct answers)

- Good   (≥ 75%to 100% correct answers).

Tool (III). Modified likert scale: (pre-posttest)

It was adapted from **(Mortada et al, 2015)**, translated into Arabic language and modified by the researcher to have broader study about pregnant women's attitude regarding safe motherhood and its components. The scale consisted of **33** statements from three-point (likert scale type) and divided into: **16** statements for antenatal period, **3** statements for intranatal period, **6** statements for postnatal period and **8** statements for newborn care. The scale was constructed and implemented by the researchers to assess attitude of the studied women as regarding to safe motherhood and its components (antenatal, intranatal, postnatal and newborn care).

Scoring:

To obtain the outcome of attitude scale, the items were judged according to three point likert scale continuum from disagree (0), Neutral (1), and agree (2). Then, summing up the scores of the items and the overall scores gave the attitude score. Then, the frequency of attitude statements was calculated to be scored from negative (1), positive (2), and highly positive (3). As well as women' total attitude score was expressed as a percentage and classified as the following:

‒ Negative attitude: < 50%

‒ Positive attitude: 50% < 75%

‒ Highly positive attitude: ≥75%

Method:

The research was conducted according to the following steps:

Tools validity:

The tools of data collection were submitted to a panel of five nursing and medical experts in the field of obstetrics and genecology and community health nursing to ascertain relevance, completeness and content validity. Modifications were carried out according to the panel's judgments on clarity of sentences and the appropriateness of content.

Tools Reliability:

Reliability of tools was tested by using Cronbach's Alpha coefficient test, which revealed that the tools consisted of relatively homogenous

items as showed by the moderate to high reliability of each tool. The internal consistency of knowledge was 0.78 and modified Likert scale to assess attitude was 0.85

Ethical considerations:

Before data collection, each woman was given explanations about the purpose of the research and was informed that participation was voluntary and they were free to withdraw from the research at any time before the completion of it, those who agreed to complete in this research were asked to sign a consent form before starting the data collection. Confidentiality was ensured throughout the research process, and the women were assured that all data were used only for research purpose.

Pilot study:

The pilot study was carried out on 10% of the sample, which were (15) pregnant women to test the simplicity, clarity, objectivity and applicability of the study tools as well as estimation of the time needed to fill the questionnaire. According to the results of the pilot study, required modifications were done in the form of adding, omission or paraphrasing of some questions. The participants involved in the pilot were excluded from the studied sample to avoid contamination of the sample.

Fieldwork:

Preparation of data collection was carried out from the beginning of July 2019 to the end of September 2019 and data collection from beginning of October 2019 to end of March 2020. This research was conducted under the approval of the Faculty of Nursing Ethical Committee, Benha University. A written official approval to conduct this research was obtained from the Dean of faculty nursing to director of Benha university hospital. Other written official letter was taken and delivered to the director of obstetrics and gynecology outpatient clinic, in order to obtain their agreement to conduct the research after explaining its purpose. An oral consent was also taken from each woman for participation. The researchers conducted the research twice/week (Saturdays and Mondays); from 9.00 a.m. to 12.00 p.m. in the outpatient clinics until the predetermined sample size was obtained. The women were interviewed in small groups (3-4 women) by the researchers to implement the comprehensive intervention package in the outpatient clinics. At the end of our research the booklet about safe motherhood and its components was left in the clinic to be provided to all pregnant women, so the benefit is spread.

Comprehensive Intervention Package Construction:

To fulfill the aim of this research, the following phases were adopted; preparatory phase, interviewing and assessment phase, planning phase, comprehensive intervention package implementation phase and evaluation phase.

Preparatory phase:

The preparatory phase was the first phase of the research, the researchers carried out through review of local and international related literature about the various aspects of the research problem. This helped the researchers to be acquainted with magnitude and seriousness of the problem, and guided the researchers to prepare the required data collection tools. The tool was distributed to five experts in the field, these included two obstetrics and woman health nursing professors, two obstetricians and one community health nursing professor, the aim was to test its appropriateness, comprehensiveness, clarity, importance and applicability. The jury recommended omissions of some items or addition which were done.

Interviewing and assessment phase:

This phase encompassed interviewing each woman in the waiting room of the outpatient clinic. At the beginning of the interview the researchers greeted the woman, introduced themselves to each woman included in the research, explained the purpose of the research, provided the woman with all information about the research and take oral consent to participate in the research. Data were collected by the researchers through administration of the tools (tool I: A self-administered questionnaire, tool II: maternal knowledge questionnaire and tool III: modified likert scale to assess women's attitude) to each woman (tool II and III were pre-test). Average time for the completion of each woman interview was around (30-45 minutes). A number of interviewed women / day ranged from 3-4 women. The data obtained during this phase constituted the baseline for further comparison to evaluate the effect of comprehensive intervention package.

Planning phase:

Based on results obtained during assessment phase, the comprehensive intervention package was developed by the researchers after reviewing related literature in a form of printed booklet. The booklet was designed specifically for women, in simple Arabic language to suit their level of understanding and to satisfy the studied pregnant women's deficit

knowledge and attitude regarding safe motherhood and its components. It consisted of many parts to cover the majority of safe motherhood aspects and components like antenatal, intra-natal, postnatal periods and newborn care. Each component was illustrated in a comprehensive manner. Moreover, it was illustrated by colored pictures Sessions number and its contents, different methods of teaching, and instructional media were determined. Objectives were constructed to be attained after completion of comprehensive intervention package. **The general objective was:** by the end of the comprehensive intervention package's sessions, each woman would be able to acquire essential knowledge and have positive attitude regarding safe motherhood and its components.

Implementation phase:

The researchers designed the comprehensive intervention package to enhance women's knowledge and change their attitude positively regarding safe motherhood and its components. This intervention package was implemented through five scheduled sessions. It was conducted in the waiting room of the outpatient clinic immediately after completion of the assessment phase. Each session took about 30-45 minutes according to their achievement and feedback. At the beginning of the first session women were oriented with the comprehensive intervention package contents. The subsequent session started by a feedback about the previous session and the objectives of the new session. Simple Arabic language were used to suit women' level of understanding. At the end of each session, five minutes were devoted to permit women to ask questions to clarify the session contents and to correct any misunderstanding. Each woman was informed about the time of the next sessions.

Different methods of teaching were used such as lectures, group discussions, demonstration, re-demonstration, critical thinking and problem solving and brainstorming. Instructional media included video contain all content of the sessions and the booklet were distributed to all recruited women in the research from the first session to achieve its objectives. Moreover, the researchers had used supportive tools that function as stimulus control to support desired changes include stickers and flyers that reinforce the concepts of the intervention and emphasizing the effects of comprehensive intervention package on women's knowledge and attitude

The **first session** included concept, goal, components and importance of safe motherhood program. The **second session** included first aspect of safe motherhood which was antenatal aspect. The **third session** included second aspect of safe motherhood which was intranatal aspect. The **fourth session** included third aspect of safe motherhood which was postnatal aspect. The **fifth session** included fourth aspect of safe motherhood which was neonatal care. The detailed content of each session is already mentioned in the second tool

Evaluation phase:

The effectiveness of the comprehensive intervention package was evaluated 3 weeks after implementation, using the same format of tools which used during the assessment phase (pre-post test format) which were (tool II, to evaluate women's knowledge and tool III, to evaluate women's attitude regarding comprehensive intervention package). At almost time the researchers followed the women during antenatal visits and via telephone.

Statistical design:

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 22.0) was used for that purpose, followed by data tabulation and analysis. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages and correlation coefficient (r). Test of significance (t test, chi-square). Statistically significant difference was considered at p-value $\leq$ .05, and a highly statistically significant difference was considered at p-value $\leq$ .001, while the p-value >.05 indicates non-significant results.

Limitations of the research:

- A number of women didn't come regularly for attending the educational sessions which necessitated calling them by telephone to remind them of appointments.

- Occasionally, the waiting place of the obstetrics and gynecology outpatient clinic was crowded and noisy, which required more time and effort to conduct the sessions.

Results:

Table (1): shows socio-demographic characteristics of the studied sample. It was cleared that more than half (58.4%) of studied sample were in age group 18 - 24 years with a mean age of 22.9±6.87 years. As regards the residence, less than two thirds (61.0%) of them lived in urban areas. Furthermore, more than two thirds of them (69.5%) were housewives. Regarding the educational level,

about half of them (49.4%) had secondary level of education. Moreover; about two thirds of them (63.0%) had enough income.

Fig. (1): displays that, more than the majority of studied sample (80.1%) (75.4%) took their information from (family & friends) and (doctors & nurses) respectively, **"Taking into consideration results not mutually exclusive because the studied sample may have many source of information at the same time".**

Table (2) illustrates that, more than half of the studied sample (53.2%) was primigravida. Furthermore, the majority of them (87.0%) didn't have abortion. As regards the current gestational age, about two thirds of them (64.9%) were (5-8 weeks).

Table (3): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's knowledge regarding safe motherhood with p≤0.001.

Table (4): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's knowledge regarding antenatal period as an aspect of safe motherhood with p≤0.001.

Table (5): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's knowledge regarding intranatal period as an aspect of safe motherhood with p≤0.001.

Table (6): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's knowledge regarding postnatal period as an aspect of safe motherhood with p≤0.001.

Table (7): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's knowledge regarding care of newborn as an aspect of safe motherhood with p≤0.001.

Fig. (2): displays that, (23.4%) and (72.7%) of studied sample had good knowledge regarding safe motherhood at pre-intervention and post-intervention phases respectively. While, it was revealed that (63.0%) and (18.9%) of them had poor knowledge regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively.

Table (8): clears that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's attitude regarding different aspects of safe motherhood with p≤0.001.

Fig. (3): displays that, (24.7%) and (66.2%) of studied sample had positive attitude regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively. While, it was revealed that (64.9%) and (9.1%) of them had negative attitude regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively.

Table (9) clarifies that; there was a highly statistically significant positive correlation between total knowledge and total attitude regarding safe motherhood at pre-intervention phase (P≤ 0.001). While, there was a statistically significant positive correlation between total knowledge and total attitude regarding safe motherhood at post-intervention phase (P≤ 0.05).

Table (1): Frequency distribution of the studied sample according to their socio-demographic characteristics (n=154).

Socio-demographic characteristics	No	%
Age in (years)		
18-24	90	58.4
25-29	32	20.8
30-35	16	10.4
>35	16	10.4
Mean ± SD = 22.9±6.87		
Residence:		
Rural	60	39.0
Urban	94	61.0
Level of Education		
Read & write	11	7.1
Basic education	18	11.7
Secondary education	76	49.4
University education	49	31.8
Occupation		
House wife	107	69.5
Employer	47	30.5
Income		
Enough	97	63.0
No enough	57	37.0

Figure (1): Percentage distribution of studied sample regarding their source of information about safe motherhood (n=154).
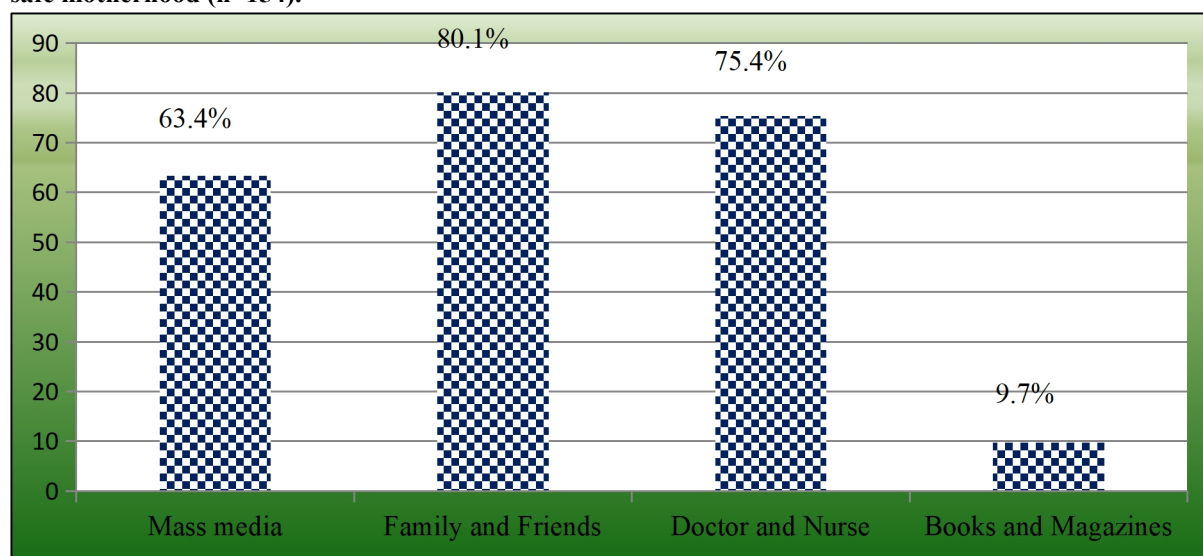
* Results not mutually exclusive

Table(2): Frequency distribution of the studied sample according to their Obstetrical history (n=154).

Obstetrical history	No	%
Number pregnancy		
One time (primigravida)	82	53.2
2 times or more (multigravida)	72	46.8
Number of abortion		
No abortion	134	87.0
One time	11	7.1
2 times or more	9	5.8
Current gestational age (first trimester):		
Within 4 weeks	13	8.4
5 weeks-8weeks	100	64.9
9 weeks-12weeks	41	26.7

Table (3): Frequency distribution of the studied sample according to their general knowledge regarding safe motherhood at pre and post intervention phases (n=154).

Knowledge items	Pre-intervention				Post-intervention				Chi-square test	P-value
	Correct answer		Incorrect or don't know answers		Correct answer		Incorrect or don't know answers			
	No	%	No	%	No	%	No	%		
Concept of Safe motherhood	50	32.5	104	67.5	113	73.4	41	26.6	51.7	0.000**
Goal of Safe motherhood	64	41.6	90	58.4	101	65.6	53	34.4	17.8	0.000**
Components of safe motherhood	48	31.2	106	68.8	115	74.7	39	25.3	58.4	0.000**
Importance of safe motherhood programs	68	44.2	86	55.8	120	77.9	34	22.1	36.9	0.000**

*A Statistical significant p ≤ 0.05   **A Highly Statistical significant p ≤ 0.001

Table (4): Frequency distribution of the studied sample according to their knowledge regarding antenatal aspect at pre and post intervention phases (n=154).

Knowledge items	Pre-intervention				Post-intervention				Chi - square test	P-value
	Correct answer		Incorrect or don't know answers		Correct answer		Incorrect or don't know answers			
	No	%	No	%	No	%	No	%		
-Concept of antenatal care visits	33	21.4	121	78.6	99	64.3	55	35.7	57.7	0.000**
-Aim of antenatal care visits	58	37.7	96	62.3	112	72.7	42	27.3	38.2	0.000**
-Best time for booking visit (first antenatal visit)	25	16.2	129	83.8	117	76.0	37	24.0	110.5	0.000**
-Advantages of early first antenatal visit	66	42.9	88	57.1	95	61.7	59	38.3	10.9	0.001**
-Schedule of subsequent antenatal follow up for normal and high risk pregnancy	5	3.2	149	96.8	125	81.2	29	18.8	103.1	0.000**
-Lifestyle modification during pregnancy	69	44.8	85	55.2	109	70.8	45	29.2	21.2	0.000**
-Dietary system during pregnancy	47	30.5	107	69.5	98	63.6	56	36.4	33.8	0.000**
- Necessary supplementation during pregnancy	43	27.9	111	72.1	150	97.4	4	2.6	158.8	0.000**
-Harmful effect of smoking and alcohol consumption during pregnancy	70	45.5	84	54.5	153	99.4	1	0.6	111.9	0.000**
-Importance of personal hygiene during pregnancy	65	42.2	89	57.8	140	90.9	14	9.1	82.05	0.000**
- Necessary investigations during pregnancy	32	20.8	122	79.2	101	65.6	53	34.4	63.0	0.000**
- Importance of tetanus vaccination during pregnancy	61	39.6	93	60.4	133	86.4	21	13.6	72.1	0.000**
-Number of doses of tetanus vaccination should be given to pregnant mother	54	35.1	100	64.9	127	82.5	27	17.5	71.4	0.000**
-Minor discomfort during pregnancy	55	35.7	99	64.3	132	85.7	22	14.3	80.7	0.000**
-Danger signs during pregnancy	62	40.3	92	59.7	119	77.3	35	22.7	43.5	0.000**
-Benefits of health facility delivery with a skilled birth attendant	39	25.3	115	74.7	144	93.5	10	6.5	148.4	0.000**

*A Statistical significant p ≤ 0.05   **A Highly Statistical significant p ≤ 0.001

Table (5): Frequency distribution of the studied sample according to their knowledge regarding Intranatal aspect at pre and post intervention phases (n=154).

Knowledge items	Pre-intervention				Post-intervention				Chi - square test	P-value
	Correct answer		Incorrect or don't know answers		Correct answer		Incorrect or don't know answers			
	No	%	No	%	No	%	No	%		
-Possible modes of delivery	73	47.4	81	52.6	135	87.7	19	12.3	56.9	0.000**
-Concept of normal labor	22	14.3	132	85.7	132	85.7	22	14.3	157.1	0.000**
-Concept of abnormal labor	25	16.2	129	83.8	111	72.1	43	27.9	97.3	0.000**
-Concept of instrumental delivery	36	23.4	118	76.6	95	61.7	59	38.3	46.2	0.000**
-Average duration of normal labor	41	26.6	113	73.4	125	81.2	29	18.8	92.1	0.000**
-Advantages of normal labor	35	22.7	119	77.3	140	90.9	14	9.1	145.8	0.000**
-Preparation for normal labor	56	36.4	98	63.6	101	65.6	53	34.4	26.3	0.000**
-Most prominent symptom and sign of labor	60	39.0	94	61.0	133	86.4	21	13.6	73.9	0.000**
-Different between true and false labor pain	48	31.2	106	68.8	127	82.5	27	17.5	82.5	0.000**
-Stages of normal labor	29	18.8	125	81.2	132	85.7	22	14.3	138.0	0.000**
-Right time for bearing down	53	34.4	101	65.6	113	73.4	41	26.6	47.0	0.000**
-Technique of bearing down	38	24.7	116	75.3	101	65.6	53	34.4	52.0	0.000**
-Harmful effect of bearing down at first stage of labor	19	12.3	135	87.7	115	74.7	39	25.3	121.7	0.000**
-Signs of maternal distress	45	29.2	109	70.8	120	77.9	34	22.1	73.4	0.000**
-Signs of fetal distress	37	24.0	117	76.0	98	63.6	56	36.4	49.0	0.000**
-What to do in case of fetal distress	31	20.1	123	79.9	99	64.3	55	35.7	61.5	0.000**
-Concept of cesarean section	62	40.3	92	59.7	102	66.2	52	33.8	20.8	0.000**
-Types of cesarean section	42	27.3	112	72.7	113	73.4	41	26.6	65.4	0.000**
-Indications of cesarean section	56	36.4	98	63.6	141	91.6	13	8.4	101.7	0.000**
-Complication of cesarean section	32	20.8	122	79.2	133	86.4	21	13.6	133.1	0.000**
-Preparation for cesarean section	47	30.5	107	69.5	129	83.8	25	16.2	89.1	0.000**

*A Statistical significant p ≤ 0.05   **A Highly Statistical significant p ≤ 0.001

Table (6): Frequency distribution of the studied sample according to their knowledge regarding postnatal aspect at pre and post intervention phases (n=154).

Knowledge items	Pre-intervention				Post-intervention				Chi - square test	P-value
	Correct answer		Incorrect or don't know answers		Correct answer		Incorrect or don't know answers			
	No	%	No	%	No	%	No	%		
General knowledge about the postpartum period: (6 items)										
-Definition of postnatal period	41	26.6	113	73.4	140	90.9	14	9.1	131.3	0.000**
-Physiological changes during postnatal period	35	22.7	119	77.3	101	65.6	53	34.4	57.3	0.000**
-Type of lochia and its duration	56	36.4	98	63.6	133	86.4	21	13.6	81.1	0.000**
-Causes of increase temperature during postnatal period	60	39.0	94	61.0	127	82.5	27	17.5	61.1	0.000**
-Causes of postpartum hemorrhage	48	31.2	106	68.8	132	85.7	22	14.3	94.3	0.000**
-Warning signs during postnatal period	55	35.7	99	64.3	125	81.2	29	18.8	65.5	0.000**
Knowledge about self-care practices during postpartum period:										
- Personal hygiene	56	36.4	98	63.6	145	94.2	9	5.8	113.4	0.000**
- Breast care	42	27.3	112	72.7	123	79.9	31	20.1	85.6	0.000**
-Breast engorgement	33	21.4	121	78.6	125	81.2	29	18.8	109.9	0.000**
-Cracked nipple	36	23.4	118	76.6	150	97.4	4	2.6	179.3	0.000**
-Perineal and episiotomy care	45	29.2	109	70.8	134	87.0	20	13.0	105.6	0.000**
-Nutrition	66	42.9	88	57.1	149	96.8	5	3.2	106.1	0.000**
-Postpartum rest, sleep and exercise	47	30.5	107	69.5	120	77.9	34	22.1	69.7	0.000**
-Sexual relation	35	22.7	119	77.3	137	89.0	17	11.0	136.9	0.000**
-Family planning methods	56	36.4	98	63.6	112	72.7	42	27.3	41.0	0.000**
-Afterpain	44	28.6	110	71.4	119	77.3	35	22.7	73.3	0.000**
-Backache	42	27.3	112	72.7	124	80.5	30	19.5	87.8	0.000**
-Piles	23	14.9	131	85.1	118	76.6	36	23.4	118.0	0.000**
-Urinary incontinence	29	18.8	125	81.2	121	78.6	33	21.4	109.9	0.000**
-Constipation	60	39.0	94	61.0	149	96.8	5	3.2	117.9	0.000**

*A Statistical significant p $\leq$ 0.05   **A Highly Statistical significant p $\leq$ 0.001

Table (7): Frequency distribution of the studied sample according to their knowledge regarding care of newborn at pre and post intervention phases (n=154).

Knowledge items	Pre-intervention				Post-intervention				Chi - square test	P-value
	Correct answer		Incorrect or don't know answers		Correct answer		Incorrect or don't know answers			
	No	%	No	%	No	%	No	%		
Knowledge about breastfeeding and weaning										
-Importance of breastfeeding	65	42.2	89	57.8	135	87.7	19	12.3	69.8	0.000**
-Time of starting breast feeding	32	20.8	122	79.2	132	85.7	22	14.3	130.4	0.000**
-Positions of breast feeding	61	39.6	93	60.4	111	72.1	43	27.9	32.9	0.000**
-Definition of weaning	54	35.1	100	64.9	95	61.7	59	38.3	21.8	0.000**
-Time of starting weaning	55	35.7	99	64.3	125	81.2	29	18.8	65.5	0.000**
Knowledge about newborn care										
-Baby bath	48	31.2	106	68.8	140	90.9	14	9.1	115.5	0.000**
-Diaper care	54	35.1	100	64.9	101	65.6	53	34.4	28.6	0.000**
-Eye care	53	34.4	101	65.6	133	86.4	21	13.6	86.8	0.000**
-Cord care	38	24.7	116	75.3	127	82.5	27	17.5	103.3	0.000**
-Newborn vaccination	19	12.3	135	87.7	132	85.7	22	14.3	165.8	0.000**
-Male and female circumcision	45	29.2	109	70.8	119	77.3	35	22.7	71.4	0.000**
-Newborn warning signs	37	24.0	117	76.0	144	93.5	10	6.5	153.4	0.000**

*A Statistical significant p ≤ 0.05   **A Highly Statistical significant p ≤ 0.001

Figure (2): Percentage distribution of studied sample regarding their total knowledge score about aspects of safe motherhood at pre and post intervention phases (n=154).
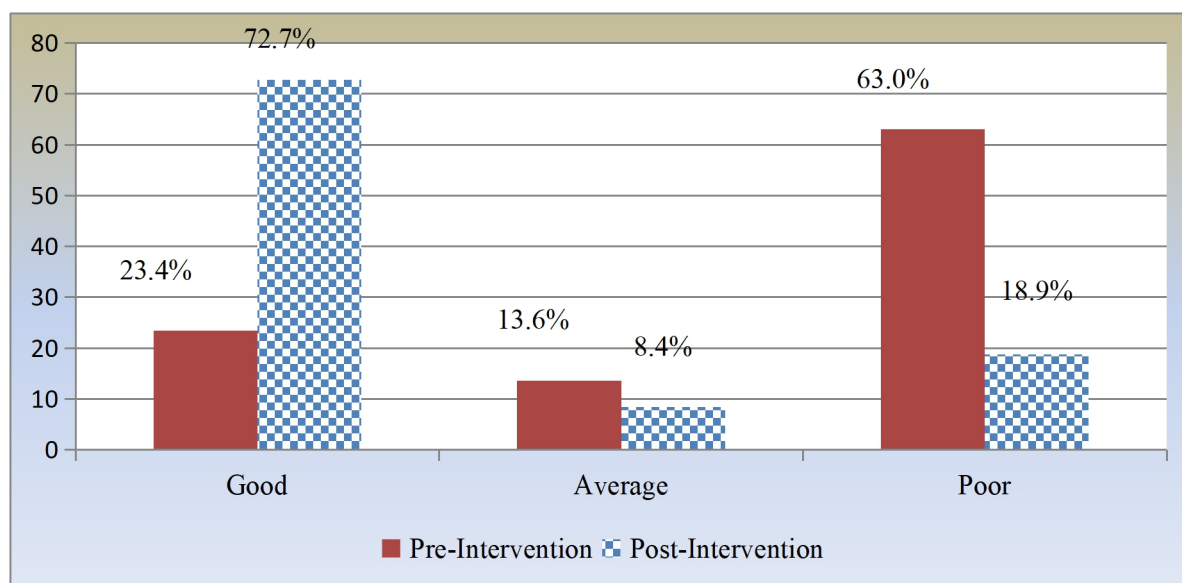
Table (8): Distribution of studied sample regarding their attitude about different aspects of safe motherhood at pre and post intervention phases (n=154).

Attitude statement	Pre-intervention						Post-intervention						Chi - square test	P-value
	Agree		Neutral		Disagree		Agree		Neutral		Disagree			
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%		
Antenatal aspect														
- Early antenatal booking is good for pregnancy	42	27.3	15	9.7	97	63.0	120	77.9	10	6.5	24	15.6	82.5	0.000**
- Antenatal follow up is good to monitor mother's and fetus' health	54	35.1	21	13.6	79	51.3	98	63.6	23	14.9	33	21.4	31.7	0.000**
- Pregnant women should change dietary habit as advised by doctor	33	21.4	25	16.3	96	62.3	123	79.9	14	9.1	17	11.0	110.2	0.000**
- Supplementation of iron and folic acid are good for the mother and fetus	48	31.2	10	6.5	96	62.3	147	95.5	1	0.6	6	3.9	137.0	0.000**
- Smoking is harmful to the fetus	58	37.7	33	21.4	63	40.9	125	81.2	11	7.1	18	11.7	60.5	0.000**
- Alcohol consumption during pregnancy will affect the fetal growth	59	38.3	42	27.3	53	34.4	129	83.8	5	3.2	20	13.0	70.1	0.000**
- Health education on hygiene practices is important during antenatal visits	43	27.9	16	10.4	95	61.7	108	70.1	8	5.2	38	24.7	55.0	0.000**
- Brushing of teeth twice daily is necessary during pregnancy	37	24.0	14	9.1	103	66.9	95	61.7	14	9.1	45	29.2	48.2	0.000**
- Tight clothes during pregnancy affect the fetus' health	23	14.9	22	14.3	109	70.8	118	76.6	6	3.9	30	19.5	118.0	0.000**
- Screening of blood for infections (HIV, HBV) should be carried out during antenatal check-up	12	7.8	30	19.5	112	72.7	113	73.4	15	9.7	26	16.9		0.000**
- Blood sugar level should be carried out during antenatal check-up	24	15.6	31	20.1	99	64.3	124	80.6	17	11.0	13	8.4	140.2	0.000**
- Urine test for bacterial infection is necessary during pregnancy	36	23.4	19	12.3	99	64.3	150	97.4	0	0.0	4	2.6	176.4	0.000**
- Blood pressure should be checked regularly during pregnancy	39	25.3	25	16.3	90	58.4	146	94.8	0	0.0	8	5.2	155.4	0.000**
- Pregnant women should undergo ultrasound scan as advised by doctor to monitor fetal growth	54	35.1	23	14.9	77	50.0	143	92.9	2	1.3	9	5.8	111.6	0.000**
- Hospital delivery is better than home delivery	61	39.6	19	12.3	74	48.1	119	77.3	20	13.0	15	9.7	57.8	0.000**
- Any problem during pregnancy, labor and pueriperium should be report immediatly to health center	57	37.0	20	13.0	77	50.0	151	98.1	0	0.0	3	1.9	130.9	0.000**
Intranatal aspect														
- The importance of delivering in a well-equipped hospital is good for maternal and fetal health	49	31.8	13	8.5	92	59.7	138	89.6	9	5.9	7	4.5	116.0	0.000**
- Intend to have skilled birth assistants (doctor/ midwife/ auxiliary midwife/ trained traditional birth attendant)	34	22.1	24	15.6	96	62.3	134	87.0	12	7.8	8	5.2	137.9	0.000**
- Health facility delivery by a skilled birth	51	33.1	18	11.7	85	55.2	127	82.5	14	9.1	13	8.4	85.8	0.000**

attendant is important for necessary safe and clean delivery practices

Postnatal aspect

	N	%	N	%	N	%	N	%	N	%	N	%	value	p
- Intend to have postnatal check up with health professional	12	7.8	42	27.3	100	64.9	99	64.3	22	14.3	33	21.4	108.1	0.000**
- Intention to undergo routine postnatal examination during routine postnatal visits.	17	11.0	16	10.4	121	78.6	97	63.0	19	12.3	38	24.7	99.7	0.000**
- It is important to seek postnatal medical care for maintain the health of mother	28	18.2	24	15.6	102	66.2	112	72.7	26	16.9	16	10.4	113.1	0.000**
- Practicing of contraception immediately after pueriperium is safe method to prevent unspaced pregnancy	46	29.9	21	13.6	87	56.5	130	84.5	5	3.2	19	12.3	93.5	0.000**
- The husband should participate and support in the decision about using family planning methods	19	12.3	34	22.1	101	65.6	103	66.9	30	19.5	21	13.6	110.5	0.000**
- Intention to undergo routine postnatal examination for the baby	20	13.0	15	9.7	119	77.3	110	71.4	18	11.7	26	16.9	122.2	0.000**

Care of newborn

	N	%	N	%	N	%	N	%	N	%	N	%	value	p
- Breastfeeding within 30 minutes after delivery has many benefits for both mothers and baby	17	11.0	17	11.0	120	78.0	94	61.0	23	15.0	37	24.0	98.1	0.000**
- Exclusive breast feeding is not a highly safe and enough family planning method.	25	16.2	9	5.8	120	78.0	101	65.6	29	18.8	24	15.6	120.3	0.000**
- Exclusive breastfeeding is best recommended for 1st 6 months of baby life.	31	20.1	26	16.9	97	63.0	135	87.7	18	11.7	1	0.6	160.6	0.000**
- Breast feeding is better and healthier than formula feeding	58	37.7	34	22.1	62	40.3	127	82.5	8	5.2	19	12.3	64.6	0.000**
- Breastfeeding increased mother –infant bonding.	43	27.9	20	13.0	91	59.1	142	92.2	5	3.2	7	4.6	133.9	0.000**
- Mothers who formula feed miss one of the great joys of motherhood.	36	23.4	40	26.0	78	50.6	121	78.6	3	1.9	30	19.5	99.1	0.000**
- Drinking water to baby during first days after birth is good	13	8.4	12	7.8	129	83.8	97	63.0	7	4.5	50	32.5	100.3	0.000**
- Male circumcision is important unlike female circumcision, which has been medically and religiously forbidden	28	18.2	38	24.7	88	57.1	137	89.0	13	8.4	4	2.6	160.9	0.000**

*A Statistical significant p ≤ 0.05

**A Highly Statistical significant p ≤ 0.001

Figure (3): Percentage distribution of studied sample regarding their total attitude score about different aspects of safe motherhood at pre and post intervention phases (n=154).
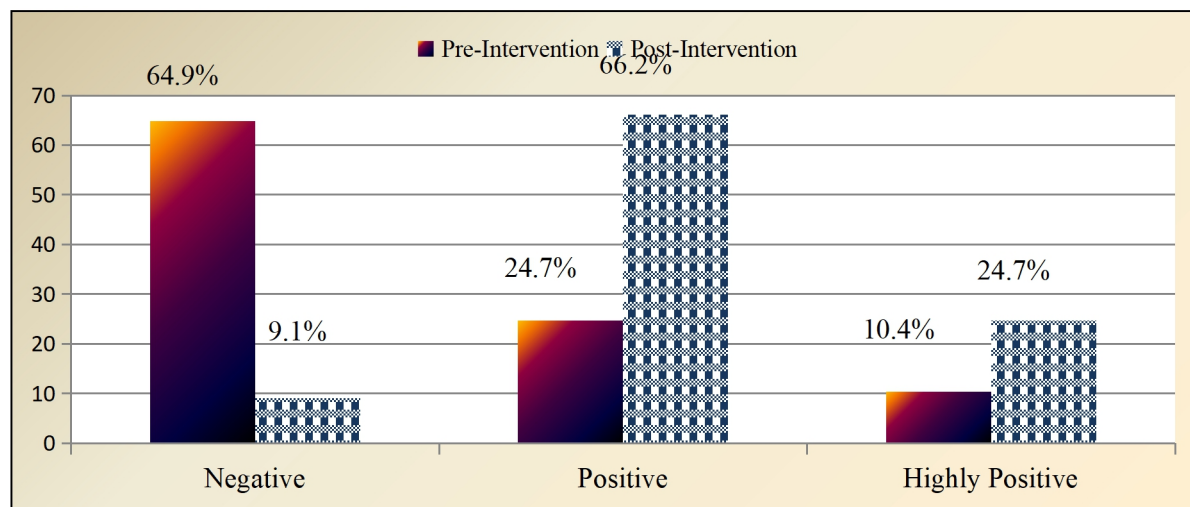
Table (9): Correlation between total knowledge and total attitude score of the studied sample regarding safe motherhood at pre and post intervention phases (n=154).

	Total knowledge			
	pre		Post	
Variables	**r**	**P-value**	**r**	**P-value**
Total attitude	0.74	0.000**	0. 52	0.002*

*A Statistical significant p ≤ 0.05   **A Highly Statistical significant p ≤ 0.001

Discussion

Saving mother's life is a global aim as the health of mothers has long been considered as cornerstone of public health and attention. Safe motherhood encompasses a series of initiatives, practices, protocols and service delivery guidelines designed to ensure that women receive high-quality care. The ways to achieve safe motherhood include providing health educational intervention to women about safe motherhood **(Asresie et al, 2019)**. The concept of "safe motherhood" is usually restricted to physical safety, but childbearing is also an important rite of passage, with deep personal and cultural significance for a woman and her family. Safe motherhood means ensuring that all women receive the care they need to be safe and healthy throughout pregnancy, child birth and postnatal period. Safe motherhood includes antenatal care, intranatal care, postnatal care and neonatal care, so the notion of safe motherhood must be expanded beyond the prevention of morbidity or mortality to encompass respect for women's basic human rights **(Affipunguh and Laar, 2016)**.

The current research aimed to evaluate the effectiveness of comprehensive intervention package on pregnant women's perception regarding selected aspects of safe motherhood. This aim was significantly achieved through a quasi-experimental research design. The findings of this research were accepted the research hypothesis which was, knowledge of pregnant women will be improved and their attitude will be positively changed after implementation of a comprehensive intervention package.

Socio-demographic factors such as age, residence, occupation, educational level and income mainly affect women's knowledge and attitude about safe motherhood. So these factors should be determined for the studied sample. The finding of the current research revealed that more than half of studied sample were in age group 18 - 24 years with a mean age of 22.9±6.87 years. As regards the residence, less than two thirds of them lived in urban areas. Furthermore, more than two thirds of them were housewives. Regarding the educational level, about half of them had secondary level of education. Moreover; about two thirds of them had enough income.

Regarding the source of information about safe motherhood, the majority of studied sample took their information from (family & friends) then

from (doctors & nurses). Moreover, this result was in accordance with **(Salama and Aly, 2019)**, found that nearly half of both study group and control groups had source of information from friends and families while minority of them had source of information from newspaper. Additionally, these results agreed with **(Gupta et al, 2016)** who conducted "a study to assess knowledge and attitude of antenatal women about maternal nutrition attending a tertiary care center", showed that source of information for pregnant women was mainly family members (38.0%). This congruence can be explained by convergence level of women's awareness and societal cultures.

On opposite of that, **(Okereke, 2013)** who studied "Knowledge of safe motherhood among women in rural communities in northern Nigeria: implications for maternal mortality reduction", revealed that over half of survey participants acquired their information of safe motherhood practices from health talks and discussions in health facilities. While a third (33%) indicated that community discussions were the source of their information. About a quarter of respondents indicated that the media were the sources of information. Only 10% of women indicated that friends and neighbors were their sources of information about safe motherhood. However, less than 5% of respondents indicate their spouses, other relatives as the source of their information about safe motherhood practices. This may be related to the differences in socio-demographic characteristics of studied samples.

As regards obstetrical history, the study finding revealed that, more than half of the studied sample was primigravida. Furthermore, the majority of them didn't have abortion. Regarding the current gestational age, about two thirds of them were (5-8 weeks).

Health knowledge is an important element to enable women to be aware of health status and the importance of safe motherhood. Safe motherhood knowledge about health practices are an important indicator of the reproductive health and unsafe motherhood is the one of the most challenging and life threatening **(Patel et al, 2016)**.

Concerning the studied sample's knowledge about aspects of safe motherhood, the findings of the current study illustrated that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all aspects of safe motherhood (antenatal, intranatal, postnatal and care of newborn) with p≤0.001. Where, the findings displayed that, about

one quarter and three quarter s of studied sample had good knowledge regarding safe motherhood at pre-intervention and post-intervention phases respectively. While, it was revealed that about two thirds and one fifth of them had poor knowledge regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively. This may be attributed to the women's compliance with intervention package received during instructional sessions regarding knowledge about safe motherhood practices and promoting attitude that consequently decrease the maternal and fetal morbidity and mortality.

In this respect, the present findings were supported by **(Mushi et al, 2007)** who studied "Knowledge about safe motherhood and HIV/AIDS among school pupils in a rural area in Tanzania", proved that poor knowledge of safe motherhood issues among school pupils in rural Tanzania is related to lack of effective and coordinated interventions to address reproductive health and motherhood. For long-term and sustained impact, school children must be provided with appropriate safe motherhood information as early as possible through innovative school-based interventions. Also, **(Soe and Somrongthong, 2011)** who conducted "The effect of community based safe motherhood pictorial handbook health education intervention in Pa-Oh ethnic group, Myanmar", illustrated that the community based safe motherhood health education intervention using pictorial handbook and group education had positive impact on women's knowledge about the healthy practices or intention to practices of maternal health care in antenatal, delivery and postnatal period including breastfeeding and family planning. These findings might be related to women's commitment to the received nursing intervention package.

Additionally, these findings were congruent with **(Sharma and Sharma, 2012)** who studied "Knowledge, attitude and belief of pregnant women towards safe motherhood in a rural Indian setting", founded that the results show low levels of awareness among rural pregnant women at pre-test phase and the findings indicate that appropriate communication strategies should be designed and implemented amongst the most vulnerable section of society, especially through health education campaigns, in order to have a constructive outcome in the near future. Also, **(Rao and Shetty, 2012)** who studied "evaluative study on effectiveness of maternal and child health care participatory training program among staff nurses, auxiliary nurse midwives and lady health visitors", reported that there was improvements in scores between the pre-training period and post-training period

demonstrated that the training in MCH care significantly increased scores on evaluations of knowledge and skills, and concluded that Maintaining women's knowledge through retraining or reinforcement could be pivotal to prevent maternal and infant mortality. Moreover, **(Okereke, 2013)** reported that over 90% of respondents showed poor knowledge about all aspects of safe motherhood practices, thus they needed health education. This result may be due to the efficiency of the nursing intervention guidelines and the instructional sessions.

In addition, **(Indra, 2016)** who conducted "Effectiveness of Self Instructional Module (SIM) on Knowledge Regarding Selected Aspects of Safe Motherhood among Primigravida Women in Selected Hospitals, Puducherry", indicated that there was a significant improvement in knowledge of women after the administration of self-instructional module on safe motherhood which indicates that self-instructional module is very effective in improving knowledge of women. These results were in agreement with **(Jahan, 2016)** who concluded that high percentage of women was not fully aware of the various components of safe motherhood. So the present research findings suggestion for an integrated program to the enhancement of knowledge regarding safe motherhood. Also, our research results were in the same harmony with **(Aravindan et al, 2019)** who conducted "a study to assess the effect of video assisted teaching program regarding perinatal care on knowledge among gravid women in a selected tertiary care hospital in Kolkata", mentioned that there was statistically significant difference between the knowledge scores of pre and posttest, which concluded that the VATP was effective in improving the knowledge on perinatal care which is integral part of safe motherhood. Our research results have been strengthened and enhanced by **(Olohiomeru, 214)** who studied "maternal mortality and the safe motherhood program, Nigeria: implication for reproductive health", concluded that maternal and fetal deaths can also be prevented with improving existing health knowledge and increasing pregnant women's ability, even healthy women, face some unpredictable risks. This represents the positive effect of nursing intervention package.

Moreover, the results were consistent with **(Tamrakar and Nagaseshamma, 2015)** who studied "effectiveness of planned teaching program on knowledge of primigravida regarding selected aspects of safe motherhood", showed that the planned teaching program was effective to increase the knowledge regarding the antenatal care, which is one of the important aspect of safe motherhood.

Education regarding antenatal care should be given to all pregnant mothers to make their motherhood period healthy and safe and to bring good pregnancy outcome which may aid in reducing maternal morbidity and mortality rates. The improvement in knowledge was as a result of, the effect of instructional sessions that were given during the teaching program.

On the other hand, this result was in contrast with **(Gyawali, 2013)** who conducted "knowledge and practices on maternal health care among mothers: a cross sectional study from rural areas of mid-western development region Nepal", showed that three quarters of the participants had correct knowledge regarding minimum numbers of antenatal visits to be done by a pregnant woman (WHO guideline). Nearly two-fifth participants knew schedule of antenatal care (ANC) visits. Almost 60% had done ≥ 4 ANC visits during last pregnancy. Majority visited Sub Health Post/Health Post/Primary Health Care Centre for ANC Checkup. About 90% had taken Iron and folic acid tablets. About 57% were home deliveries (last childbirth), 40% deliveries were assisted by relatives/husband, and only 32% did postnatal health checkup. Furthermore, the finding of present research wasn't in agreement with **(Okhakhume and Okhakhume, 2019)** who concluded that there was adequate knowledge of all aspects of safe motherhood practices among child bearing mothers in Ekiti State. This may be interpreted due to cultural differences and as a result of the difference between societies in their interest in designing better educational strategies to improve health education practices among women.

According to **(Lilungulu et al, 2016)**, attitude is emotional, motivational, perceptive and cognitive beliefs that positively or negatively influence the behavior or practice of an individual. So, the need of implementing knowledge, attitude and of safe motherhood intervention in pregnant women it has been showed that as a package comprising the following interlocking system includes interventions, early screening, administration of a preventive prophylactic therapy and curative of the various detected risk conditions effectively on the basis of reduced maternal and fetal complications.

Pertaining to the studied sample's attitude regarding aspects of safe motherhood, the results of our research showed that there was a highly statistical significant difference between the results of post-intervention phase compared to pre-intervention phase in favor of post- intervention regarding all items of studied sample's attitude

regarding different aspects of safe motherhood (antenatal, intranatal, postnatal and care of newborn) with p≤0.001. Where, the findings cleared that, about one quarter and more than two thirds of studied sample had positive attitude regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively. While, it was revealed that about two thirds and tenth of them had negative attitude regarding different aspects of safe motherhood at pre-intervention and post-intervention phases respectively. This finding can be attributed to that women pay more attention to safe motherhood practices and have a higher commitment to the received nursing intervention package. Also, improvement of information, motivation, and behavioral skills are necessary to change related behaviors and attain correct attitude and self-care behaviors

These findings were matched with **(Soe and Somrongthong, 2011)** who concluded that the community based safe motherhood health education intervention using pictorial handbook and group education had positive impact on women's knowledge, attitude and their practices or intention to practices of maternal health care in antenatal, delivery and postnatal period including breastfeeding and family planning. Moreover, these findings were in the same harmony with **(Sharma and Sharma, 2012)** showed that the attitude and beliefs about safe motherhood practices amongst pregnant women residing in the urban slum of the city of Jaipur, India were negative and pointed to the need for health education campaigns. Additionally, this result was supported by **(Jahan, 2016)** who indicated that proper knowledge on safe motherhood did not reach to the mothers which affect their attitude negatively. This is attributed to the knowledge and attitude that women taught during instructional sessions play a prominent role in encouraging and motivating women to change their unsafe motherhood practices. Besides, intervention guidelines play a very important role in helping women to acquire knowledge and positive attitude regarding safe motherhood practices.

Furthermore, the present findings were in the same line with **(Mortada et al, 2015)** who studied "effectiveness of community based health education intervention about safe motherhood among pregnant females in Sharkia Governorate, Egypt, indicated that there were significant improvement in the total knowledge and attitude score regarding; antenatal care (from 13.80±3.47 to 21.96±4.32) and (from 11.26±1.20 to 12.92±1.80) respectively, post-natal care total score (from 5.62±0.74 to 9.10±0.70) and from (7.68±1.76 to 10.86±2.60) respectively, total Family planning

(from 6.88±1.28 to 10.86±1.72) and (5.64±1.26 to 6.38±2.54) respectively, Breast feeding total score (from 16.92±2.30 to 22.42±2.74) and (from 6.82±1.44 to 9.30±1.52) respectively. These findings may be attributed to the effect of nursing intervention guidelines on women's knowledge and proper attitude in healthy behaviors consequently reduced the maternal and fetal morbidity and mortality. Besides, the high costs of treatment have demanded a shift in the emphasis of care for the prevention instead of the treatment.

On the other side, the present findings somewhat different with **(Prabhu, 2017)** who conducted "knowledge and attitude assessment on institutional delivery among primi and multigravidae mothers", illustrated that in primigravidae mothers 27(54%) of respondents had moderately favourable attitude and 23(46%) of respondents had favourable attitude. In multigravidae mothers 34(64%) of respondents have favourable attitude and 18(36%) of respondents have moderately favourable attitude and none of them had unfavourable attitude. This difference between our research results and these results may be interpreted due to cultural differences and social awareness and as a result of the difference between the two samples' size, place of residence and source of information.

On investigating correlation coefficient between total knowledge, total attitude and scores, our research results revealed that; there was a highly positive statistical significant correlation between total knowledge and total attitude regarding safe motherhood at pre-intervention phase (P≤ 0.001). While, there was a positive statistical correlation between total knowledge and total attitude regarding safe motherhood at post-intervention phase (P≤ 0.05). The result was in accordance with **(Prabhu, 2017)** revealed that the correlation coefficient value of knowledge and attitude of primigravida mothers is +0.549 and multigravida mothers is +0.149 which shows that there is a positive relationship exists between knowledge and attitude of primi and multigravida mothers. The findings of the current research can be explained by the fact that a lack of knowledge and awareness about aspects of safe motherhood among participants can lead to unhealthy & negative attitude and vice versa. This means more the knowledge better the attitude.

Conclusion:

This research reported that the implementation of comprehensive intervention package succeeded in and had a considerable improvement in the knowledge and attitude

regarding different aspects of safe motherhood among pregnant women. There was a highly statistically significant positive correlation between total knowledge and total attitude regarding safe motherhood at pre-intervention phase. While, there was a statistically significant positive correlation between total knowledge and total attitude regarding safe motherhood at post-intervention phase. Therefore, the research hypotheses were accepted.

Recommendation

In light of the research findings, the following recommendations were suggested:

• Applying educational intervention to improve women's perception about safe motherhood practices in different maternity health services to prevent further maternal and fetal mortality and morbidity.

• Simple illustrated guidelines about different aspects of safe motherhood should be available for women in obstetrics and gynecology outpatient clinic.

• The findings suggest the need for targeted health education using various educational methods for pregnant women specially the young mothers and lower educated ones.

• Healthcare providers, educators and policy makers can use these insights, to develop strategies and further investigation assessing the educational health needs of rural women.

• All stakeholders should be mobilized and sensitized to modify the health education myths among women in the area of study which was different aspects of safe motherhood.

Further researches:

- Further qualitative studies using larger representative probability sample size are needed to achieve more generalization of the results.
- Further studies are proposed to establish institutions to organize coordinate and fund state and national research on sustainable safe motherhood.
- Further studies are needed to investigate the relationship between women's perception about safe motherhood and incidence maternal and fetal mortality and morbidity.

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Conflict of interest

There were no conflicts of interest.

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