

## Effect of Instructional Package on Maternity Nurses' Knowledge and Practices regarding Assessment of Fetal Well-being

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### Abstract

Background: Assessment of fetal well-being during pregnancy is a critical tool for ensuring optimal neonatal outcomes. Nurses have a major role for assessment of fetal wellbeing and improving the physical and psychosocial maternal condition. Aim of the study: Was to evaluate the effect of instructional package on maternity nurses' knowledge and practices regarding assessment of fetal wellbeing. Study design: A quasi-experimental design was utilized. Setting: The current study was conducted at Obstetrics and Gynecological department affiliated to Benha University Hospital. Sample: A convenient sample included 50 maternity nurses. Tools of data collection: Two tools were used for data collection and included: Tool (I) Part I Self-administered questionnaire to assess maternity nurses' demographic data. Part II Assessment of maternity nurses' knowledge regarding assessment of fetal wellbeing. Tool (II) Observational checklist was used to assess maternity nurses' practices regarding assessment of fetal wellbeing. Results: The result of present study revealed that there was a highly statistically significant difference in relation to total nurses' knowledge and practices about assessment of fetal well-being pre, post and at follow up phases of instructional package implementation. Moreover, there was a positive statistically significant correlation between total knowledge and total practice scores pre, post and at follow up phases of instructional package implementation. Conclusion: The instructional package had a positive effect on improving knowledge and practices of maternity nurses regarding assessment of fetal wellbeing. Recommendations: Develop periodic in-service training programs for nurses to enhance their practical skills regarding assessment of fetal wellbeing.

**Keywords:** Fetal Well-being, Instructional Package, Knowledge, Maternity Nurses, Practices.

### 1. Introduction

Pregnancy is a unique natural period that is part of woman's life. The physiological changes of pregnancy begin after conception till birth and affect every organ in the body hence, pregnant woman need to adapt to pregnancy that facilitate normal fetal growth and development. Recurrent fetal heart rate monitoring during pregnancy gives an impression of fetal well-being, thus promoting the health status of newborns after birth [1].

Fetal well-being is a term which describes the fetus whose growth is appropriate for the gestational age and who has normal form and structure. Fetal well-being depends on a satisfactory maternal health throughout pregnancy. Fetal health is the indicator of fetal wellbeing and regular contact in the uterus of pregnant women during pregnancy, thus the complications that occur during pregnancy can lead to severe problems for the fetus which restrict proper growth and causes impairment or death. Safe pregnancy achieved through predicting risk levels before the occasion of complications that encourage proper fetal growth [2].

The primary goal of antepartum fetal surveillance is to identify fetuses at risk this can be done by confirming normal fetal growth and development, as well as early detection of complications so, timely intervention can take place. The assessment of fetal well-being includes, antenatal screening and diagnostic testing, measuring fetal growth, ultrasound scanning and monitoring of fetal movements. Assessing maternal well-being also provides vital clues, as poor maternal health may negatively impact on the fetus [3].

The main techniques for assessment of fetal well-being are the fetal movement count, the non-stress test, biophysical profile, modified biophysical profile,

contraction stress test, oxytocin challenge test, fetal heart sound assessment, fetal acoustic stimulation test, amniocentesis, umbilical blood sampling, chorionic villus sampling, doppler ultrasound, assessment of amniotic fluid volume and doppler velocimetry [4].

These tests are used to assess fetal health during pregnancy in certain maternal conditions such as, hypertension, pregestational diabetes, connective tissue disorders as lupus, chronic renal disease, antiphospholipid syndrome, hyperthyroidism, hemoglobinopathies and cyanotic heart disease which are associated with vascular disease leading to decreased perfusion of the placenta and fetus. Antenatal testing is also performed for new conditions that occur during pregnancy such as preeclampsia, isoimmunization or fetal growth restriction [5].

Assessment of maternal and fetal wellbeing begins at the initial antenatal visit and continues throughout pregnancy. The initial visit is an ideal time to screen for factors that might place the woman and fetus at risk for problems such as preterm labor, birth defects, low birth weight and other preventable health problems. Moreover, it considered an optimal time to begin educating and counseling the woman about physiological changes which occur during pregnancy that will affect the life [6].

Nurses employed in prenatal care setting need to have accurate information and explain the benefits and limitations of screening to women. Timely presentation of information and identification of available information about evolving genetic screening and technology makes accurate information necessary for nurse in many practice setting. Nurses who understand the screening process can help women make informed decisions about participating in screening. Also, nurses can provide

appropriate information and support through the testing process and help to interpret results of the tests [7].

The maternity nurse also plays an important role in providing information about fetal monitoring measures, its effectiveness in low risk women and its advantages and limitations. It is the responsibility of each nurse to assess fetal heart rate patterns, implement independent nursing interventions and report non-reassuring patterns to the physician to provide consistent and timely evaluation of fetal well-being and progress of labor [8].

An instructional package is an organized set of learning activities designed to provide information and evaluates the knowledge through testing, practical demonstration or another field in order to enable nurses for building knowledge and considered as a powerful tool for perfect practices and enhancing women's and fetal health which in turn decreases prenatal morbidity and mortality [9].

#### **Significant of the study:**

Perinatal mortality is the death of the fetus between 28 weeks of gestation onwards and before the first 7 days of life. It is a reflection of poor socio-economic status of a country, poor maternal health service utilization, the quality of obstetrics and availability of neonatal care facilities and inappropriate maternal health care provision [10]. The perinatal mortality rate in developed countries is about 90% of all fetal and infant mortality. Worldwide, the current perinatal mortality rate in 2022 is 15.084 deaths per 1000 live births, While in Egypt, the perinatal mortality rate in 2022 is 15.513 deaths per 1000 live births [11].

The primary goal of study the assessment of fetal wellbeing is to identify fetuses at risk for intrauterine injury and death so that, intervention and timely delivery can prevent progression to stillbirth and reduced the intrauterine fetal mortality and morbidity. Also to prevent or identify and treat any condition that may threaten the health of the fetus/ newborn and mother. The antenatal monitoring and follow up would decrease fetal death without putting a large numbers of healthy fetuses at risk as preterm labour and associated mortality and morbidity. Therefore the present study aims to highlight the importance of assessment of fetal wellbeing.

#### **2. Aim of the study:**

The aim of study was to evaluate the effect of instructional package on maternity nurses' knowledge and practices regarding assessment of fetal well-being, this aim was achieved through:

- Assessing maternity nurses' knowledge regarding assessment of fetal well-being.
- Assessing maternity nurses' practices regarding assessment of fetal well-being.
- Designing, implementing and evaluating the effect of instructional package on improving maternity nurses' knowledge and practices regarding assessment of fetal well-being.

#### **Study hypothesis:**

Maternity nurses' knowledge and practices regarding assessment of fetal well-being would be improved after implementation of the instructional package than before.

#### **3. Subjects and Method**

##### **Study design:**

A quasi-experimental study design (one group Pre /post-test) was utilized to achieve the aim of the study.

##### **Study setting:**

The study was conducted at obstetrics and gynecological department affiliated to Benha University Hospital, Benha, Egypt.

##### **Sample type:**

A convenient sample was included.

##### **Sample size:**

All maternity nurses were working at the obstetrics and gynecological department at Benha University Hospital at the time of data collection (50 nurses).

##### **Variables of the study**

- **Dependent variable:**  
Knowledge and practices of maternity nurses.
- **Independent variable:**  
The instructional package.

##### **Tools of data collection:**

Two tools were used for data collection:

##### **Tool I: Self-administered questionnaire:**

Which included two parts

**Part 1:** This part was concerned with demographic characteristics of the maternity nurses under study as (age, level of education, occupation, residence, years of experience and attendance of training courses regarding fetal wellbeing measures).

**Part 2:** This part was used to assess maternity nurses' knowledge regarding assessment of fetal well-being; it consisted of 25 items in the form of MCQ questions about the following:- (definition of fetal well-being, importance of assessment of fetal well-being, the routine assessment of the fetal health that done at each follow-up visit, the special cases that require more regular follow-up, the duration of pregnancy in which fetal vital signs assessment test performed, methods of assessment of fetal well-being, definition of non-stress test, the risks of non-stress test, the time required to perform the non-stress test, definition of oxytocin challenge test, method of performing oxytocin challenge test, importance of oxytocin challenge test, and contraindications of the oxytocin challenge test).

It included also, importance of fetal heartbeat monitoring, the normal fetal heart rate, factors that affect the fetal heart rate result, the nursing interventions in case of fetal bradycardia, definition of contraction stress test, the normal rate of fetal movement per day, uses of ultrasound during pregnancy, the components of a biophysical profile, definition of chorionic villus sampling, importance of taking placental and amniotic fluid sampling, definition of fetal acoustic stimulation test, and the time required to perform the fetal acoustic stimulation test.

**Knowledge scoring system:**

Each item was assigned a score (1) for incorrect answer and a score (2) for correct answer. The total knowledge score was summed up by the addition of the total score of each item and ranged from (25-50), then the total score was converted into percentage and categorized as following:-

- Poor < 60% of total knowledge score. ( $\leq 29$ )
- Average 60- < 75% of total knowledge score. (30-37)
- Good  $\geq 75\%$  of total knowledge score. (38-50)

**Tool II: Observational checklist:**

The researcher adopted the observational checklist from [12][13] it was used to assess the maternity nurses' practices regarding assessment of fetal wellbeing it comprised from (7) procedures, all procedures included (98) items and the items are classified according the procedures as the following:-

- External electronic fetal monitoring (17 items).
- Oxytocin challenge test (15 items).
- Fetal heart sound (by pinard stethoscope) (14 items).
- Contraction stress test (CST) (Nipple stimulation test) (16 items).
- Assessment of fetal movement (10 items).
- Ultrasound (12 items).
- Fetal acoustic stimulation test (14 items).

**Scoring system**

Each item of each procedure was assigned a score (2) for done and a score (1) for not done. The total score was calculated by the addition of the total score of all procedures. The total score was ranged from (98-206) and classified as:-

- Satisfactory practice  $\geq 60\%$  of total score (124-206).
- Unsatisfactory practice < 60% of total score (98-123).

**Tools validity:**

Tools of data collection were reviewed by three panel expertise of obstetrics and gynecological nursing at faculty of nursing, Benha University to test content validity and according to their comments; the questionnaire was modified regarding clarity of sentences and appropriateness of contents.

**Tools reliability:**

Reliability was done by Chronbach's Alpha coefficient test which revealed that the internal consistency of knowledge questionnaire was 0.79 and the internal consistency of observational checklist was 0.89.

**Ethical considerations:**

Ethical aspects were considered before starting the study as the following:

- The study approval was obtained from scientific research ethical committee of Faculty of Nursing at Benha University for fulfillment of the study.
- An official permission from the selected study settings was obtained for the fulfillment of the study.
- Before applying the tools, the researcher explained the aim and importance of the study to gain nurses' confidence and trust.

- Oral consent was taken by the researcher from each nurse to participate in the study and confidentiality were assured.
- The study hadn't any physical, social or psychological risks on the nurses.
- All tools of data collection were burned after statistically analysis to promote confidentiality of the study.
- The study tools were ensured that the study didn't cause any harm for any participant during data collection. Also didn't include any immoral statements and respect human rights.
- The nurses were free to withdraw from study at any time.

**Pilot study:**

A pilot study was carried out on 10 % of the total sample (5 nurses) to test the clarity, feasibility and applicability of tools as well as to estimate the time needed for data collection. No modifications were conducted. So, nurses involved in pilot study were included in the study.

**Field work**

The study was carried out from the beginning of March, 2022 to the end of August, 2022 covering 6 months. The researcher was visited the previously mentioned study setting three days/week (Saturday, Tuesday and Thursday) from 9.00 Am to 2.00 Pm. The study was conducted at the previously mentioned study setting through five phases included preparatory, interviewing and assessment phase, planning phase, implementation and evaluation phases.

**A- Preparatory phase**

The researcher reviewed the advanced national and international literature related to the present study, and then designed tools of data collection. Finally, the researcher was conducted pilot study to test content validity of tools used.

**B-Interviewing and assessment phase:**

At the beginning of the interview the researcher interviewed the maternity nurses in proper private place, greeted the nurses, introduced herself and the purpose of the study was explained, provided the nurses with all information about the study (purpose, duration, and activities) and obtained oral consent for participation in the study. Data was collected by the researcher through the distribution of self-administered questionnaire (tool no. I) (pretest) to collect nurses' demographic characteristics and nurses' knowledge regarding assessment of fetal well-being. The average time required for completion of the questionnaire was around (20-30 minutes). Then, the researcher used the observational checklists (tool no. II) (pretest) to assess nurses' practices regarding assessment of fetal well-being while providing care to pregnant women.

**C-Planning phase:**

Based on the results obtained from pretest assessment of nurses' knowledge and practices regarding assessment of fetal wellbeing and review of relevant literature, the researcher was designed the instructional package in an Arabic language supported by figures and included two

parts from theoretical knowledge and practical skills. The sessions' numbers and its contents were determined.

#### **C-Implementation phase:**

General and specific objectives of instructional package were stated and implemented to satisfy the actual needs of the studied sample. The researcher applied the instructional package through 5 sessions over three weeks (2 sessions every week). The researcher divided the sessions into two theoretical sessions and three practical sessions. The duration of each session was (45-60) minutes. These sessions conducted for small groups. The study sample included 50 nurses. The researcher was classified the study sample into (5) groups for the period of data collection and each group involved (10) nurse then the researcher designed these sessions for illustrating information regarding knowledge and practical assessment of fetal wellbeing to all nurses.

- At the beginning of the first session, nurses were oriented with the package contents. Each nurse was informed about the time of the next sessions at the end of session. The subsequent session started by feedback about the previous session and the objectives of the new session. Motivation and reinforcement during sessions were used to enhance motivation for sharing in the study. During sessions, each nurse has an opportunity to ask questions and share information with each other.
- At the end of each session, the researcher gave chance to the nurses to ask any questions to correct any misunderstanding related to the presentation of assessment of fetal wellbeing.
- Different strategies of teaching were used as lecture, discussion, role model, demonstration and re-demonstration, suitable teaching media were included hand out Booklet about different methods of assessment of fetal wellbeing which constructed by the researcher in a simple Arabic language after reviewing the related literatures and based on nurses knowledge and practices of assessment of fetal wellbeing were distributed to all recruited nurses in the study to achieve its objectives and video through lab top to help proper understanding of the content by the nurses. The researcher discussed all items of instructional package program to all maternity nurses were participating in the study as the following:

#### **The theoretical sessions:**

*First session:* - At the beginning of the first session the researcher gave the nurses the instructional package and illustrated the instructional package to the studied sample including the general and specific objectives by using Arabic language to suit all level of nurses' education. Then, the researcher started by the introduction of the theoretical part of the instructional package and was provided nurses with knowledge about definition of fetal wellbeing, importance of assessment of fetal well-being, special cases that require more follow up and routine assessment of the fetal health that done at each follow up visit.

*Second session:* - started by a feedback about the previous session and discuss the objectives of the new session then, the researcher provided nurses with

knowledge about different methods of assessment of fetal well-being by using different teaching methods as lecture, group discussion and brain storming. At the end of this session the researcher gave nurses the opportunity to ask questions and provided period of discussion.

#### **The practical sessions:**

*Third session:* - Implied the implementation of the practical part of the instructional package and included certain procedures as (External electronic fetal monitoring (non-stress test) and oxytocin challenge test).

*Fourth session:* - Started by feedback and re-demonstration of the previous session then demonstration of (contraction stress test and fetal heart sound assessment).

*Fifth session:* - Started by feedback and re-demonstration of the previous session then demonstration of (fetal movement count, ultrasound and fetal acoustic stimulation test).

#### **D- Evaluation phase:**

The evaluation phase emphasized on determining the effect of Instructional package on maternity nurses' knowledge and practices regarding Assessment of fetal wellbeing by comparing the results pre, post and follow-up implementation of Instructional package. Post-test was done after implementation and follow-up test was done after four weeks of post-test to evaluate the effectiveness of an Instructional package in order to test nurses' retention of knowledge and improving of practice as indicators of this instructional package program.

The researcher used tool no. I part II (Pre-posttest) to assess nurses' knowledge regarding assessment of fetal wellbeing. Tool no. II (Pre-posttest) to assess nurses practices regarding Assessment of fetal wellbeing.

#### **Limitation of the study:**

Sometimes interviewing nurses and the implementation of sessions were postponed as many nurses were busy most of time with women during data collection.

#### **Strength of the study:**

- Availability of many updated references related to the study.
- Availability of the maternity nurses all the time in the obstetrics and gynecology department.
- The majority of nurses and physician were collaborative during the study.

#### **Administrative design**

An official approval letter to conduct this study was obtained from Dean of Faculty of Nursing to Director of Benha University Hospital, then the researcher interviewed each study participant and obtained an informed consent before starting the data collection.

#### **Statistical design**

Data was verified prior to computerized entry. The Statistical Package for Social Sciences (SPSS version 20) was used followed by data analysis and tabulation. Descriptive statistics were applied (e.g., mean, standard deviation, frequency and percentages). Also, tests of significance (Chi - square test and Friedman Test) were applied to test the study hypothesis. Pearson correlation coefficients were used to investigate the relationship

among scores of knowledge and practices. A statistical significant level value was considered when  $p \leq 0.05$ . And a highly statistical significant level value was considered when  $p < 0.001$ .

#### 4.Results

**Table (1):** Shows that, more than one half (60.0%) of the studied nurses were aged 20-<30 years with mean age  $30.91 \pm 6.54$  years. Regarding academic qualification, more than one half (52.0%) of the studied nurses had diploma in nursing. Moreover, the majority (92.0%) of the studied nurses was working as nurse and more than three quarters (76.0%) of the studied nurses live in rural areas. In addition, less than one half (42.0%) of the studied nurses have 5-<10 years of experience with mean years of experience  $9.72 \pm 3.81$  years. Also, the minority (8.0%) of the studied nurses attended training courses related to methods of assessment of fetal well- being, with three quarters (75.0%) of them attended these courses since 1-<5 years.

**Figure (1)** Shows that, the minority (8.0%) of the studied nurses have a good level of total knowledge about assessment of fetal well- being at pre intervention phase compare to more than three quarters (80.0%) at post intervention phase and more than three quarters (76.0%) at follow-up phase.

**Figure (2)** Shows that, the minority (16.0%) of the studied nurses have satisfactory level of total practice regarding assessment of fetal well- being at pre intervention phase compare to the majority (90.0%) at post intervention phase and more than three quarters (86.0%) at follow-up phase.

**Table (2):** Presents that, there was no statistical significant relation between total nurses' knowledge and age as well as years of experience at pre intervention phase ( $P > 0.05$ ). Moreover, there was a statistical significant relation between total nurses' knowledge and age at post intervention and at follow up phase ( $P < 0.05$ ). While, there was a highly statistical significant relation between total nurses' knowledge and academic qualification, job, years of experience and attendance of training courses post-intervention and at follow up phase ( $p < 0.001$ ). Also, there was no statistical significant relation between total nurses' knowledge and residence at pre, post intervention and at follow up phase ( $P > 0.05$ ).

**Table (3):** Shows that, there was no statistical significant relation between total nurses' practice score and age as well as years of experience during pre-intervention phase ( $P > 0.05$ ). While, there was a statistical significant relation between total nurses' practice score and age as well as years of experience post intervention and at follow up phase ( $P < 0.05$ ). Also, there was a highly statistically significant relation between total nurses' practice at pre, post intervention and at follow up phase and their academic qualification, job and attendance of training courses ( $P < 0.001$ ). Moreover, there was no statistical significant relation between total nurses' practice score and residence pre, post intervention and at follow up phase ( $P > 0.05$ ).

**Table (4):** Illustrates that, there was a positive statistical significant correlation between total nurses' knowledge score and total practices score regarding assessment of fetal well- being at pre, post intervention and at follow-up phases ( $p < 0.001$ ).

**Table (1)** Distribution of the studied nurses according to their demographic characteristics (n=50).

	Variable	No.	%
<b>Age</b>	20-<30 years	<b>30</b>	<b>60.0</b>
	30-<40 years	14	28.0
	$\geq 40$ years	6	12.0
	<b>Mean <math>\pm</math> SD</b>	<b>30.91 <math>\pm</math> 6.54</b>	
<b>Academic qualification</b>	Diploma in Nursing	<b>26</b>	<b>52.0</b>
	Technical Nursing Institute	20	40.0
	Bachelor of Nursing	4	8.0
	Postgraduate studies	0	0.0
<b>Job</b>	Nurse	<b>46</b>	<b>92.0</b>
	Nursing supervisor	3	6.0
	Head of Nursing	1	2.0
<b>Residence</b>	Rural	<b>38</b>	<b>76.0</b>
	Urban	12	24.0
<b>Years of experience</b>	<5 years	14	28.0
	5-<10 years	<b>21</b>	<b>42.0</b>
	10-<15 years	10	20.0
	$\geq 15$ years	5	10.0
	<b>Mean <math>\pm</math> SD</b>	<b>9.72 <math>\pm</math> 3.81</b>	
<b>Attendance of training courses related to methods of fetal well-being assessment</b>	Yes	<b>4</b>	<b>8.0</b>
	No	46	92.0
<b>Duration since attendance of training courses (n=4)</b>	1-<5 years	<b>3</b>	<b>75.0</b>
	5-<10 years	1	25.0
	$\geq 10$ years	0	0.0

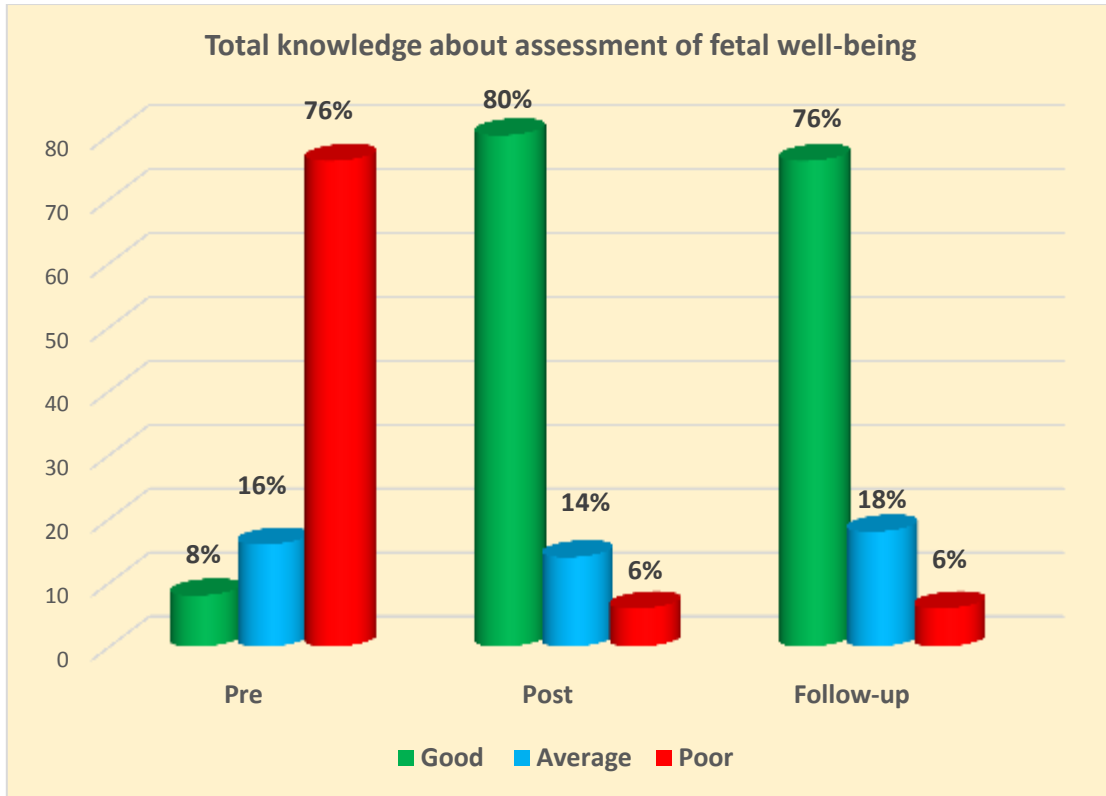


Fig. (1) Distribution of the studied nurses' total knowledge about assessment of fetal well-being at pre- intervention, post-intervention and at follow-up phases (n=50).



Fig. (2) Distribution of the studied nurses' total practices regarding methods of assessment of fetal well-being at pre-intervention, post-intervention and at follow-up phases (n=50)

**Table (2)** Relationship between demographic characteristics of the studied nurses and their total knowledge about assessment of fetal well- being at pre- intervention, post-intervention and at follow-up phases (n=50).

Items	Pre- intervention								X <sup>2</sup>	P-Value	Post- intervention								X <sup>2</sup>	P-Value	follow-up after 4 weeks								X <sup>2</sup>	P-Value
	Good (n=4)		Average (n=8)		Poor (n=38)		Good (n=40)				Average (n=7)		Poor (n=3)		Good (n=38)		Average (n=9)				Poor (n=3)									
	No.	%	No.	%	No.	%	No.	%			No.	%	No.	%	No.	%	No.	%			No.	%								
Age	20-<30	1	25.0	2	25.0	27	71.0	2.669	0.144	29	72.0	1	14.3	0	0.0	6.227	0.021*	29	76.3	1	11.1	0	0.0	6.057	0.027*					
	30-<40	3	75.0	2	25.0	9	23.7			11	27.0	2	28.6	1	33.3			9	23.7	4	44.4	1	33.3							
	≥ 40	0	0.0	4	50.0	2	5.3			0	0.0	4	57.1	2	66.7			0	0.0	4	44.4	2	66.7							
Academic qualification	Diploma in Nursing	0	0.0	0	0.0	26	68.4	11.96	0.011*	17	42.5	6	85.7	3	100	17.90	0.000**	15	39.5	8	88.9	3	100	16.51	0.000**					
	Technical nursing Institute	1	25.0	7	87.5	12	31.6			19	47.5	1	14.3	0	0.0			19	50.0	1	11.1	0	0.0							
	Bachelor of Nursing	3	75.0	1	12.5	0	0.0			4	10.0	0	0.0	0	0.0			4	10.5	0	0.0	0	0.0							
Job	Nurse	1	25.0	7	87.5	38	100	13.24	0.010*	36	90.0	7	100	3	100	19.31	0.000**	34	89.5	9	100	3	100	18.47	0.000**					
	Nursing supervisor	2	50.0	1	12.5	0	0.0			3	7.5	0	0.0	0	0.0			3	7.9	0	0.0	0	0.0							
	Head of Nursing	1	25.0	0	0.0	0	0.0			1	2.5	0	0.0	0	0.0			1	2.6	0	0.0	0	0.0							
Residence	Rural	2	50.0	3	37.5	33	86.8	4.307	0.101	31	77.5	5	71.4	2	66.7	3.522	0.111	29	76.3	7	77.8	2		3.600	0.107					
	Urban	2	50.0	5	62.5	5	13.2			9	22.5	2	28.6	1	33.3			9	23.7	2	22.2	1								
Years of experience	<5	1	25.0	2	25.0	11	28.9	5.527	0.096	14	35.0	0	0.0	0	0.0	13.07	0.000**	14	36.8	0	0.0	0	0.0	12.74	0.000**					
	5-<10	1	25.0	2	25.0	18	47.4			20	50.0	1	14.2	0	0.0			19	50.0	2	22.2	0	0.0							
	10-<15	2	50.0	2	25.0	6	15.8			6	15.0	3	42.9	1	33.3			5	13.2	4	44.5	1	33.3							
	≥ 15	0	0.0	2	25.0	3	7.9			0	0.0	3	42.9	2	66.7			0	0.0	3	33.3	2	66.7							
Attendance of training courses	Yes	4	100	0	0.0	0	0.0	16.54	0.000**	4	10.0	0	0.0	0	0.0	14.01	0.000**	4	10.5	0	0.0	0	0.0	13.00	0.000**					

X<sup>2</sup>: Chi-square test significant at (p ≤ 0.001).

No statistical significant at p >0.05.

\* A statistical Significant at p < 0.05.

\*\* A highly statistical

**Table (3)** Relationship between demographic characteristics of the studied nurses and their total practices regarding methods of assessment of fetal well-being at pre-intervention, post-intervention and at follow-up phases (n=50).

Items	Pre- intervention		X <sup>2</sup>	P- Value	Post- intervention				X <sup>2</sup>	P- Value	follow-up after 4 weeks				X <sup>2</sup>	P-Value			
	Satisfactory				Unsatisfactory		Satisfactory				Unsatisfactory		Satisfactory				Unsatisfactory		
	(n=8)				(n=42)		(n=45)				(n=5)		(n=43)				(n=7)		
	No.	%			No.	%	No.	%			No.	%	No.	%			No.	%	
Age (year)	20-<30	2	25.0	28	66.7	3.204	0.091	29	64.4	1	20.0	5.990	0.041*	29	67.4	1	14.3	5.758	0.044*
	30-<40	4	50.0	10	23.8			13	28.9	1	20.0			11	25.6	3	42.9		
	≥ 40	2	25.0	4	9.5			3	6.7	3	60.0			3	7.0	3	42.9		
Academic qualification	Diploma in Nursing	0	0.0	26	61.9	14.91	0.000**	22	48.9	4	80.0	19.57	0.000**	20	46.5	6	85.7	15.10	0.000**
	Technical nursing Institute	4	50.0	16	38.1			19	42.2	1	20.0			19	44.2	1	14.3		
	Bachelor of Nursing	4	50.0	0	0.0			4	8.9	0	0.0			4	9.3	0	0.0		
Job	Nurse	4	50.0	42	100.0	15.63	0.000**	41	91.1	5	100.0	22.31	0.000**	39	90.7	7	100.0	20.14	0.000**
	Nursing supervisor	3	37.5	0	0.0			3	6.7	0	0.0			3	7.0	0	0.0		
	Head of Nursing	1	12.5	0	0.0			1	2.2	0	0.0			1	2.3	0	0.0		
Residence	Rural	4	50.0	34	81.0	1.207	0.211	35	77.8	3	60.0	1.524	0.197	34	79.1	4	57.1	1.500	0.950
	Urban	4	50.0	8	19.0			10	22.2	2	40.0			9	20.9	3	42.9		
Years of experience	<5 years	2	25.0	12	28.6	4.558	0.087	14	31.1	0	0.0	7.082	0.025*	14	32.6	0	0.0	8.947	0.014*
	5-<10 years	2	25.0	19	45.2			20	44.4	1	20.0			20	46.5	1	14.3		
	10-<15 years	2	25.0	8	19.0			8	17.8	2	40.0			8	18.6	2	28.6		
	≥ 15 years	2	25.0	3	7.2			3	6.7	2	40.0			1	2.3	4	57.1		
Attendance of training courses	Yes	4	50.0	0	0.0	12.07	0.000**	4	8.9	0	0.0	13.68	0.000**	4	9.3	0	0.0	12.35	0.000**
	No	4	50.0	42	100.0			41	91.1	5	100.0			39	90.7	7	100.0		

X<sup>2</sup>: Chi-square test significant at (p ≤ 0.001).

No statistical significant at p > 0.05.

\* A statistical Significant at p < 0.05.

\*\* A highly statistical



**Table (4)** Correlation between the studied nurses' total knowledge and total practices regarding assessment of fetal well-being at pre- intervention, post- intervention and at follow-up phases (n=50).

Items	Total knowledge score					
	Pre intervention		Post intervention		Follow-up- intervention after 4 weeks	
<b>Total practice score</b>	r= 0.518	p= 0.000**	r= 0.574	p= 0.000**	r= 0.559	p= 0.000**

## 5. Discussion

The maternity nurse plays an imperative role in providing information about fetal monitoring, its effectiveness in low-risk women and its advantages and limitations. The responsibility of the maternity nurses are to assess patterns of fetal heart rate, implement independent nursing interventions and report non-reassuring patterns to the physician regularly to assess and record results of electronic fetal monitoring to provide a consistent and timely evaluation of fetal well-being and progress of labor [14].

The present study was aimed to evaluate the effect of instructional package on maternity nurses' knowledge and practices regarding assessment of fetal wellbeing. The results of the present study were significantly supported the study hypothesis.

As regards demographic characteristics of the studied nurses, the present study results revealed that more than half of the studied nurses were in the age group from 20-<30 years. This result is supported by [15] who studied "A Study to Assess the Effectiveness of Structured Teaching Programme on Knowledge regarding Non Invasive Diagnostic Procedures used to Assess the Fetal Well Being among Staff Nurses at Ashwin Hospital, Coimbatore" and showed that more than half of the studied nurses were aged from 20-30 years.

On the other hand, this result is contraindicated with [16] who studied "A Study to Assess the Knowledge of Staff Nurses Regarding Antenatal Assessment of Fetal Well Being Working in Mahila Chikitsalaya Sanganeri Gate Jaipur Rajasthan, India", and revealed that the majority of the studied nurses were in the age group of 31-40 years.

From the researcher point of view, this may be due to that most of those nurses were newly graduated, young and tolerate the nature of the work also may be explained by the fact that younger nurses are active, more interested and motivated than older age nurses.

Concerning academic qualification of the studied nurses, the result of the current study showed that more than half of the studied nurses had diploma in nursing and the majority of the studied nurses didn't attend any training courses related to assessment of fetal well-being. This result is nearly in the same line with [17] who studied "Maternity Nurses' Performance Regarding Non-invasive Fetal Wellbeing Measures: Educational Intervention, Egypt", and showed that the highest percentage of the studied nurses had a secondary nursing education. In addition the majority of the studied nurses hadn't attended any training courses regarding non-invasive fetal wellbeing measures.

This result was in disagreement with [1] who studied "Effect of Educational Program on Knowledge and Practices of Maternity Nurses regarding Cardiotocography, Egypt", and revealed that the majority of the studied nurses had technical nursing institute.

Regarding job of the studied nurses, the result of the current study showed that the majority of the studied nurses were working as a nurse. This result is nearly agrees with the study of [18] who studied "The effect of educational programs about methods of assessing fetal well-being during pregnancy among nurses, Jordan", and reported that more than half of the studied nurses were working as a nurse.

Regarding residence of the studied nurses, the findings of the present study showed that more than three quarters of the studied nurses live in rural areas. This study finding is in the same line with [19] who studied "Effect of electronic fetal monitoring educational program on knowledge and interpretations of internship nursing student, Assiut, Egypt" and clarified that more than half of the studied nurses live in rural areas.

Regarding years of experience of the studied nurses, the findings of the present study showed that less than one half of the studied nurses had 5-<10 years of experience with mean  $9.72 \pm 3.81$  years, this finding is supported by the study of [16] who reported that less than one half of the studied nurses had 6<10 years of experience.

On the other hand, this result is contraindicated with [20] who studied "Knowledge regarding fetal well-being among the Staff Nurses working in obstetrics and Gynecological wards, India" and illustrated that minority of the studied nurses had 6<10 years of experience.

Concerning knowledge of studied nurses about assessment of fetal well-being, the result of the present study revealed that there was highly statistically significant difference in relation to total nurses' knowledge scores regarding assessment of fetal wellbeing pre, post and at follow up phases of instructional package implementation.

From the researcher point of view in this study, this result may be due to the positive effect of the implementation of instructional package and the learning sessions application. Also, the topic of the study is considered vital and sensitive to their work so, nurses were very interested and satisfied during the learning sessions.

Also, there was a slightly decrease in the total nurses' knowledge scores after implementation of the

instructional package but still higher than before implementation of instructional package.

This result is supported by [15] who revealed that during the pretest most of the staff nurses had inadequate knowledge. While, during the post test the majority of the staff nurses had adequate knowledge.

On the other hand, this result is contradicted with [21] who studied "*Knowledge and perceptions of quality of obstetric and newborn care of local health providers, Malawi,*" and reported that the training program had little impact on levels of knowledge and the gap of knowledge couldn't be overcome by simply providing more training, so most of the staff reported perception of poor quality of care.

From the researcher point of view in this study, this may be due to that the training courses were very important element for improving level of staff nurses' knowledge, also lack of continuous educational training affect negatively on level of their knowledge.

Concerning studied nurses' practices about assessment of fetal well-being, the result of the present study revealed that there was highly statistically significant difference in relation to total nurses' practices scores regarding assessment of fetal wellbeing pre, post and at follow up phases of instructional package implementation. This result is in the same line with [19] who clarified that more than three-quarters of studied nurses had unsatisfactory practice before supportive nursing instructions.

On the other hand, this result is contraindicated with the study of [22] about "*Midwives' Knowledge and Readiness to Practice Antenatal Screening and Genetic Testing in selected Hospitals in Lagos, Nigeria*", and reported that more than two third of the study sample were ready to practice antenatal screening and genetic testing.

From the researcher point of view in this study, this may be due to lack of training, lack of continuous in service educational programs, absent of continuous supervision and evaluation regarding any practices of assessment of fetal well-being.

Regarding relation between studied nurses' total knowledge and demographic characteristics, the findings of the current study revealed that there was a statistical significant relation between total nurses' knowledge and age at post intervention and at follow up phases. This finding come in line with [1] who reported that there was a statistical significant relation between studied nurses' age and total knowledge score at post intervention phase.

On the other hand, this result is contraindicated with [23] who studied "*Evaluate The Effectiveness Of Self- Instructional Module Regarding Selected Fetal Well- Being Measures Among Staff Nurses In A Selected Maternity Hospital At Bengaluru, Karanataka, India*", and reported that there was no relation between studied nurses' age and total knowledge score.

Regarding academic qualification, the result of the current study revealed that there was a highly statistical

significant relation between total nurses' knowledge and academic qualification at post intervention and at follow up phases. This result is in agreement with [22] who reported that there was highly statistically significant relation between educational level and immediate post-program knowledge score.

On the other hand, this result is contraindicated with the study of [20] reported that there was no relation between studied nurses' years of experience and total knowledge score.

Regarding relation between residence of the studied nurses and total knowledge, the results of the current study showed that there was no statistical significant relation between total nurses' knowledge and residence at pre, post and at follow up phases. This result agrees with the study of [19] who reported that there was no statistical significant relation between total nurses' knowledge and residence.

Regarding attendance of training courses, the result of the current study demonstrated that there was a highly statistical significant relation between total nurses' knowledge and attendance of training courses at pre, post and at follow up phases. This finding is in same line with [8] "*Effect of Supportive Nursing Instructions for Maternity Nurses Regarding Electronic Fetal Monitoring*" and revealed that there was a highly statistical significant difference between studied nurses' total knowledge score and attendance of training courses before and after intervention.

Regarding relation between studied nurses' practices and demographic characteristics, the current study findings illustrated that there was a statistical significant relation between total nurses' practice and age as well as years of experience post intervention and at follow up phase.

This result is in line with [24] who studied "*The effectiveness of an education program concerning cardiocography on nurse- midwife's knowledge in Maternity Hospitals in Baghdad City, Iraq*", and reported that there was significant relationship between knowledge and practices regarding cardiocography and demographic characteristics of nurses as age and years of experiences.

Regarding relation between studied nurses' academic qualification and total practices, the result of the current study revealed that, there was a highly statistically significant relation between total nurses' practice at pre, post intervention and at follow up phase and their academic qualification. This result is in agreement with [17] who showed that that there was a highly statistically significant difference between educational qualification and total practice score before and after intervention.

On the other hand, this result is contraindicated with [13] who studied "*knowledge and practice of maternity nurses regarding fetal wellbeing*" and reported that there was no relation between studied nurses' academic qualification and total practice score.

Regarding relation between studied nurses' attendance of training courses and job, the result of the

current study illustrated that there was a highly statistical significant relation between total nurses' practice and job as well as attendance of training courses at pre, post and at follow up phases. This finding is in same line with [8] who revealed that there was a highly statistical significant difference between studied nurses' total practice score before and after intervention.

Concerning correlation between total nurses' knowledge and total practices regarding assessment of fetal well-being at pre- intervention, post- intervention and at follow-up phases, the finding of the current study showed a highly statistical significant positive correlation between total nurses' knowledge score and total practices score regarding assessment of fetal well-being at pre, post intervention and at follow-up phases.

This result is similar to study performed by [1] and found that there was a significant positive correlation between nurses' knowledge and practice before and after implementation of educational program regarding cardiotocography.

## 6. Conclusion

Based on the results of the present study, it could be concluded that the instructional package had positive effect on nurses' knowledge and practices regarding assessment of fetal well-being. In addition, there was a highly statistically significant difference in relation to total nurses' knowledge and practices about assessment of fetal well-being pre, post and at follow up phases of instructional package implementation. Moreover, there was a positive statistically significant correlation between total knowledge and total practice scores pre, post and at follow up phases of instructional package implementation. Hence, the present study findings supported the study hypothesis.

## 7. Recommendations

**Based on the result of the present study, the following recommendations are suggested:**

- Organizing workshops for maternity nurses regarding methods of assessment of fetal wellbeing.
- Develop periodic in-service training programs for nurses to enhance their practical skills regarding assessment of fetal wellbeing.

**Further study need to be performed:**

- Evaluate the effect of simulation training program on maternity nurses' performance regarding assessment of fetal well-being.
- Replication of the present study on large sample size and in different setting for generalization of results.

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