



Effect of an Instructional Package on Nurses' Knowledge and Practice Regarding Uterotonic Drugs Administration

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Abstract:

Background: Uterotonic medications are dangerous pharmacological classes that require careful observation to assess labor progress and prevent negative effects on the mother and fetus. **The aim of the study:** was to assess the effect of an instructional package on nurses' knowledge and practice regarding uterotonic drugs administration. **Research Design:** A Quasi-experimental design (pre-posttest) study design was utilized. **Setting:** The study was carried out in the labor unit of the maternity hospital at Zagazig University Hospital, Sharqia Governorate, Egypt. **Sample:** All available nurses (20 nurses) were included. **Tools:** Tool I: A structured interview schedule which included two parts; Staff nurses' socio-demographic characteristics and assessment of nurses' knowledge regarding uterotonic drugs. Tool II: Observational checklist for nurses' practice regarding uterotonic drugs administration. **Results:** The results revealed a significantly positive improvement in nurses' knowledge and their practice. **Conclusion:** The implementation of the instructional package about uterotonic drugs administration can improve the maternity nurses' knowledge and practice. **Recommendations:** Planning an in-service training program for all staff nurses to update, improve and refresh their knowledge and their practices depending on the recent evidence-based guidelines during labor.

Keywords: Instructional package, Uterotonic drugs, Nurses' knowledge, practice, Labor outcome.

Introduction:

The earth is filled with amazing things that God made. The birth process is the most amazing of all these amazing things (Thorneloe et al., 2019). For any mother, giving birth is an incredibly memorable event. A series of events known as labor and/or delivery culminate in the birth of the fetus and pregnancy material. Therefore, it occurs when the fetus and pregnancy content are expelled from the uterus by uterine contractions along with abdominal pressure. In order to gently



push the baby out of the womb and into the extrauterine world, regular uterine contractions cause the cervix to dilate by 10 cm and provide enough uterine muscle force (Begley et al., 2019).

Since labor is both a beginning and an end, it is a time of transition for the mother, her fetus, and her family (Organization, 2018). It is using fetal and maternal hormones as cues to contract and relax the uterine muscles. For instance, in addition to oxytocin, prostaglandins are a sort of signal (Gallos et al., 2018).

According to Natarajan et al. (2016), induction of labor is the process of stimulating uterine contractions during pregnancy before the labor starts on its own to achieve a vaginal birth. The technique of stimulating the uterine muscles to increase the frequency, intensity, and length of contractions once spontaneous labor has started is called "augmentation of labor" (Bulndi et al., 2017). When uterine contractions are considered an underlying cause of labor delay, this has been used often to treat the condition. Traditional techniques for inducing and augmenting labor include the use of uterotonic medications (such as intravenous oxytocin infusion or the administration of prostaglandins (PGs)) or amniotomy, which is the artificial (manual) rupture of the amniotic membranes (Thamer and Jasim, 2022).

In medicine, uterotonics are used to induce contractions during labor induction or augmentation, and they are also used to treat postpartum hemorrhage (PPHg) chemically. Pharmacological medications called uterotonics, or ecboolics, cause the uterus to contract and become more tonic (Zielinski et al., 2016).

Drugs of various chemical types that have the ability to stimulate the contractions of the uterine muscles are known as uterotonics. The most significant of these numerous uterotonics (such as oxytocin, prostaglandins, and ergot derivatives) is oxytocin, which is widely utilized in clinical settings (Ibrahim and Hassan, 2022).

One medication that is frequently used both during and after labor is synthetic oxytocin. Because of this, medical professionals should be aware of its harmful effects and mode of action (Thamer and Jasim, 2022). Due to the increased risks and/or difficulties associated with these operations, only highly qualified healthcare professionals should perform labor induction or augmentation in facilities where emergency obstetric care is accessible (Thorneloe et al., 2019).

The administration of uterotonics, particularly at large dosages, may cause fetal heart rate (FHR) anomalies and uterine tachysystole, which could be harmful to both the mother and her fetus (Vaz et al., 2021). This is because during uterine



contractions, the blood supply that supplies nourishment to the intervillous area is reduced or interrupted. One of the essential medications that needs to be closely watched and monitored at all times to prevent serious side effects including fetal respiratory crises and/or uterine rupture is oxytocin. In order to evaluate the course of labor and identify any early warning signs of induction failure, it also requires careful observation (Sukumaran et al., 2021).

In order to plan and carry out an efficient nursing process, maternity nurses should be sufficiently knowledgeable about the indications, mechanism of action, and any negative effects that the uterotonic medications may have on the mother and/or fetus, as well as all nursing considerations that are related to each of them (Pandit et al., 2016). Maternity nurses are acknowledged as responsible and accountable professionals who collaborate with expectant mothers to provide necessary care, support, and guidance during pregnancy, labor, and the postpartum phase (Mohamed et al., 2019).

Significance of the study:

As essential members of the health team, maternity nurses have a big responsibility to encourage adherence to protocols before, during, and after uterotonic medication administration. This is because these medications can affect not only the mother but also the fetus during pregnancy and labor, as well as the infant in the first few days of life. They also play a crucial role in taking on the duty of managing the obstetric and gynecological care that low-risk women require through evaluation, observation, appropriate interventions, and prompt reporting of any abnormalities to the doctor in order to provide the best possible obstetric care.

Therefore, lowering nurses' mistakes when administering uterotonics will help to preserve the lives of the mother and the fetus. Maternity nurses must be fully informed about the indications, actions, and side effects of these medications, as well as the nursing considerations related to each one, in order to create and carry out an effective nursing process. According to research conducted in Egypt to evaluate nurses' knowledge and practices related uterotonic medicines, 44% of the nurses in the study had inadequate knowledge, and 60% had unacceptable practice (**Mohamed et al., 2019; Mohamed et al., 2022; Ibrahim and Hassan, 2022**). Regretfully, little research was done to assess how nurses' knowledge and behaviors were affected by the instructional guidelines for administering uterotonic medicines.



Aim of the present study:

Assess the effect of an instructional package on nurses' knowledge and practice regarding uterotonic drugs administration. This was achieved through the following objectives:

1. Determine the staff nurses' knowledge and practice regarding uterotonic drugs administration.
2. Design and implement an instructional package regarding uterotonic drugs administration.

Hypothesis: It was predicted that after an instructional package on the administration of uterotonic medicines was implemented, nurses' knowledge and practice would increase.

Subjects and methods:

Study design: A quasi-experimental design was used in the present study.

Study setting: The study was conducted in the maternity hospital at Zagazig University Hospital, Sharkia Governorate, Egypt.

Study subjects: Nurses: All nurses provided direct nursing care for women during labor in the above-mentioned setting. They were 20 nurses at different age and years of experience as well as, different qualifications.

Inclusion criteria:

1. Staff nurses who are working in maternity ward.
2. Staff nurses who are willing to participate in the study.
3. Staff nurses who are available at the time of study.

Exclusion criteria:

1. Staff nurse work in maternity ward who are not ready to consent in the study.
2. Staff nurses work in maternity ward that are not available during study period.
3. Staff nurses who had the qualification of ANM or multipurpose workers.

Tools of data collection:

The data collection tools for this study were composed of three tools:

Tool (I): A structured interview schedule: Following a thorough examination of pertinent national and international literature, the researcher created and



employed a specially designed structured interview schedule to gather basic data about the study respondents (Lohani, 2020; Shiny, 2017; Mohammed et al., 2022). It consisted of the two sections listed below:

Part 1: Sociodemographic Features of Staff Nurses: This section was used to gather information about the general characteristics of staff nurses, including age, marital status, education, occupation, years of experience in the labor unit, and prior training on how to care for women when administering uterotonic drugs, among other things.

Part (2): Evaluation of Staff Nurses' Knowledge of Uterotonic medications: The researcher created this instrument to evaluate staff nurses' knowledge of administering uterotonic medications after studying recent relevant literature.

The following subjects were covered in the thirty-eight general knowledge questions: medications for uterotonics (types, mechanism of action, storage temperature, administration routes, indications, contraindications, drip control, and adverse effects); labor definition, stages, and management; and labor induction and augmentation. Furthermore, nursing care and precautions taken prior to the administration of uterotonics, nursing interventions and observations made during administration, and the frequency, length, and strength of uterine contractions to be attained are all important considerations. Additionally, the antidote for various uterotonic drug kinds, indications for discontinuing the infusion, indicators of uterine rupture, signals of maternal and fetal distress, signs of uterine hyper-stimulation, and nursing measures following uterotonics administration.

A correct response received a score of 1, and a wrong or no response received a score of 0. a summary of every query, containing information. An average level of knowledge is indicated when each aspect's overall score is between 60 and 75 percent. Furthermore, a low degree of understanding is indicated by a total score of less than 50% for each component.

Tool II: A checklist for nurses' practice observation: The researchers used their prior experience with the nurses in a clinical context and their knowledge of nursing reviews to conduct a clinical observational checklist. It was carried out by watching nurses before, during, and after providing care for women, commencing with the administration of uterotonic medicines, handling emergency situations, and, lastly, documenting the process.

The observational check-list was scored using a system that assigned a score of one for completed steps and a score of zero for unfinished ones. A higher level of practice was reflected by the higher scores. Poor (less than 50%), average



(60–75%), and good (more than 75%) are the classifications for those scores. **Tool III: Intervention program:**

The researcher created and verified a self-learning booklet, which was then given to nurses as a self-learning guide to improve their understanding and skills about the administration of oxytocin during labor.

Validity and reliability

A panel of five obstetrics and gynecological nursing experts established it for face and content validity. They revised the tools for clarity, relevance, applicability, comprehensiveness, understanding, and ease of implementation, and they made minor adjustments based on their assessment. The Cronbach's Alpha Coefficient Test was used to assess reliability, and the results showed that all of the tools' components were comparatively uniform.

Field of the work:

Following official approval, the study tools' pilot testing and analysis were completed. The investigator began gathering data three days a week.

The 16-week program was divided into three sections. In order to assure proper supervision, facilitate the learning process, and enable all nurses to engage in the conversation, each session had a maximum of five nurses.

Nurses attended sessions either in the morning or in the afternoon. The meeting began at 11 a.m. and ended at 1 p.m. or 12 p.m. and ended at 2 p.m. After the nurses had finished their work, it was the best moment for them. Each session lasted between thirty and sixty minutes.

In order to assess nurses' current level of knowledge and practices regarding the administration of oxytocin during labor (the first one to two weeks), a pretest self-administered questionnaire was created and given to them after they had received program orientation. Talk about the phases, physiology, and management of normal labor (3–4 weeks).

oxytocin administration, augmentation of labor, action, method of administration, fetal and maternal side effects, contraindications, and the role of the nurse during oxytocin administration (5–6 weeks).

procedures for administering uterotonic medications during labor, as well as evaluation of the mother and fetus (7-8 weeks)

Continue evaluating the woman and newborn (fourth stage of labor) nine to ten weeks following delivery. Two weeks have been spent on revision.



Pilot Study:

Ten percent of the overall sample, consisting of both women and staff nurses, participated in a pilot study. The total sample size does not include those. It was done to test the study tools for clarity and feasibility, to gauge the amount of time needed to complete the study, to gauge the level of staff nurses' comprehension of the questionnaire and willingness to participate, to identify potential issues and roadblocks that could arise and impede data collection, and to estimate the amount of time needed for data collection. Based on the findings of the pilot research, all necessary changes were made by adding or removing some questions and making some of the questions' typing clearer and easier, such as by rewriting some lines.

Ethical considerations:

After outlining the goal of the study, a formal letter from Zagazig University's Faculty of Nursing was sent to the appropriate authorities to request their approval to carry it out. The study was conducted with official approval from the director of Zagazig University Hospitals, the head of the nursing department responsible for women's health and midwifery, and the ethical committee of the nursing faculty. Every nurse and parturient woman was given an explanation of the study's purpose, nature, advantages, and disadvantages. Participation in the study was agreed upon orally. Participants were guaranteed privacy, anonymity, and the freedom to withdraw from the study at any time for any reason. anonymity was maintained during the whole investigation, and the findings were only used for publication and educational purposes.

Statistical analysis:

IBM Corp. was used to gather, tabulate, and statistically analyze all of the data. published in 2015. Version 23.0 of IBM SPSS Statistics for Windows. NY: IBM Corp., Armonk. Qualitative data were presented as and (percentage), whereas quantitative data were presented as mean \pm SD and median (range). Pairs of normally distributed variables were compared using the paired t test. Ordinal variable pairs were compared using the marginal homogeneity test. Pairs of category variables were compared using the McNemar test. The Fisher exact test or the Chi-square test were used to compare the percentage of categorical variables. To evaluate the link between the different research variables, the Spearman's correlation coefficient was computed. A value close to 1 indicates strong correlation, a value close to 0 indicates weak correlation, and a (+) sign indicates direct correlation and a (-) sign indicates inverse correlation. Every test



was two-sided, and a p-value of less than 0.05 was regarded as statistically significant, while a p-value of more than 0.05 was regarded as statistically insignificant. The link between the dependent variable and one or more independent variables was determined using logistic regression.

Effect size $d = \frac{\mu_1 - \mu_2}{Sd}$ difference represents the difference between paired means of the population of interest. (SD) the standard deviation of the paired differences

Cohen (1988) proposed the following interpretation of the d values. A d near 0.2 is a small effect, d near 0.5 is a medium effect, and d near 0.8 is a large effect.

Results:

Table (1): Frequency and percentage distribution of the Studied nurses according to personal parameters (n.=20):

Variables		Number	Percent
Age / years:	21-30	2	10
	31-40	2	10
	41-50	11	55.0
	≥50	5	25.0
Mean ± Stand. = 42.8 ± 5.25			
Gender nurse:	Female	20	100.0
Marital status:	Unmarried	0	0
	Married	16	80.0
	Widowed	4	20.0
	divorced	0	0
Residence:	Rural	8	40.0
	Urban	12	60.0

Table 1 presents frequency and percentage distribution of the studied nurses according to personal parameters. It illustrates that about (55.0%) of of studied nurses were in age group 41-50 years with a mean of age 42.8 ± 5 years. Regarding studied nurses' residence, the same table indicates that more than half (60 %) of them lived in urban areas. Furthermore, the majority of them (80.0 %) were married.



Table (2): Comparison of uterotonic drugs administration nurses' knowledge level pre and post intervention program:

Item	Study phase				eta	t-test	P-value
	pre intervention		post intervention				
	No.	%	No.	%			
Nurses' knowledge regarding uterotonic drugs							
satisfactory	1	5.0	18	93.0	0.74	7.281	0.0001 *
unsatisfactory	19	95.0	2	7.0			
Mean ±SD median (range)	21.1±7.03 17.5(12-39)		36.5±7.1 39(18-43)				

t: paired t test, p<0.05 statistically significant.

Table 2 shows comparison of uterotonic drugs administration nurses' knowledge level pre and post intervention program which illustrate that the program increased knowledge scores of nurses by 74%. These differences were highly statistically significant (P=0.000).

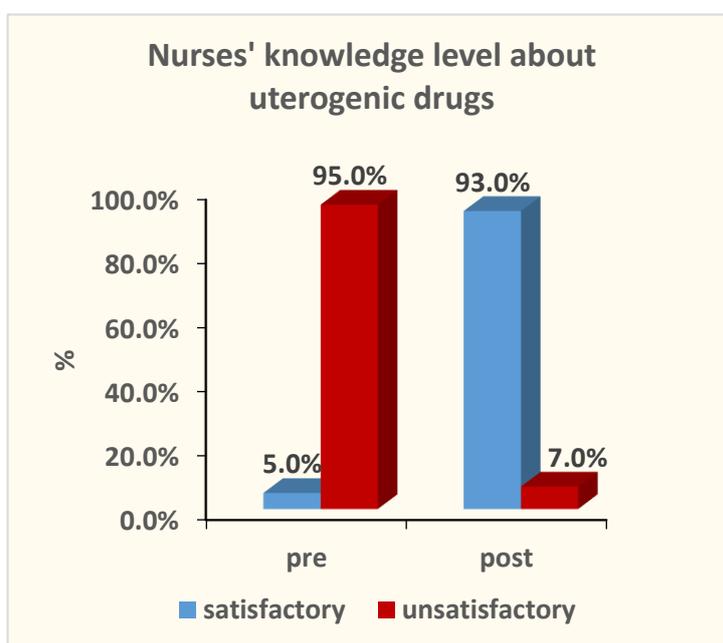


Figure (1): Nurses' knowledge Level pre and post intervention program about Uterotonic Drugs Administration pre and post intervention program.

Figure 1 illustrates that; the majority of the studied nurses (95%) had unsatisfactory previous knowledge about uterotonic drugs administration



pre interventional program. While post interventional program, more than two third (93%) had satisfactory knowledge level.

Table (3): Comparison nurses' total practice Level in Uterotonic Drugs Administration pre and post Intervention program:

Nurses' practice	Study phase				eta	t-test	p-value
	pre intervention		Post intervention				
	No.	%	No.	%			
Nurses practice uterotonic drugs administration:							
Competent	2	10.0	17	85.0	0.9	13.28	0.0001*
Incompetent	18	90.0	3	15.0			
Mean ±SD median (range)	87.6±12.99 85(73-119)		129.6±7.55 131(113-140)				

t: paired t test, p<0.05 statistically significant,

Table 3 illustrates comparison nurses' total practice Level in Uterotonic Drugs administration pre and post Intervention program in which it increased total practice of nurses in uterotonic drugs administration by 90%. It shows highly statistically significant differences (P=0.000).

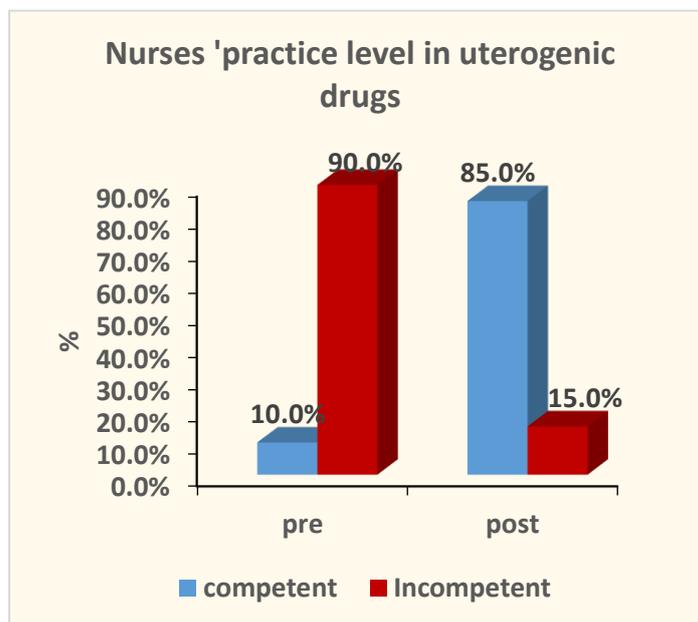


Figure (2): Nurses' practice level pre and post intervention program about Uterotonic Drugs Administration

Figure 2 reflects an improvement in nurses practice' level regarding Uterotonic Drugs Administration at post intervention (85%) were competent respectively compared to pre intervention (10%) were incompetent.



Discussion:

Not only is childbirth a life-altering experience, but it is also one of the most significant events for the family. Therefore, the care that is provided to the woman may have both immediate and long-term medical and emotional effects on the mother and her child. A sequence of slow, progressive occurrences occurs during the transition from pregnancy to labor. As the last stage of pregnancy, labor has social, emotional, and psychological ramifications for the mother and her family. It is possible to employ uterotonic medications to either induce or enhance labor. The procedure of artificially inducing labor involves stimulating the uterus.

In order to provide uterotonic drugs, nurses must constantly improve their knowledge and comprehend the norms that govern their practice. Thus, the purpose of this study was to assess how the instructional package on the administration of uterotonic medicines affected nurses' knowledge and practice.

Based on the sociodemographic features of the nurses under investigation, the current study's findings indicated that the nurses' ages ranged from 41 to 50 years old, with a mean age of 42.8 ± 5.25 years. According to a study by Mohammed et al. (2022) on the impact of instructional guidelines on the administration of uterotonic drugs on nurses' performance and labor outcomes, the majority of the nurses in the study were between the ages of 40 and 50, with an average age of 41.65 ± 8.25 .

According to a study by Ibrahim and Hassan (2022) on the effects of educational programs on maternity nurses' knowledge and behaviors regarding the administration of oxytocin during labor, the majority of the nurses in the study were under 25 years old, with a mean age of 26.0 ± 2.81 years. This might be explained by the varying sample ages in the various research. Furthermore, a study conducted at Al-Kut City hospitals on the assessment of nurses' and midwives' knowledge of nursing measures for the use of utero-tonic drugs (Thamer and Jasim, 2022a) revealed that around half of the study sample was in the 20–24 age range. The same findings were reported in the study (Thamer and Jasim, 2022b) on the effectiveness of an educational program on nurses' and midwives' knowledge of nursing measures for uterotonic drug usage in Al Kut City Hospitals. More and more nurses were under 25 years old, with a mean age of 25.2 ± 5.8 , according to a 2019 study by Mohamed et al. on the Effect of Educational Program on Improving Nursing Knowledge and Practice Regarding Administration of Oxytocin during Labor. Since my study focused on the labor



unit of Zagazig University hospital nurses while other studies were conducted on multiple hospitals, this could be because the sample age groups differed.

According to the total score level of the nurses' knowledge about uterotonic drug administration, the majority of the nurses in the study had good knowledge of the subject right after the program was put into place, with a highly statistically significant difference from the minority who had a satisfactory level of knowledge before the guidelines were put into place. The results of this study were in line with those of (Thamer and Jasim, 2022b), which discovered significant differences in nurses' and midwives' knowledge regarding the pre-test and post-test between the study and control groups. This study examined the impact of an educational program on nurses' and midwives' knowledge regarding nursing measures for the use of uterotonic drugs in Al-Kut City hospitals.

The impact of a self-instructional module on staff nurses' understanding of the maternal and newborn outcomes of induction of labor in a particular hospital in Bangalore, India, is the subject of additional research (Shrestha, 2017). A study by Manu et al. (2021) in India titled A Study to Assess the Effectiveness of Planned Teaching Programme on Knowledge Regarding Oxytocin Drug Administration among Midwives in Selected Hospital of Kanpur also supported this. Determining the impact of a planned educational program on midwives' understanding of oxytocin medication delivery was the aim of the study. The study also made clear that the midwives' total knowledge score on the oxytocin medicine significantly improved after the teaching program was put into place.

Similar findings were also obtained in The Effect of Demonstration on Knowledge & Practices Regarding Selected Obstetric Drugs Among Nurses Working in Labor Rooms in Urban Area (Pandit et al., 2022). In Maharashtra, they carried out a study to look at the demographics of nurses and assess how demonstration affected their understanding and usage of specific obstetric drugs. According to their findings, the majority of the nurses in the study demonstrated appropriate knowledge in the posttest, although less than a tenth of them did so in the pretest. Every previous study shows how important and crucial educational programs are in assisting maternity nurses in remembering the essential knowledge needed for their work.

There have also been studies that demonstrate the low level of knowledge among maternity nurses, such as Sengab et al. (2020) and Shiny (2017). Sengab et al.'s study, "Nurses' Knowledge and Practices Regarding Oxytocin Infusion Care for Women during Labor," evaluated nurses' knowledge and practice of oxytocin infusion treatment for women in labor. Shiny's study, "Assessment of



the Knowledge and Practice on Use of Oxytocin," examined oxytocin knowledge and practice, and linked oxytocin knowledge and practice. This demonstrates the value of offering a continuing education program to enhance nurses' understanding of uterotonic medicines, a crucial obstetric medication.

According to the study's current findings, nurses' practice level in administering uterotonic medicines significantly improved following the implementation of a training program. This was in line with research by Pandit et al. (2020) on the impact of demonstration on nurses' knowledge and practices regarding specific obstetric drugs in urban labor rooms and Mohammed et al. (2019) on the impact of educational programs on enhancing nursing knowledge and practice regarding the administration of oxytocin during labor, which found that nurses' practices significantly improved following oxytocin administration training. This highlights the significance of ongoing nursing practice provision to guarantee that nurses follow the proper procedures and give them a guideline protocol.

CONCLUSION

Based on the light of the current study findings, it could be concluded that the studied nurses' knowledge and practice regarding uterotonic drugs administration were deficient at the pre-implantation of instructional package. When compared to pre-implementation results, the research hypothesis was achieved following the implementation of the instructional package regarding the administration of the uterotonic drugs, which led to a statistically significant improvement in the nurses' knowledge and performance. And also, the studied nurses' overall knowledge and practice scores were positively correlated. From researcher observations, the increasing knowledge, the improving the practice. In additional, the overall knowledge and practice scores of the nurses studied were positively correlated.

Recommendation

According to the findings of the present study, the following suggestions are recommended:

- In order to update, enhance, and refresh staff nurses' knowledge and practices regarding the administration of uterotonic medicines in accordance with the most recent evidence-based guidelines during labor, an in-service training program must be planned for all staff nurses.



-Written standard protocols, policies and guidelines of care must be developed to enhance the quality of the nursing care rendered to women during administration of uterotonic drugs.

-Investigation of the barriers to nurses' noncompliance with the guidelines of uterotonic drugs administration.

-Encouraging nurses to update their education by attending workshops and conferences related to uterotonic drugs administration.

Further study needs to be performed:

-More research involving a big number of nurses should be done to examine the same issue in various obstetric health agencies.

-All maternity nurses working in public and private hospitals must be included in the study.

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