

**Effectiveness of an Education Program Concerning Cardiotocography on Nurses-  
Midwives Practice in Maternity Hospitals at Baghdad City.**

فاعلية البرنامج التثقيفي المتعلق بتخطيط نبض قلب الجنين وتقلصات الرحمية على ممارسات الممرضات – القابلات  
في مستشفيات الولادة في مدينة بغداد

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**المستخلص:**

**الهدف:** يهدف البحث إلى معرفة فاعلية البرنامج التثقيفي فيما يتعلق بممارسات الممرضات القابلات و أداءهم بتخطيط نبض قلب الجنين وتقلصات الرحمية الأم الحامل وإيجاد العلاقة بين ممارسات الممرضات – القابلات وبعض المتغيرات المدروسة.

**المنهجية:** دراسة شبه التجريبية (باستخدام أسلوب اختبار قبلي - بعدي) في ثلاثة دوائر للصحة وهي دائرة الرصافة، دائرة صحة الكرخ و دائرة صحة مدينة الطب للفترة من ٢٦ مارس ٢٠١٤ إلى غاية ٣٠ أغسطس ٢٠١٥. وتنقسم العينة إلى مجموعتين (٦٥) من الممرضات القابلات (مجموعة الدراسة) اللواتي يتعرضن إلى برنامج التعليمي و(٦٥) من الممرضات القابلات (العينة الضابطة) لم تتعرض إلى البرنامج التعليمي، قد تم جمع البيانات من خلال استخدام الاستمارة الاستبيان وقائمة الرصد المتعلقة بالممارسات تخطيط نبض قلب الجنين والتقلصات الرحمية وتم استخدام الاستبانة كأداة لجمع البيانات.

**النتائج:** أظهرت النتائج تحسن ايجابيا ودلالة إحصائيا ملحوظة في ممارسات القابلات الممرضات نحو أداءهم في انجاز تخطيط نبض قلب الجنين وتقلصات الرحمية

**التوصيات:** أوصت الدراسة أن تطبع وتوزع كتيبات دليل لتحسين الممارسات الممرضات القابلات و توفير فرصة لهم لأن يلتحقن بدورات تدريبية متعلقة بتخطيط نبض قلب الجنين وتقلصات الرحمية.

**الكلمات المفتاحية:** مراقبة الجنين الخارجية ، الممرضات - القابلات، ممارسات ، مخطط نبض قلب الجنين والتقلصات الرحمية للام الحامل

**Abstract:**

**Objectives:** To identify the effectiveness program on nurse- midwife practice concerning performed cardiotocography to pregnant women and to find out the relationship between nurse- midwife practice and certain studied variables.

**Methodology:** A quasi-experimental design (pretest-post test approach) was conducted at three sector Al-Russafa directorate, AL- Karckh directorate and Medical City Directorate from the period of March, 26th 2014 to August, 30th 2015. A non-probability sample consisted of (130) nurse -midwives were selected and divided into two groups (65) nurses-midwives (case group) who exposed to the educational program and (65) nurses-midwives who didn't expose to the program considered as control group . Data were collected through the use of questionnaire and checklist concerning practice for cardiotocography

**Result:** in general the results show a statistical significant improvement of nurses-midwives practices concerning cardiotocography.

**Recommendation:** The study was recommended that print and distribute guide booklets and improve their practice and provide an opportunity for nurses-midwives to be enrolled training sessions concerning cardiotocography

**Key words:** CTG, External fetal monitoring, midwives, nurses, Practice,

**Introduction:**

The CTG monitor records both fetal heart rate (cardio) and maternal uterine contractions (toco). Continuous electronic fetal monitoring is commonly performed by (CTG) An understanding of the principles of CTG monitoring and a systematic approach to CTG analysis may enable health provider to better appreciate obstetric make specific clinical decisions.

This understanding may aid communication and timely delivery especially when the fetus is considered at high risk<sup>(1)</sup>.

The non stress test (NST) is most widely applied technique for antepartum evaluation of the fetus the basis for the NST is that the normal fetus procedures characteristic heart rate patterns in response to fetal movement ,uterine contraction or stimulation in the term fetus ,acceleration are associated with movement more than 85% of the time<sup>(2)</sup>.

The fetal heart rate is monitored by CTG for 20 Min (the test can be extended for additional 20 min periods if the common reason for absent of fetal heart rate acceleration fetus is in a sleep cycle) however ,medication maternal smoking and presence of fetal malformation<sup>(3)</sup>.

Acute intrapartum emergencies and poor fetal oxygenation commonly contribute to stillbirth and neonatal deaths, as well as to long-term neurologic disabilities including mental impairment and cerebral palsy<sup>(4)</sup>.

In presence of some risk factors, electronic fetal monitoring is necessary for fetal surveillance. On the other hand, for low risk pregnancies the use of (CTG) does not offer significant contribution to fetal outcomes<sup>(5)</sup>.

Mentioned that to the annual report of Ministry of Health in Iraq ( a maternal mortality of important indicators in assessing the health situation of the

country and achieve the Millennium Development Goals especial MDG 4 and MDG 5 maternal mortality ratio per 100000 live birth range 30.1 in 2014 either, and neonatal mortality rate for (0-28) day has reached 17.3 per 1000 live birth<sup>(6)</sup>.

The nurse- midwife with training in fetal monitoring instructs the women about the NST and explains why it is recommended. The test is termed "nonstress" because it consists of monitoring only The fetus is not challenged or stress by stimulated uterine contractions to obtain the necessary data<sup>(7)</sup>.

Fetal monitoring is extremely important to quantify fetal well-being during pregnancy. The recording and the analysis of fetal heart rate (FHR) allows the identification of risky conditions for the fetus, the selection of the optimal timing for the delivery and, thus, it can contribute to reduce fetal mortality and perinatal morbidity<sup>(8)</sup>.

Nurses & midwives responsibilities for these clinical assessment procedures include checking that a signed consent form has been obtained as needed, Scheduling the procedure, explaining the procedure to the women and her support person, preparing the women physically and psychologically, providing support during the procedure, assessing both fetal and maternal responses to the procedure, providing any necessary follow up care and managing equipments. Additional consent to perform a procedure is necessary if the procedure poses any risk to the mother or fetus that would not otherwise be present. Information must be provided about what the procedure requires and what the possible risks are electronic fetal monitoring is one of the important parameter in determining the fetal wellbeing of the unborn fetus. And the nurses should have adequate knowledge regarding these CTG in order to prevent complication<sup>(9)</sup>.

**Objectives of this study:** To identify the effectiveness of an education program on nurse- midwife practice concerning

performed cardiocography to pregnant women and examine the relationship between their practices and some Demographic variables.

**Methodology:** A quasi-experimental design study is carried out through the application of pre-test and post-test approach for the study and control groups, was conducted at three sector Al-Russafa directorate, AL- Karckh directorate and Medical City Directorate from the period of 26<sup>th</sup> March, 2014 to August, 30<sup>th</sup> 2015. The design was one of the most appropriate and effective approaches for such an intervention to be conducted, particularly majority of nurses –midwives' don't implement such daily tasks. To achieve the objective of the study probability sample consisted of (130) nurse -midwives were selected and divided into two groups (65) nurses-midwives (case group) who exposed to the educational program and (65 ) nurses-midwives who didn't expose to the program considered as control group. Data were collected through

the use of questionnaire and checklist concerning practice performs procedure by (cardiocography). Instrument was constructed Through the use of (3) level of likerts scale for implementation of the educational program the rating score of the program was (3) for implemented (2) for some time, and (1) for not implement with cut of point=2. Checklist used by the researchers for five times observation. Checklist practices in the instrument composed 10 categories; each one included (several) items. the instrument content validity was determined through a panel of experts, reliability of instrument was determined through the use of correlation coefficient of for the test- retest approach which indicates that reliability coefficient were (0.86 ) for practical checklist. The data has been analyzed through the application of descriptive (frequency, percentage, mean score and relative sufficiency) and inferential (t- test) statistical analysis).

### Result:

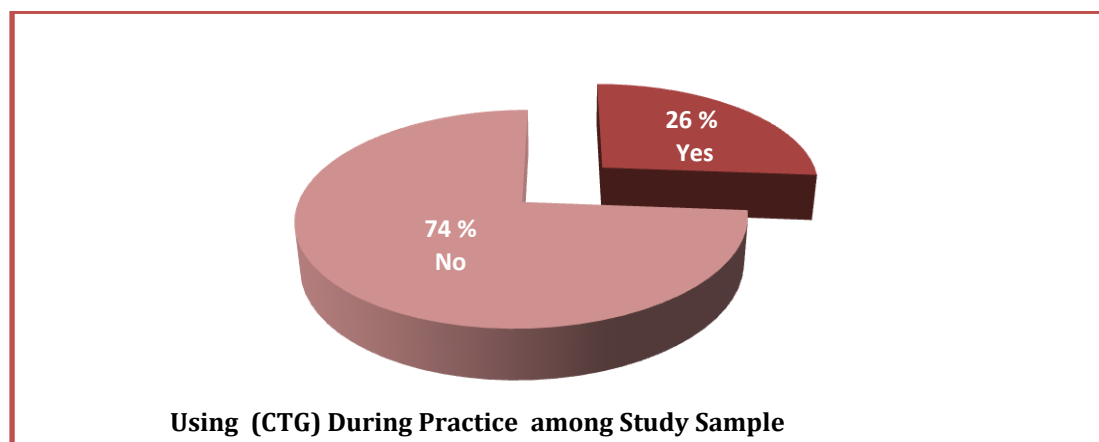
**Table (1): Distribution of Socio-Demographic Characteristic of Study Sample for both Study & Control Groups**

Socio-Demographic Variables	Study group (n=65)		Control group (n=65)		$\chi^2$	df	P-value	C.S .
	No.	%	No.	%				
<i>Age/years</i>					38.92	6	0.33	NS
20-24	12	18.4	16	<b>24.6</b>				
25-29	14	<b>21.6</b>	11	17.0				
30-34	10	15.5	9	13.8				
35-39	12	18.4	6	9.2				
40-44	7	10.6	12	18.5				
45-49	6	9.2	3	<b>4.6</b>				
50 >	4	<b>6.3</b>	8	12.2				
$\bar{x} \pm SD$	33.32 $\pm$ 9.01		34.57 $\pm$ 11.04					
<b>Social Status</b>								
Married	38	<b>58.5</b>	27	<b>41.5</b>	1.619	3	0.99	NS
Single	19	29.2	26	40.0				
Widow	2	3.1	7	10.8				
Divorced	6	9.2	5	7.7				
<b>Level of Education</b>								
Nursing school graduated	5	7.7	9	13.8	21.62	4	0.65	NS
Nursing secondary school	25	<b>38.5</b>	26	<b>40.0</b>				
Midwifery secondary school	20	30.8	17	26.2				

technical medical institute nursing& midwifery	10	15.3	10	15.4				
College of nursing	5	7.7	3	4.6				
<b>Midwifery Experience / Years</b>								
Non	23	35.4	26	40.0	11.373	5	0.936	NS
Less than 1 year	12	18.5	13	20.0				
1-5 years	21	<b>32.5</b>	14	<b>21.6</b>				
6 -10 years	8	12.3	8	12.3				
11-15 years	1	1.5	2	3.1				
16 & above	0	0	2	3.0				
$\bar{x} \pm SD$	2.29 $\pm$ 2.98		3.42 $\pm$ 5.89					
<b>Years of Practice in the obstetric units</b>								
Non	7	10.8	10	15.4	33.59	5	0.117	NS
Less than 1 year	13	20.0	10	15.4				
1-5 years	32	<b>49.3</b>	26	<b>40.0</b>				
6 -10 years	8	12.2	13	20.0				
11-15 years	1	1.5	2	3.1				
16 years & above	4	6.0	4	6.1				
$\bar{x} \pm SD$	5.35 $\pm$ 5.83		4.77 $\pm$ 5.19					

% =Percentages, SD = Standard Deviation,  $\chi^2$  = Chi Square, df = degree of freedom, C.S. = Comparison Significant, NS = Non-Significant.

**Table (1)** shows that the highest percentage (21.6%) of nurses - midwives in the study group were (25-29) years old, while in the control group (24.6%) of nurses – midwives were (20-24) years of old. The highest percentages (58.5%) (41.5%) respectively for both study and control groups of nurse- midwives were married statuses. The highest percentages (38.5%)(40%) respectively for both study and control groups were graduated from nurses- midwivesschool. that the highest percentage nurses- midwives(41.5 %)(40%) respectively for both study and control groups were have nursing experience (1-5) years.The highest percentages (32.5) (21.6%)The nurses - midwives respectively for both study and control groups have (1-5) yearsexperience midwifery.The highest percentage (49.3%)(40%) nurses – midwives respectively for both study and control groups have(1-5) years in the obstetric unit .



**Figure (1) Illustration Using (CTG) during Practice among Study Group**

It shows the highest percentage (74%) of the nurses- midwives in the study group no using (CTG) during practice in the unit, while the lowest percentage (26%) of the nurses- midwives in the study group using (CTG) during practice in the unit.

**Table (2): Comparison Significant between the Study and Control Group Related Nurse –Midwives' Practices at a Post Test**

Domains	Post Control group n=65	Post Study group n=65	Asymp. Sig		C.S.
	MS	MS	Z	(2-tailed)	
<i>Supplies equipment required</i>	1.68	2.73	-9.53	0.00	HS
<i>Prepare the device</i>	1.62	2.54	-8.38	0.00	HS
<i>Readiness and prepare pregnantwomen</i>	1.62	2.54	-8.38	0.00	HS
<i>Assess the health status of pregnant women &amp;her fetus</i>	1.61	2.49	-8.22	0.00	HS
<i>Procedures and preparation</i>	1.76	2.62	-7.95	0.00	HS
<i>CTG features</i>	1.76	2.62	-8.02	0.00	HS
<i>Interpretation of the pattern classification (FHR)</i>	1.64	2.65	-9.92	0.00	HS
<i>Interpretation is stress test NST</i>	1.66	2.64	-9.68	0.00	HS
<i>Nursing care responsibility in absent FHR Acceleration</i>	1.75	2.61	-7.52	0.00	HS
<i>Documentation nursing</i>	1.68	2.74	-10.20	0.00	HS

% = Percentage, M.S. = Mean score, Z = Z test, C.S. = Comparison Significant, HS = High Significant at P ≤ 0.05

This table shows that there were high significance between posttest for both study & control groups regarding all nurse- midwives practice. Shows that there were low means in most items related to posttest (control group) practice of nurse – midwives. While there were high mean scores in all items in posttest (study group) after the implementation of the educational program with high statistical significant.

**Table(3): Effectiveness an Educational Program Concerning Cardiotocography on Nurses-Midwives' Practices of the Study Group at (Pre, Post-1 and Post-2 Periods)**

Domains	Periods	No.	Grand MS	RS	Matched Paired	P-value	C.S .
Overall Domain to Practice checklist	Pre	65	1.61	54	Pre X Post-1	0.000	HS
	Post-1	65	2.63	88	Pre X Post-2	0.000	HS
	Post-2	65	2.72	91	Post-1 X Post-2	0.000	HS

Grand M.S. = Grand Mean score, R.S = Relative Sufficiency, C.S. = Comparison Significant, HS = High Significant at P ≤ 0.05

The findings indicate that the three matching concerning to the Cardiotocography on Nurses -Midwives'practices of the study group show that there a highly significant differences obtained for three matching (pre-post1,pre-post2 and post1- post2) for all domains.

**Table (4): Relative Sufficiency and Improvement Percentages for Study Group of Main Domain Related Practices of Study Group at (Pre - Post-2 Periods )**

Domains	Periods	No.	R.S	Ass.	Imp%
Overall Domain to Practice checklist	Pre	65	54	Under	55.5
	Post-2	65	91	Upper	

Imp.:Improvement= $(M_{post}-M_{pre})/2*100$ , R.S = Relative Sufficiency, Ass: Assessment

This table shows that practices of nurse-midwives improvement by different periods for overall domains (55.5%) after the implementation of educational program.

**Table (5): Relationship between Demographical Characteristic and Related Variable Distributions for overall Main Domains Regarding to Nurses-Midwives' Practice both Study & Control Groups**

Variables	Overall Domains Related Practice							
	Study Group				Control Group			
Independent	R	F	Sig.	C.S.	R	F	Sig.	C.S.
<i>Age</i>	0.28	2.63	0.80	NS	0.07	0.16	0.84	NS
<i>Social Status</i>	0.24	2.00	0.14	NS	0.26	2.24	0.11	NS
<i>Educational level</i>	0.29	3.01	0.056	S	0.24	1.90	0.15	NS
<i>Years of Experiences</i>	0.30	3.16	0.049	S	0.07	0.17	0.84	NS
<i>Nursing Experience years</i>	0.35	4.43	0.016	S	0.14	1.65	0.52	NS
<i>Midwifery's Experience Years</i>	0.13	1.61	0.54	NS	0.12	0.52	0.59	NS
<i>Years of Practice in the obstetric units</i>	0.32	3.65	0.032	S	0.14	0.65	0.52	NS
<i>Do you have knowledge of (CTG)</i>	0.08	0.21	0.80	NS	0.22	0.13	0.87	NS
<i>Are you using (CTG) during practice in the unit</i>	0.12	0.46	0.63	NS	0.22	1.16	0.20	NS
<i>Are you participated in training courses for(CTG)</i>	0.08	0.23	0.79	NS	0.19	1.23	0.29	NS
<i>Duration training The time period of the course</i>	0.20	1.38	0.25	NS	0.17	0.98	0.37	NS

R: Correlation, F: F test, C.S. = Comparison Significant, NS = Non Significant at  $P \leq 0.05$

**Table(5)** reveals that educational level, years of experience, Nursing Experience years , Years of Practice in the obstetric units was significant in relation with their knowledge and practices in study group. For control group there is no significant in job Title in relation with practices in control group. Demographical characteristic when analyzed by using Simple Linear regression.



**Discussion:**

Regarding age years this study revealed that the highest percentage (21.6%) of nurses- midwives in the study group were ranged between (25-29) years old. while in the control group(24.6%) of nurses- midwives were ranged between (20-24) years old. WHO reported that the age of nurses - midwives will take a minimum of 25 years in places to have skilled care<sup>(10)</sup>. In china was conducted that all participants were age between 24-32 years<sup>(11)</sup>.

Regarding level of education the highest percentages (38.5%) (40%) for both study and control groups respectively were secondary nursing school graduated .This study in agreement with the study employed by Thamer who reported that highest percentage 40.4% has been secondary nursing school graduated, <sup>(12)</sup>. WHO reported that the highest percentage of nurses - midwives education (52.9%) were secondary graduates <sup>(13)</sup>.

Regarding midwifery experience the highest percentages (32.5) (21.6%) nurses - midwives respectively for both study and control groups were have (1-5) years experience midwifery. and the mean with standard deviation (SD) of midwifery experience years for both groups were (2.29 ± 2.98),( 3.42 ± 5.89 ). This study is in agreement with Ertem who reported that (27.8%) of nurses-midwives have worked for less than 5 years<sup>(14)</sup>. Result of the present study is consistent with Rashied have midwifery experiences for (1-5) years<sup>(15)</sup>. It was reported that (32%) of midwives spent experience between (1-5) years in maternity unit <sup>(16)</sup>.

Regarding practices in the obstetric units the result of current study shows that The highest percentage nurses – midwives (49.3%) (40%) respectively for both study and control groups have(1-5) years in the obstetric unit and the mean with standard deviation (SD) of years of practice in the obstetric units for both groups were (5.35 ± 5.83 ) (4.77 ± 5.19 ) respectively this result agree with moosa' who reported that the (57.1) of them have employ between (1-3)years in obstetric unit <sup>(17)</sup>. It was determined that (58.9) of nurses-

midwives are working in obstetrics unit<sup>(18)</sup>. It was stated that it is important for new midwives to have the opportunity to work at maternity unit where they supported by an experienced colleague<sup>(19)</sup>. It was stated that half of midwives were working in labor and delivery units<sup>(20)</sup>. Regarding using (CTG) during practice current study revealed that the highest percentage (74%) of the nurses- midwives in the study group did not practice using (CTG) while the lowest percentage (26%) the nurses - midwives in the study group was using (CTG) during practice in their unit. Result of present study is consistent with a study which is demonstrated that CTG technology continues to have a role in monitoring and detecting abnormalities in the fetal heart rate but this role of midwives is limited by how well the CTG is used during practices<sup>(21)</sup>. It was reported that CTG one of techniques used to assess fetal wellbeing and confirmed that nurse- midwives did not have practices on it due to lack of teaching programs will lead to have poor in performance used CTG tracings<sup>(20)</sup>.

**Effectiveness of education program between study and control group on nurses-midwives' Practice concerning cardiocography at posttest.**

Data obtained as result of observation of practice there were high significance between posttest for both study & control groups regarding all nurses-midwives' practices. It also shows that there were low means in most items related to post test(control group) practice of nurses-midwives ,while there were high mean scores in all items in post-test(study group) after the implementation of an educational program with high statistical significant. It was also reported a practice change following an interactive education intervention<sup>(22)</sup>. The delivery of the interactive education intervention did not result in a statistically significant change in the nurses use of guideline (fetal monitoring) appropriate care (Time 2 and Time 3) during an episode of care<sup>(23)</sup>. This finding is inconsistent with the work of authors who showed that interactive education

sessions can be effective<sup>(24,26)</sup>. Other findings in studies that the participant reported changes in their clinical practice following educational session or action learning as implementation strategies<sup>(25,26,27)</sup>. It was reported that among the various education intervention approaches, interactive education was an effective intervention for practice change to nurses position<sup>(26)</sup>.

#### **Main domain related to practice improvement**

Result for the three matching concerning to the Cardiotocography on Nurses -Midwives' practices of the study group show that there a highly significant differences obtained for three matching (pre-post1, pre-post2 and post1- post2) for all domains the scoring of the assessment of nurses-midwives practices improvement by different periods for overall domains after the implement of educational program this finding agree with the study of an exploratory descriptive study was conducted to examine midwives' and doctors' attitude towards the use of the CTG machine in labour ward practice in maternity unit in Northern Ireland, to the use of CTG machines. The majority of the respondents (60.0%,  $n=24$ ) felt that their training adequately prepared them for using CTG. The study revealed a number of professional needs and concerns relating to CTG usage. The study concluded that there is a need to improve confidence levels in using type of fetal monitoring<sup>(28)</sup>. A knowledge translation intervention, in the form of an evidence-based informed decision-making frame work for intelligent structured inter- mittent auscultation (CTG) and a comprehensive educational intervention were developed to enhance midwives' knowledge and awareness of intermittent auscultation and to influence decision-making and practice for FH monitoring for low-risk women. While auscultation and palpation are essential midwifery skills, the teaching of CTG does not go beyond simply outlining the protocol for frequency, duration and timing and less is

understood about the underlying physiology associated with what is heard and the reassurance of fetal wellbeing that this hold that practical training improves learning and increase self- confidence among nurse - midwives<sup>(29, 30)</sup>. It was claimed that practical skill training can contributed to improved maternal and neonatal outcome<sup>(31)</sup>.

#### **Relative sufficiency and improvement percents For study group of main Domains related to practice in pre-post2.**

The finding indicated that the scoring of the assessment of nurses- midwives practices improvement by different periods for overall domains after the implement of educational program. (55.5%) improvement in their practice concerning overall domain to Practice checklist, unexpectedly found that inservicing was ranked highly, that is, as an effective practice change intervention, by participants<sup>(32)</sup>. So can be said that educational meetings which include courses, conferences, lectures, workshops, seminars, and symposia can have more effect on improving professional practice and healthcare outcomes. however, interactive educational strategies such as small-scale interactive meetings and workshops appear to be more successful in changing practice<sup>(33)</sup>.

Towards the use of CTG machines with respondents indicating that they viewed CTG technology The majority of the respondents (60.0%, )felt that their training adequately prepared them for using CTGs. The study revealed a number of professional needs and concerns relating to CTG usage. The study concluded that there is a need to improve confidence levels in using alternatives to this type of fetal monitoring<sup>(34)</sup>.

#### **Relationship between nurses-midwives' practices with demographic characteristics**

The correlation reported that the significant of the Nurse-midwives practices had relationship with their socio-demographical characteristics in the overall assessments of knowledge and practices program in multiple



periods, in (Educational level, Years of Experiences, Nursing Experience years, Years of Practice in the obstetric units) Regarding Educational level who reported that highest percentage 40.4% has been secondary nursing school graduated<sup>(35)</sup>. It was reported majority of midwives had their professional educational qualification up general nursing and midwifery<sup>(20)</sup>. Regarding Years of Experiences stated that there was significant between the nurses who employment in the hospital for a long period and their experience in hospital and improvement in the practice .regarding Nursing Experience years<sup>(36)</sup>, Stated that they midwives confident in their abilities to use CTG and read fetal monitor tracings(CTG) after 2-3 years of experience parallels theory that approximately 2-3 years is needed to master particular clinical skills and to understand the long-term implications of assessments and actions<sup>(37)</sup>. Regarding Years of Practice in the obstetric units. It was reported that obstetric units have become larger with patients being knowledgeable and demanding also, established team works at maternity words require that midwives are experiences practices and security in their role<sup>(38)</sup>. It was reported that the area of responsibility for midwives includes a great deal of collaboration with doctors and assistant nurses resulting in joint decision-making<sup>(39)</sup>.

#### **Recommendations.**

1. In-services training program should be applied for nurses- midwives at the maternity hospital.
2. Standardized protocols for Procedure involved emergency obstetric including CTG, should be developed for legal protection of nurses - midwives during their clinical practices.
3. Establish library with recent scientific books and magazines in an
4. Encourage nurse-midwives using internet & self learning approach regarding CTG.
5. Encourage nurses- midwives to attend workshops, conferences, training programs and review update nursing care related to CTG.

6. Future research should also take women's' contributions into consideration and focus on women outcomes

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