Journal homepage www.jzs.univsul.edu.iq
Journal of Zankoy Sulaimani
Part-A- (Pure and Applied Sciences)
ISSN:1812-4100

Nurses' Knowledge and Practices Regarding Oxytocin Administration in the First Stage of Labor in Maternity Teaching Hospital in Sulaimaniyah City

Gona Othman Faris[1*]

[1] *Maternal Neonate Nursing Department, College of Nursing, University of Sulaimani, Sulaimaniyah, Kurdistan Region, Iraq*
**Corresponding author's e-mail: gona.faris@univsul.edu.iq*

Article info

Original: 12/04/2022
Revised:07/05/2022
Accepted: 09/05/2022
Published online: 20/12/2022

***Keywords**:*
Assessment, Oxytocin administration, Nurses, Knowledge and practice

Abstract

Background: Oxytocic refers to a group of drugs that cause contraction of uterine muscles, resulting in the delivery of the placenta or fetus. As an oxytocic agent, oxytocin is a serious and significant medication that is broadly utilized in clinical practice to help with the initiation and continuation of labor. Failure to use oxytocin properly can lead to serious adverse impacts on both mother and baby; therefore, health professionals need to pay close attention during its administration. ***Materials and methods:*** Through a descriptive analytical study conducted at the labor and delivery unit in Maternity Teaching Hospital in Sulaimani city, the nurses' knowledge and practice regarding oxytocin administration during the 1st stage of labor were assessed. A convenient sampling method was employed to all (70) nurses working in the labor room from 5th January to 20th February 2022. Data collection was carried out through 3 tools, including a structured interview questionnaire which was aimed at gathering the nurses' general characteristics, a nurses' knowledge questionnaire, and an observational checklist to assess the nurses' practices regarding oxytocin administration. Statistical Package for the Social Sciences version (version 22.0) was used to analyze the collected data. ***Results:*** The results indicated that the nurses' level of knowledge and oxytocin administration practice was below average in 60.0% and 45.7% of them, respectively. It was also seen that the knowledge and practice were poor in half of the nurses. Moreover, there was a positive correlation between total knowledge and practice scores. ***Conclusion:*** Based on the findings of the present study, it is recommended that periodic in-services training programs should be conducted for the nurses who administer oxytocin drugs in order to constantly improve their knowledge and practice of safe administration and to reduce the adverse impacts of this drug.

Introduction

As one of the most enjoyable events for mothers, childbirth can become a threat to their lives. In this regard, maternity nurses need to ensure safe childbirth by enhancing and maintaining the health of the mother and fetus throughout pregnancy and childbirth ***[1]***. After the spontaneous initiation of labor, the frequency, duration, and intensity of contractions can be increased through labor augmentation which is carried out by stimulating the uterus. Labor augmentation is employed when uterine contraction is diagnosed as the underlying cause of delayed labor. Labor augmentation is traditionally utilized along with artificial rupture of membranes and intravenous oxytocin infusion ***[2]***. Labor is most commonly induced using synthetic oxytocin whose improper use might result in significant damage to the mother and the fetus ***[3]***. Therefore, the intravenous use of oxytocin was placed in a 'high-risk category' in 2007 by the USA based Institute for Safe Medication Practices ***[4]***.

Oxytocic drugs can stimulate the contraction of the uterine muscles, the most important one being

oxytocin which is broadly utilized in clinical practice ***[5]***. As a hormone produced by the hypothalamus, oxytocin is stored in the posterior lobe of the pituitary gland and later released during maternal circulation while breast stimulation and lower genital tract stimulation, lead to uterine contractions. Befor 34 gestational weeks, uterine sensitivity to oxytocin is weak, while it rises rapidly by - and the beginning of spontaneous labor ***[6]***. During spontaneous labor, the naturally synthesized oxytocin hormone helps with the stimulation of uterine contractions; however, an intravenously administered synthetic form of oxytocin results in artificial stimulation of uterine contractions. Another synthetic form of oxytocin is Pitocin which is also utilized to augment labor that is not progressing fast enough. This agent is typically injected intramuscularly after delivery during the third stage of labor to prevent post-partum hemorrhage ***[7]***.

As an essential and emergency drug in labor and delivery, oxytocin is utilized in 27.45% for induction of labor, 31.9 % for augmentation of labor, and 82.4% for deliveries ***[8]***. To prevent the bad effects of this drug on the woman and fetus, the guidelines and standards of care and actions while induction or augmentation need to be taken into account by the nurses who are responsible for deciding on oxytocin titration for laboring women ***[9]***. Oxytocin administration might cause fetal respiratory distress due to severe uterine contraction and uterine rupture; therefore, close care and monitoring are required while administering this serious medicine. Moreover, should be monitor, labor progress closely to diagnose signs of induction failure if there are any ***[10]***. Therefore, midwives need to know well about the action, side effects, and indications of these drugs. In addition, planning and implanting an effective nursing process require nursing considerations related to this drug. It is remarkably vivid that improper administration might lead to uterus hyperstimulation which can result in fetal demise, fetal asphyxia, and/or uterine rupture ***[11]***.

Nurses typically conduct the administration of medications; therefore, they need to be aware of the relevant standards and guidelines. In this regard, obstetric nurses need to carefully monitor the drug dose, administration route, and expiry date, influencing both the mother and fetus. Therefore, obtaining a positive outcome for both mother and fetus rises by understanding the dose, indications, contraindications, administration route, and drug side effects ***[12]***. Besides primary intrapartum care, obstetric nurses are responsible for observing the maternal and fetal complications and adopting safe and corrective measures in case of abnormalities. While administering oxytocin, nurses need to preserve safeguard both mother and the fetus. They should also recognize when to start, alter, or halt its infusion and when to notify the physician ***[13]***.

In short, obstetric nurses need to be equipped with sufficient knowledge and practical skills regarding administering oxytocin to prevent complications. Therefore, it is highly urgent to evaluate nurses' knowledge and practical skills while dealing with serious medications like oxytocin. Moreover, this area of women's health and obstetrics nursing has never been investigated in any studies in Sulaimaniyah city. In this regard, the present study was aimed at identifying the nurses' level of knowledge and practices regarding oxytocin administration during the 1st stage of labor in the Maternity Teaching Hospital in Sulaimaniyah city.

Materials and methods

A. Participants

A descriptive analytical study using a descriptive design was carried out to assess the nurses' knowledge and practice regarding oxytocin administration during the 1st stage of labor in the Maternity Teaching Hospital in Sulaimaniyah city from 5th January to 20th February 2022. Since the number of nurses working in the labor and delivery unit was limited, the study sample included all 70 nurses, using a non-probability (convenient) sampling technique. These nurses provided direct nursing care for women during the 1st stage of labor in the abovementioned setting.

B. Measurement tools

The measurement tool was a questionnaire that consisted of three parts. The first part had 8 items and was related to the nurses' socio-demographic variables like age, marital status, economic status, level of education, total years of experience, attendance of training course on oxytocin, source of knowledge, and employment. The second part was a structured questionnaire that had 30 items aimed at assessing the nurses'

knowledge of action, route of administration, dosage, side effects, contraindication, monitoring of the drug while administering, a precaution taken before administering the drug and effect on the mother and fetus, and observations during the administration among nurses. Every correct answer was given a score of "1" mark and every wrong answer a "zero" mark. A total score of >75% was regarded as above average level, 50-75% average level, and <50% below the average the level of knowledge. The third part as an observational checklist adopted from Krening et al. (2012) and Green (2016) ***[14, 15]*** was used to evaluate the nurses' practices during oxytocin administration. This part included three subsections; pre-oxytocin checklist (23 items), during administration checklist (23 items), and post administration checklist (6 items). A three-point rating scale (Always, Sometimes, and Never) was used to assess the nurses' practice through an observation checklist, and then scored as (3) for always, (2) for Sometimes, and (1) for Never. A score of >75% was considered good practice, 50- 75% moderate practice, and <50% poor practice.

Informed the nurses would observe their practice any shift without their awareness. Required data were collected every day from 8 am to 3 pm over of 6 weeks. In each shift, there are seven nurses in the labor room. Their practice of oxytocin administration was assessed using the structured observation checklist. Based on the duty roster for covering all the staff, the researcher herself observed the practice during the morning and evening shifts. Gave a code number to that observed checklist, and the same code number was given to the self-administered questionnaire prepared for the nurses' knowledge. Afterward, the questionnaire was provided for the respondent whose practice was already observed by the researcher.

C. Statistical analysis

The collected data were analyzed by SPSS 22. For this purpose, descriptive statistical methods including frequency, percentage, mean, and standard deviation were employed. Also, inferential statistics like chi-square, Fisher exact test, and Pearson correlation were utilized.

Results

According to Table 1 which depicts the distribution of the studied group according to their sociodemographic characteristics, it was found that the most of the participants (68.6%) were 20-29 years old with a mean age 30.0±10.6, 70% were married, 62.9% claimed that their income was barely sufficient, and 71.4% of them attended technical institutes. Regarding the nurses' years of experience, over half of them (58.6%) had a total working experience of 1-5 years with a mean of 9.14 years, and about one third of them (32.9%) participated in the training course. Moreover, the source of knowledge in 37.1% of the nurses was academic. Also, only 34.3% were governmental nurses.

Table-1: Distribution frequency and percentage of the nurses based on the studied demographic variables

Demographic Variables	**Frequency**	**Percentage**
Age		
20-29 years	48	68.6
30-39 years	6	8.6
40-49 years	10	14.3
>49 years	6	8.6
Mean ±SD 30.0± 10.6		
Marital status		
Married	49	70.0
Unmarried	21	30.0
Economic status		
Sufficient	26	37.1
Barely sufficient	44	62.9
Level of education		
Nursing Secondary School	13	18.6

Nursing Technical Institute	50	71.4
Nursing Bachelor	7	10.0
Total years of experience		
1-5 years	41	58.6
6-10 years	8	11.4
>10 years	21	30.0
Mean ± SD 9.14± 8.3		
Attendance of training course regarding oxytocin		
Yes	23	32.9
No	47	67.1
Source of knowledge		
Academic	26	37.1
Doctors	8	11.4
Nurses	22	31.4
All of the above	14	20.0
Employment		
Governmental nurse	24	34.3
Volunteers nurse	46	65.7
Total	**70**	**100**

As illustrated in Table 2, a majority of the nurses (60.0%) had below average level of knowledge, 22.9% had an average level of knowledge, and only 17.1% had above average level of knowledge regarding oxytocin administration.

Table-2: Distribution frequency and percentage of the nurses' level of knowledge regarding oxytocin administration

Level of knowledge	**Frequency**	**Percentage**
Below average (<50%)	42	60.0
Average (50-75%)	16	22.9
Above average (>75%)	12	17.1
Total	**70**	**100.0**

Table 3 reveals that nearly half of the nurses (45.7%) had a poor level of practice, 41.4% had a moderate level of practice, and only 12.9% had a good level of practice regarding oxytocin administration.

Table-3: Distribution frequency and percentage of the nurses' level of practice regarding oxytocin administration

Level of practice	**Frequency**	**Percentage**
Poor practice (<50%)	32	45.7
Moderate practice (50-75%)	29	41.4
Good practice (>75%)	9	12.9
Total	**70**	**100.0**

Table 4 demonstrates that there was a highly positive correlation between knowledge and practice among the nurses at $p<0.001$ level of significance.

Table-4: Correlation between knowledge and practice regarding oxytocin administration among the nurses

Variables	**N**	**Pearson Correlation (r)**	**P. value**
Knowledge and Practice	70	0.624	**<0.001 HS**

Table 5 indicates that there was a highly statistically significant association between the levels of the nurses' knowledge regarding oxytocin administration and their age, marital status, level of education, total years of experience, attendance in training courses, source of knowledge, and employment.

Table-5: Association between the nurses' level of knowledge regarding oxytocin administration and sociodemographic variables.

Variable	**Below average F (%)**	**Average F (%)**	**Above average F (%)**	**Total F (%)**	**Chi-square Test**
Age					**χ^2=34.885**
20-29 years	37(77.1)	11(22.9)	0(0.0)	48(68.6)	**d.f= 6**
30-39 years	1(16.7)	2(33.3)	3(50.0)	6(8.6)	**p= <0.001**
40-49 years	2(20.0)	2(20.2)	6(60.0)	10(14.3)	**HS****
>49 years	2(33.3)	1(16.7)	3(50.0)	6(8.5)	
Marital status					**χ^2=6.465**
Married	26(53.1)	11(22.4)	12(24.5)	49(70.0)	**d.f= 2**
Unmarried	16(76.2)	5(23.8)	0(0.0)	21(30.0)	**p= 0.039 S***
Level of education					**χ^2=26.012**
Nursing Secondary School	3(23.1)	3(23.1)	7(53.8)	13(18.6)	**d.f= 4**
Nursing Technical Institute	38(76.0)	9(18.0)	3(6.0)	50(71.4)	**p= <0.001**
Nursing Bachelor	1(14.3)	4(57.1)	2(28.6)	7(10.0)	**HS***
Total years of experience					**χ^2=29.315**
1-5 years	31(76.6)	10(24.4)	0(0.0)	41(58.6)	**d.f= 4**
6-10 years	6(75)	1(12.5)	1(12.5)	8(11.4)	**p= <0.001**
>10 years	5(23.8)	5(23.8)	11(52.4)	21(30.0)	**HS***
Attendance of training course regarding oxytocin					**χ^2=6.878** **d.f= 2**
Yes	9(39.2)	7(30.4)	7(30.4)	23(32.9)	**p= 0.038**
No	33(70.2)	9(19.2)	5(10.6)	47(67.1)	**S***
Source of knowledge					
Academic	14(53.8)	8(30.8)	4(15.4)	26(37.1)	**χ^2=15.061**
Doctors	5(62.5)	0(0.0)	3(37.5)	8(11.4)	**d.f= 6**
Nurses	16(72.7)	1(4.6)	5(22.7)	22(31.4)	**p= 0.008**
All of the above	7(50.0)	7(50.0)	0(0.0)	14(20.0)	**S****
Employment					**χ^2=30.530**
Governmental nurse	6(25.0)	6(25.0)	12(50.0)	24(34.3)	**d.f= 2**
Volunteers nurse	36(78.3)	10(21.7)	0(0.0)	46(65.7)	**p= <0.001** **HS***

**Fisher exact test *Chi-square S= Significant HS= highly significant NS= Not significant

As shown in Table 6, a highly statistically significant association between the levels of the nurses' practice of oxytocin administration and their age, marital status, level of education, total years of experience, source of knowledge, and employment. However, no significant association was observed between their attendance in oxytocin administration training course rand their level of practice (p=0.243).

Table-6: Association between the nurses' level of practice regarding oxytocin administration and their socio-demographics variables.

Variable	Poor F (%)	Moderate F (%)	Good F (%)	Total F (%)	Chi-square Test
Age					**χ2=21.202**
20-29 years	28(58.3)	19(39.6)	1(2.1)	48(68.6)	**d.f= 6**
30-39 years	0(0.0)	3(50.0)	3(50.0)	6(8.6)	**p= <0.001**
40-49 years	2(20.0)	5(50.0)	3(30.0)	10(14.3)	**HS****
>49 years	2(33.3)	2(33.3)	2(33.3)	6(8.6)	
Marital status					**χ2=1.836**
Married	21(42.9)	20(40.8)	8(16.3)	49(70.0)	**d.f= 2**
Unmarried	11(52.4)	9(42.9)	1(4.8)	21(30.0)	**p= <0.001**
					HS*
Level of education					**χ2= 7.460**
Nursing Secondary School	3(23.1)	6(46.2)	4(30.8)	13(18.6)	**d.f= 4**
Nursing Technical Institute	27(54.0)	19(38.0)	4(8.0)	50(71.4)	**p= 0.034**
Nursing Bachelor	2(28.6)	4(57.1)	1(14.3)	7(10.0)	**S***
Total years of experience					**χ2=20.819**
1-5 years	22(53.7)	18(43.9)	1(2.4)	41(58.6)	**d.f= 4**
6-10 years	6(75.0)	2(25.0)	0(0.0)	18(11.4)	**p= <0.001**
>10 years	4(19.0)	9(42.9)	8(38.1)	21(30.0)	**HS***
Attendance of training course regarding oxytocin					**χ2=3.032** **d.f= 2**
Yes	8(34.8)	10(43.5)	5(21.7)	23(32.9)	**p= 0.243**
No	24(51.1)	19(40.4)	4(8.5)	47(76.1)	**NS***
Source of knowledge					
Academic	10(38.5)	12(46.2)	4(15.4)	26(37.1)	**χ2=1.819**
Doctors	4(50.0)	3(37.5)	1(12.5)	8(11.4)	**d.f= 6**
Nurses	12(54.5)	8(36.4)	2(9.1)	22(31.4)	**p= 0.049**
All of the above	6(42.9)	6(42.9)	2(14.3)	14(20.0)	**S****
Employment					**χ2=17.027**
Governmental nurse	5(20.8)	11(45.8)	8(33.3)	24(34.3)	**d.f= 2**
Volunteers nurse	27(58.7)	18(39.1)	1(11.1)	46(65.7)	**p= <0.001**
					HS*

**Fisher exact test *Chi-square S= Significant HS= highly significant NS= Not significant

Discussion

Despite its frequent use in obstetrics, oxytocin can be associated with some adverse events in childbirth. Therefore, its use by midwives imposes a huge responsibility on them because inappropriate application of this drug might negatively influences on the mother and the fetus during delivery, and later on the newborn. Midwives are active members of the care group, and they play a crucial role in diagnosing the changes in oxytocin use. Nurses and in particular midwives need to be very careful while administering the oxytocin, and they need to follow it up with full monitoring because it might be harmful to the life of both the mother and fetus ***[16]***.

The present study is a descriptive one aimed at assessing the nurses' knowledge and practical skills regarding oxytocin administration during the 1st stage of labor. For this purpose, a total number of 70 nurses in labor unit in the obstetric department were studied. The data collected on the nurses' sociodemographic characteristics revealed that more than half of them aged between 20-29 years with a mean age of 30.0±10.6. This finding is in line with those of other studies which reported that half of the studied nurses were from 25-30 years [17, 18]. The present study also showed that 71.4% of the studied nurses had attended technical institutes. This finding is not in agreement with those of other studies ***[18-19]*** which found that two thirds of the nurses in their studies had secondary nursing education. According to the results of the present study, 67.1% of the nurses had never attended any oxytocin administration training courses. This finding is in complete agreement with two studies that reported that the majority of the nurses had not attended any training courses ***[18, 20]***.

The study results also indicated that the level of the nurses' knowledge about oxytocin administration was below average in 60% of them, average in 22.9%, and above average in 17.1%. Therefore, it was concluded that the level of knowledge about oxytocin administration was below average in most of the nurses. This finding is in line with a similar study which showed that the level of knowledge about oxytocin administration was below average in two thirds of the studied nurses ***[5]***. Unlike these findings, the results of a study ***[21]*** aimed at assessing the nurses' knowledge about oxytocin administration during labor revealed that more than two thirds of the nurses had adequate knowledge. Furthermore, present study results agree with ***[22]*** where it was indicated that about two thirds of the studied nurses had a poor level of knowledge about oxytocin administration.

These findings agree with ***[23]*** which evaluated the nurses' knowledge and practice regarding oxytocin administration during labor. In that study, it was shown that the level of oxytocin administration knowledge was low in two thirds of the nurses, and below average in a majority of them. Similarly, a similar study reported that two thirds of the nurses had anadequate level of knowledge of oxytocin administration ***[24]***. Furthermore, study results ***[25]*** revealed that over half of the studied nurses had a moderate level of oxytocin administration knowledge. Unlike these findings, another study reported that most of the studied nurses had good knowledge of oxytocin administration ***[26]***.

In terms of the level of practical skills in the studied group, the results of the current study indicated that nearly half of the nurses (45.7%) had a poor level of practice, 41.4% had a moderate level of practice, and only 12.9% had a good level of practice. In this regard, the results of a similar study showed that the level of oxytocin administration practice was moderate in over two thirds of the nurses, poor in one third, and good in none of them ***[26]***. This finding was also in line with those of a study which reported that most of the studied nurses had poor practical skills in administering oxytocin ***[27]***. Another similar study revealed that oxytocin administration practice was poor in two thirds of the nurses, moderate in one third, and good in less than one quarter of them ***[5]***.

Regarding the relationship between knowledge and practice among the studied group, the present study's results demonstrated a highly positive significant correlation between these two variables. This finding is in line with those of a similar study where a positive correlation between knowledge and practice was reported ***[28]***. Furthermore, a similar positive correlation between practice and knowledge of oxytocin administration was reported ***[5, 26]***.

Moreover, the current study results revealed a positive relationship between the nurses' level of knowledge and their sociodemographic characteristics. Unlike this finding, no statistically significant association between these two variables was reported in other studies ***[18,10]***. Finally, about the relation between the level of the nurses' practice and their sociodemographic characteristics, the results of the current study showed that there was a statistically significant relationship between these two variables. This finding is not in agreement with the results of a study which reported no statistically significant association between these two variables ***[29]***.

Conclusions

As revealed by the findings of the current study, over half of the studied nurses had a poor level of knowledge of oxytocin administration, and nearly half of them had a poor level of oxytocin administration practice during the 1st stage of labor. There was a highly statistically significant association between the nurses' knowledge and practice and their sociodemographic variables. There was a highly significant positive correlation between the nurses' total knowledge and practice scores. Oxytocin administration knowledge and practice were correlated, which means an increase in the nurses' knowledge leads to improvement in their practice. It is highly recommended that standard policy/protocol or guidelines concerning medication administration of oxytocin should be developed and the nurses should be encouraged to promote their knowledge. Clinical demonstration should conduct regarding the use of oxytocin to enhance the nursing employees' practical skills. It is also suggested that education program for nurses should be encouraged, implemented, and continued by employing different strategies of education regarding safe medication administration during labor and delivery.

Acknowledgments

The researcher would like to express gratitude and appreciation to the Assistant Prof. Dr. Atiya Kareem Mohammed for her support and willingness to help at all times for the successful completion of this work. Special thanks for all nurses who participated in this study for their effective cooperation.

Conflict of interest

The author declares that there is no conflict of interest in this study.

References

[1] Sathiya L.S., & Semmalar S. (2015). Complications of Oxytocin Induction of Labor. *Journal of Nursing and Health Science*. 4(2), 29-32.
[2] World health organization (WHO). Recommendations for Augmentation of Labor (2014), p.1-4.
[3] Özata M., & Altunkan H. (2010). Frequency of medical errors in hospitals, determination of medical error types and medical errors konya Sample. *Medical Research Journal*. 8(2),100-111.
[4] Sara W. (2015). Synthetic oxytocin looking beyond the benefits. *Practising Midwife*. 18(1), 34-35.
[5] Shiny S. (2017). Assessment of the knowledge and practice on use of oxytocin among nurses working in selected hospitals in Chennai. *Doctoral dissertation*, Faculty of Nursing, Chennai University, Chennai.
[6] Wing D., & Farinelli C. (2012). *Abnormal labor and induction of labor Obstetrics Normal and problem pregnancies* (5th ed.). Philadelphia: Elsevier Saunders.
[7] Megan J.L., (2012). An Investigation of the Effects of Pitocin for Labor Induction and Augmentation on Breastfeeding Success. *Scripps Senior Theses*, Claremont Colleges, USA.
[8] Poudyal A.K., Shrestha B., & Onta S.R. (2014). Availability and use of oxytocin in health facilities in Nepal. *Journal of Institute of Medicine*. 36(1), 3-8.
[9] Suellen C. (2000). The nurse's role during oxytocin administration. *MCN American Journal of Maternal Child Nursing*. 25(2), 80-85.
[10] Thamer H., & Iqbal A., (2014). Assessment of Nurses' Knowledge Regarding Oxytocin Administration during Labor at Maternity Hospitals in Al-Kut City. *Iraqi National Journal of Nursing Specialties*. 27(1), 1-10.
[11] Steven C., Kathleen R.S., Eric K.G., & Thomas G., (2011). Oxytocin: new perspectives on an old drug. *American Journal of Obstetrics Gynecology*. 200(1), 35-42.
[12] Susan D. (2018). Oxytocin Use in Labor. *Journal of Perinatal Neonate Nursing*. 32(1), 34-42.
[13] Nancy P. (2011). Oxytocin safety: legal implication for perinatal. *Nursing for Women's Health Journal*. 15(2), 110-117.
[14] Krening C., Anthony K., & Garko C. (2012). Oxytocin Administration the Transition to a Safer Model of Care. *Journal of Perinatal Neonate Nursing*. 26(1), 15-24.
[15] Carol J.G.C. (2016). *Maternal Newborn Nursing Care Plans* (3rd ed.) USA: Ascend learning company. Publisher.
[16] Linda S.R. (2015). *Mosby's' Nursing Drug Reference Text Book* (28th ed.). Netherlands: Elseiver.
[17] Esmaeil M.N., Seyyedeh R.E., Mohammad A.C., Amir N., Amir S., & Ayeshe H.E. (2013). Medication Errors of Nurses in the Emergency Department. *Journal of Medical Ethics and History of Medicine*. 6(11), 2-7.
[18] Eman S.M.S., Nadia M.F., Aziza I.M., & Somaya O.A. (2020). Nurses' Knowledge and Practices Regarding Oxytocin Infusion Care for Women during Labor. *Journal of Nursing Science Benha University*. 1(1), 85-97.
[19] Muzeya F. (2015). Knowledge, attitudes and practices of nurse-midwives related to obstetric care. *Master Dessertation*, University of South Africa.

[20] Azza A.E., Abdel F.A., Galal A.E., Soad A.E.R., Somaya O. (2017). Assessment of nurse's practical skills regarding avoidance of post-partum hemorrhage. *Egyptian Journal of Health Care*. 8(3), 219-233.

[21] Raja M.E. (2015). Assessment of nurse's midwives knowledge regarding nursing care of a woman who receiving oxytocin drug during labor. *Master Dissertation*, National Ribat University, Sudan.

[22] Naglaa Z.H.R., Jilan A.I.A., & Nevertity H.Z. (2014). Nurses' Compliance with oxytocic administration guidelines during labor. *Alexandria Scientific nursing Journal*. 16(2), 55-72.

[23] Rania R.E.S., Seham S.I., Amal M.G., & Fatma Z.F. (2020). Assessment of nurses' compliance with oxytocin administration protocol during labor at Dammita city. *Port Said Scientific Journal of Nursing*. 7(3), 42-65.

[24] Rina S. (2017). The effectiveness of self-instructional module on knowledge regarding maternal and neonatal outcome of induction of labor among staff nurses in selected hospital Bangalore. *India Journal of Advanced Academic Research*. 4(2), 79-91.

[25] Biju S., Keerthana W., Joseph G.N., Priyadarshini J., & Jasna A. (2019). Are the Maternity Nurses Knowledgeable on Oxytocin Induction During Labor; A Protocol Development for Hospitals in South India. *Indian Journal of Public Health Research & Development*. 10(8), 792-797.

[26] Lohani B. (2020). Nurses knowledge and practice regarding oxytocin administration during first stage labor in maternity ward of teaching hospital. *Journal of Patan Academy of Health Sciences*. 7(2),103-111.

[27] Hanan M.S.M., Mervat M.A.M.D., & Amany H.G.M. (2019). Effect of educational program on improving nursing knowledge and practice regarding administration of oxytocin during labor. *Journal of Nursing and Health Science*. 8(5), 44-53.

[28] Heba M.A.W., Om Hashim M.M.S., & Hanan E.M.E. (2021). Assessment of Nurses' Knowledge and Skills Regarding Oxytocin Administration. *Mansoura Nursing Journal*. 8, 27-37.

[29] Reda S., Warda Y., & Nahla S.A. (2014). Critical Care Nurses' Knowledge and Practice Regarding Administration of Selected Positive Inotropics at Cairo University Hospitals. *Journal of Natural Sciences Research*. 4(2), 90-100.