Mutah University
Faculty of Graduate Studies

Health Care Providers' Knowledge and Practices of Oxytocin Induction of Labor in the South of Jordan

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Dedication

I would like to specially dedicate this thesis to my father and mother, to my brothers and sister. Also, a special dedication to my friends and to all those who supported me to complete my thesis.

Acknowledgment

In the name of Allah, the Compassionate the Merciful…

This thesis would not have been possible without the support of Allah, who gave me the strength, health and ability to complete this project.

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Abstract

Health Care Providers' Knowledge and Practices of Oxytocin Induction of Labor in the South of Jordan

Azhar Fares Zayadeen
Mutah University, 2021

Background:

Health care providers have a lack of knowledge and practices of oxytocin induction of labor and a large gap between the national protocol and acute clinical practices among health care providers in Al-Karak governorate in South of Jordan.

Objectives:

This study has two main objectives: Firstly, to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan. Secondly, to find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction at public and private hospitals in Al-Karak Governorate in the South of Jordan.

Methods:

A descriptive, correlational, cross-sectional design was used in this study. Convenience sampling was used to recruit the sample of health care providers. The study was conducted in public and private hospitals in Al-Karak Governorate in the South of Jordan from March to August 2020. A preprepared questionnaire was the instrument used for the data collection. The Statistical Package for the Social Sciences was used to analyze the data and obtain descriptive and inferential statistics.

Results:

A total of 131 health care providers participated in the study. The results showed that 52.7% of the participants (n = 69) had inadequate knowledge and 74% of the participants (n = 97) were performing improper practices. However, physicians had more knowledge than nurses and midwives in all the hospitals included in the study.

Conclusion

Health care providers at public and private hospitals in Al-Karak Governorate in the South of Jordan have inadequate knowledge and perform improper practices of oxytocin labor induction.

Keywords Health care providers, knowledge, practices, oxytocin, induction of labor, Jordan.

الملخص

"تاثير المعرفة والممارسة عند مقدمي الرعاية الصحية بما يخص تحريض المحاض وتأثير على الأم وحديثي الولادة في جنوب الأردن "

إعداد: ازهار فارس زيادين

جامعة مؤتة، 2021

خلفية

مقدمو الرعاية الصحية لديهم نقص في المعرفة والممارسات لتحريض الأوكسيتوسين على المخاض وفجوة كبيرة بين البروتوكول الوطني والممارسات السريرية الحادة بين مقدمي الرعاية الصحية في محافظة الكرك جنوب الأردن.

الهدف

تهدف هذه الدراسة إلى هدفين رئيسيين: أولاً ، تقييم معرفة مقدمي الرعاية الصحية وممارسات تحريض الولادة بالأوكسيتوسين في المستشفيات العامة والخاصة في محافظة الكرك في جنوب الأردن.
ثانيًا ، لمعرفة العلاقة بين المتغيرات الديموغرافية المختارة لمقدمي الرعاية الصحية ومستويات معرفتهم وممارستهم فيما يتعلق بتحريض الأوكسيتوسين في المستشفيات العامة والخاصة في محافظة الكرك جنوب الأردن.

المنهجية

تم استخدام التصميم الوصفي والارتباطي المقطعي في هذه الدراسة. تم استخدام أخذ العينات الملائمة لتجنيد عينة من مقدمي الرعاية الصحية. أجريت الدراسة في المستشفيات العامة والخاصة في محافظة الكرك جنوب الأردن من آذار إلى آب 2020. وكان الاستبيان المعد مسبقاً هو الأداة المستخدمة في جمع البيانات. تم استخدام الحزمة الإحصائية للعلوم الاجتماعية لتحليل البيانات والحصول على إحصائيات وصفية واستنتاجية.

النتائج

شارك ما مجموعه 131 من مقدمي الرعاية الصحية في الدراسة. أظهرت النتائج أن 52.7٪ من المشاركين (العدد = 69) لديهم معرفة غير كافية وأن 74٪ من المشاركين (العدد = 97) كانوا يؤدون ممارسات غير لائقة. ومع ذلك ، كان لدى الأطباء معرفة أكثر من الممرضات والقابلات في جميع المستشفيات المشمولة في الدراسة. توجد علاقة ارتباط موجبة بين مجموع درجات المعرفة والعمر والخبرة العملية والمستوى التعليمي.

الاستنتاجات

مقدمو الرعاية الصحية في المستشفيات العامة والخاصة في محافظة الكرك في جنوب الأردن لديهم معرفة غير كافية ويقومون بممارسات غير سليمة لتحريض المخاض بالأوكسيتوسين.

الكلمات المفتاحية

مقدمو الرعاية الصحية، معرفة، ممارسات، أوكسيتوسين، تحريض المخاض، الأردن.

Chapter One
Introduction

1.1 Background

Induction of labor is the stimulation of uterine contraction before the onset of spontaneous labor (Myles, 2016). It is an obstetric intervention that can be used when elective birth is beneficial to the mother and baby (Myles, 2016). Induction is also defined as the initiation of uterine contractions by any method (medical, mechanical, or combined) for vaginal delivery (Ryan & McCarthy, 2016). As a general principle, the simplest inductions are those performed when the cervix is ripe and they usually precede the spontaneous onset of labor by a few hours to a day or two, and thus a mechanical technique alone is required (Balasujitha, 2020). For the most difficult inductions, when the cervix is very unripe, a combination of a pharmacological agent, possibly involving more than one drug, is followed by a mechanical stimulus to induce labor (Simpson, 2020).

With the escalation of the induction rate, there is evidence of an increase in the frequency of labor induction due to problems experienced by both the woman and the neonate. Such problems include hypertensive disorders of pregnancy, gestational diabetes, and postdate intrauterine growth restriction (Solone & Shaw, 2020).

Induction of labor is used when the benefits of vaginal delivery outweigh the maternal and fetal risks of waiting for the spontaneous onset of labor (Marconi, 2019). However, there is a concern that induction of labor is associated with an increase in operative vaginal or cesarean delivery and excessive uterine activity with a risk of fetal heart rate (FHR) abnormalities (Marconi, 2019).

Generally, a cesarean section is performed in a higher proportion of induced labors as compared to spontaneous labors (Davey & King, 2016). Jordan is no exception, where the overall rate of cesarean births rose from 18.2% in 2002 to 29.1% (13.2% as emergency and 15.9% as planned cesarean) in 2012, where the most frequent reason for a planned cesarean is a scarred uterus (59.4%) and that for an emergency cesarean is prolonged fetal distress due to induction (30%) (Batieha et al., 2017). Induction of labor is certainly one of the most frequently performed obstetric procedures in the world (Marconi, Manodoro, Cipriani, & Parazzini, 2020). It has many indications, but the most prevalent is postdate pregnancy (Lawani et al., 2014). The induction rate in the United States of America more than doubled from 9.5% of all deliveries in 1990 to 23.8% in 2015 (Lou et al., 2019). Moreover, inductions increased from 20.3% in 2006 to 29.4% in 2016 (Lou et al., 2019).

In Jordan, maternal and child health (MCH) services are provided by the public sector ((Ministry of Health (MOH), Royal Medical Services (RMS)) and the private sector (through affiliated hospitals and clinics). There are 118 hospitals in Jordan. Thirteen are located in the South of Jordan, six of which are in Al-Karak Governorate. There are also 506 MCH centers in Jordan, 105 of

which are in the South of Jordan. Al-Karak Governorate has 39 such centers (MOH, 2019).

The 2017–2018 Jordan Population and Family Health Survey (JPFHS), which was published by the Department of Statistics (DOS) in 2019, explains that the primary components of the health services provided for mothers and children in MCH centers include antenatal and postnatal care, as well as vaccination coverage and treatment of common childhood illnesses (DOS, 2019). The survey results showed that the majority of pregnant women received the basic components of antenatal care (over 95% for all components). For almost all of the women who received antenatal care for their most recent birth, several services were performed, including having their blood pressure measured, a urine sample taken, a blood sample taken, and their weight measured, as well as tetanus toxoid injections, which are given during pregnancy for the prevention of neonatal tetanus, an important cause of death among infants (DOS, 2019).

The second most-performed service provided by MCH centers in Jordan is postnatal care. According to the JPFHS, 83% of mothers and 86% of newborns had a postnatal check within the first 2 days after birth. More than 95% of babies were weighed during the first 2 days after birth, 84% had their temperature measured, and 80% had their umbilical cord examined. Also, 69% of mothers were counseled on danger signs that would indicate they should seek care for their baby and 66% of mothers were counseled on breastfeeding (DOS, 2019). As regards the delivery services that are performed at hospitals, the JPFHS indicates that all births in the 5 years before the survey were delivered by a skilled provider (100%), and 98% were delivered in a health care facility (DOS, 2019).

The induction of labor is one of the delivery services provided in Jordanian hospitals, and the rate is alarmingly high. According to a study conducted in 2007, the rate of induction of labor in Jordan was 12%, the augmentation of labor was 46%, and the rate for episiotomy was 53% (Khresheh et al., 2009). A later Jordanian study found that 81% of women have undergone induction of labor (Shaban et al., 2011). On the other hand, another Jordanian study revealed that there are no reliable statistics to support data about induction of labor and that obstetricians do not have official guidelines or policies on induction. Further, there is no clear policy for normal pregnancy and childbirth; therefore, induction of labor is not monitored or policy led (Hatamleh et al., 2008).

Induction of labor may end with successful results in vaginal delivery, but sometimes it fails and is coupled with the potential risks of an increased rate of operative vaginal delivery, cesarean birth, excessive uterine activity, abnormal FHR patterns, uterine rupture, maternal water intoxication, delivery of a preterm infant due to incorrect estimation of dates, and possibly cord prolapse (Lawani et al., 2014).

Labor can be chemically induced by oxytocin, which is the drug most commonly used to induce or augment labor worldwide (Dhanya et al., 2019). Oxytocin is effective for cervical ripening with few adverse effects. Laboring women will often progress to spontaneous labor in 8 to 12 hours. However, health care providers should take into consideration the serious adverse reaction to oxytocin that can occur if the drug is misused (Dhanya et al., 2019; Thamer & Abbas, 2014). On the other hand, oxytocin has been known as the social hormone or the love hormone that lead to increase warmth, stabilize newborn's vital signs, increase mother-newborn relationship and decrease maternal anxiety after giving birth through skin to skin contact. Further, oxytocin might decrease postpartum depression. However, there was no relation between late antenatal third trimester serum oxytocin level and early onset postpartum depression symptoms (Rawashdeh et al, 2021).

Health care providers have a lack of evidence-based knowledge and practices of induction of labor with oxytocin (Sasagawa, Emi et al., 2016; Ejekam et al., 2019). There is also inappropriate and inconsistent use of oxytocin among midwives and physicians, and they do not know how oxytocin should be stored (Ejekam et al., 2019). Lack of knowledge, a misconception regarding the management of oxytocin infusion, and a large gap between the national protocol and acute clinical practices have also been reported (Sasagawa, Emi et al., 2016).

Healthcare providers in Jordanian health care facilities routinely administer oxytocin to pregnant women, and most of the women deliver without experiencing the risks associated with the drug (Shaban et al., 2011). However, health care providers in Jordan, especially in the delivery room, perform incorrect practices for augmentation, induction of labor, pain during labor, and episiotomy that do not comply with the recommendations of the World Health Organization (WHO) (Khresheh et al., 2009). Further, there are few statistics on the methods used for the induction of labor in Jordan and there are no recommendations for the use of induction of labor. However, at public and private hospitals in Al-Karak Governorate, the setting for this study, prostaglandin is used as a method of induction of labor followed by oxytocin use.

1.2 Problem statement

There is a lack of studies in Jordan on health care providers' knowledge and practices of oxytocin induction of labor. To the best of the researcher's knowledge, two studies related to the induction of labor have been conducted in Jordan, one by Hatamlah et al. (2013) and one by Shaban et al. (2011). This study is the first of its kind because it attempts to assess the knowledge and practices of health care providers regarding oxytocin induction of labor in a governorate in the South of Jordan.

1.3 Significance of the study

The results of this study can be used to develop educational sessions for health care providers in order to update their knowledge and practices regarding the appropriate use of oxytocin for pregnant women in the labor and delivery process. Further, this study can help in developing national guidelines for labor induction based on international recommendations. Consequently, it is hoped that complications resulting from inadequate knowledge and improper practice of oxytocin induction can be reduced, and the maternal mortality rate and perinatal mortality rate can, in turn, be decreased, which will facilitate the achievement of sustainable development goals.

1.4 Research objectives

In light of the problem statement, the following objectives are formulated:

1- To assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan.
2- To find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction at public and private hospitals in Al-Karak Governorate in the South of Jordan.

1.5 Research questions

The following questions are articulated to achieve the objectives of the study:

1- What are the health care providers' knowledge and practices regarding the use of oxytocin to induce labor at public and private hospitals in Al-Karak Governorate in the South of Jordan?
2- Is there an association between selected demographics of health care providers and their knowledge and practice levels regarding the use of oxytocin to induce labor at public and private hospitals in Al-Karak Governorate in the South of Jordan?

1.6 Theoretical definitions of the study variables

Health care provider

Refers to a person who works in partnership with women to provide support, care, and advice during pregnancy, labor, and after birth, and includes physicians, nurses, and midwives (Evans, Brown, & Baker, 2017).

Knowledge

Refers to information, facts, and skills acquired through education or experience; the theoretical or practical realization of a subject (Evans, Brown, & Baker, 2017).

Practice

Refers to specific intentional actions performed by health care providers in the process of administering oxytocin, which is assessed using a rating scale (Evans, Brown, & Baker, 2017).

Oxytocin

Refers to the drug used to increase the production of prostaglandins and cervical softening, and to stimulate uterine contractions (Lowdermilk et al., 2015).

Induction of labor

Refers to the chemical or mechanical initiation of uterine contractions before their spontaneous onset to bring about birth (Lowdermilk et al., 2015). For this study, chemical induction refers to induction by oxytocin.

1.7 Operational definitions of the study variables

Knowledge is measured by a questionnaire consisting of seven questions about health care providers' knowledge regarding oxytocin. Each question has more than one correct answer. The total maximum score is 40 points (total number of correct answers). The questionnaire was initially developed by Ejekam et al. (2019).

Practices is measured by a questionnaire consisting of 11 questions about the health care providers' practices regarding oxytocin. Each question has one correct answer. The total maximum score equals 11 points. The questionnaire was initially developed by Ejekam et al. (2019).

1.8 Summary

This chapter presented a description of the current situation in Jordan in respect of the knowledge and practices of health care providers regarding oxytocin induction of labor. It also outlined the significance of the study, the research objectives and questions, and the theoretical and operational definitions of the study variables. The next chapter discusses the review of the literature related to the research problem addressed in this thesis.

Chapter Two
Literature Review

2.1 Introduction

This chapter gives an insight into the studies and research papers related to the subject of the study that aims to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan and to find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction**.**

2.2 Search strategy

This literature review includes recent and up-to-date studies. The Cumulative Index to Nursing and Allied Health Literature (CINAHL), PubMed and Medical Literature on-Line (MEDLINE), Google Scholar, and Sci-Hub databases were properly searched to find appropriate studies published between 2008 and 2020. The search process was conducted using the following keywords in diverse arrangements: "Jordan," "knowledge, practices," "oxytocin," "side effect of using oxytocin," "intrapartum," and "labor room." In addition, the reference lists in the retrieved articles were reviewed to find other appropriate studies.

Several inclusion criteria were used to retrieve the studies that were most relevant to the subject of the present study. The criteria were as follows: published studies; written in the English language during the selected period, incorporating knowledge and practices of health care providers, and addressing health care providers' knowledge and practices of oxytocin induction of labor globally and in Jordan.

2.3 Induction of labor

Induction of labor is the stimulation of uterine contraction before the onset of spontaneous labor (Myles, 2016). Indications of induction of labor are postterm pregnancy, intrauterine fetal growth restriction, spontaneous rupture of membrane, preterm premature rupture of membrane, gestational diabetes mellitus at more than 37 weeks, oligohydramnios, preeclampsia, and hypertension (Coates et al., 2020). However, induction of labor is contraindicated with macrosomia, multifetal gestation, severe hydrocephalus, malpresentation, abnormal placenta implantation, cervical cancer, and active genital herpes (Lowdermilk et al., 2015).

2.3.1 Methods of induction of labor

Many methods can be used to induce labor, such as chemical agents, mechanical and physical methods, and alternative methods. As regards chemical agents, dinoprostone and misoprostol are the two main options. Dinoprostone has been shown to be effective when used before induction to ripen the cervix.

Misoprostol, on the other hand, is more effective than dinoprostone for induction of labor and less expensive. However, misoprostol has disadvantages, which include a high risk for uterine tachysystole with an abnormal (non-reassuring) FHR pattern and the passage of meconium into the amniotic fluid (Alfirevic et al., 2015; Lowdermilk et al., 2015). Thus, dinoprostone is widely used where there are obstetric conditions that require induction of labor (Tsikouras et al., 2016). Moreover, it has been approved by the United States Food and Drug Administration used for cervical ripening in pregnant women close to or at term with a medical or obstetric indication (Zhao et al., 2019).

One of the mechanical methods of induction is the balloon catheter, which is used to ripen and dilate the cervix to 3 cm in about 8 to 12 hours. This method is less expensive and more effective compared with the chemical agent misoprostol. Moreover, clinical evidence supports the use of the balloon catheter as a cervical ripping method especially because it is not associated with tachysystole and fetal stress (Policiano et al., 2017). However, the use of this mechanical method increases the chance of urinary tract infection because it allows the entry of microorganisms via the cervix (Chen et al., 2016).

Another mechanical method for induction of labor is amniotomy, which is the artificial rupturing of the membranes to induce labor when the condition of the cervix is ripening or to augment labor if progress begins to slow (Lowdermilk et al., 2015). The process involves stripping the amniotic membrane to release prostaglandins and oxytocin by separation of the membrane from the wall of the cervix and lower uterine segment by inserting a finger into the internal cervical external orifice and rotating it 360 degrees (Chen et al., 2016).

Physical methods include sexual intercourse as prostaglandins in the semen stimulate contractions with orgasm. Although orgasm stimulates uterine contractions, there is inadequate evidence to support the belief in its effectiveness (Carbone et al., 2019). Nipple stimulation also releases endogenous oxytocin from the pituitary gland. It has been shown that nipple stimulation can be used to initiate or enhance labor, especially during the latent phase of labor (Suresh & Soni, 2019).

Finally, alternative methods used by women to stimulate cervical ripening and onset of labor include the intake of herbal remedies such as blue cohosh, castor oil, and raspberry leaf whether or not there is evidence that these are actually effective (Lowdermilk et al., 2015).

2.3.2 Failed induction

In the case of dinoprostone, induction failure is considered to occur when labor does not start after one cycle of induction of labor (Sabry, 2020). In the case of oxytocin, which is another chemical method of labor induction failure is defined as the inability to achieve cervical dilatation of more than 4 cm after 12 hours of oxytocin administration (Grobman et al., 2018).

2.4 Oxytocin as a method of induction

Oxytocin is a peptide hormone secreted by the posterior pituitary gland (Myles, 2016). It was discovered by Sir Henry Dale in 1906 in an animal analysis during which he found that extracts of the human pituitary gland motivated contraction in a pregnant female's internal reproductive organ (Caret et al., 2020). Oxytocin is described as a uterine-contracting, milk-ejecting secretion that acts as a helper for a vaginal birth and breastfeeding through the contraction of smooth muscle cells (Myles, 2016). Internal secretion works by raising the concentration of calcium inside the muscle cells and thereby controlling the contraction of the muscle cells that are responsible for contractions of the female internal reproductive organ, the uterus (Page, 2017).

There are many medical uses for oxytocin which can be given in a variety of dose levels depending on the medical indication (Myles, 2016). For example, oxytocin is used for postpartum hemorrhage at a dose of 10 international units (IU) that is administered via the intramuscular (IM) route. Oxytocin is used for induction of labor at an initial dose that varies from 0.5 milliunits (mU)/min to 2 mU/min. It is also used for incomplete birth and inevitable abortion at 10–20 mU/min. Dosage should not exceed 30 mU/12 hours (Fernando et al., 2017).

Oxytocin is not recommended for use in the following cases: severe abnormal condition, fetal distress, shoulder presentation (transverse lie), floating fetal presenting part, uncontrolled hemorrhage, umbilical cord prolapse, active genital herpes infection, placenta previa, and previous incision prohibiting labor (Osilla & Sharma, 2019).

2.4.1 Mode of oxytocin administration

Oxytocin is administered either intramuscularly or intravenously. This is because previous studies discovered that intravenous (IV) push administration has to be avoided as attainable (Myles, 2016). The initial dose is 1 mU/min, but the WHO guidelines state that a protocol should be followed when administering oxytocin. The WHO protocol recommends starting with an dose of 1 mU/min and increase by 1 to 2 mU each 30 to 60 minutes (WHO, 2018). The extent of the effectiveness of the action by oxytocin depends on the method of administration as well as the response of the uterus. When given intravenously, the action begins immediately and subsides after 1 hour. On the other hand, in the case of the IM route, uterine contractions occur 3–5 minutes after IM administration and decrease within 2–3 hours (Drummond et al., 2018).

2.4.2 Hazards of oxytocin

Oxytocin use presents some hazards to mother and fetus (Myles, 2016). Maternal hazards include placental abruption, cardiovascular disease, nausea, and potential uterine rupture that may result in an emergency cesarean birth because of abnormal (non-reassuring) FHR patterns, as well as postpartum

hemorrhage and infection (Hidalgo et al., 2016). Also, a large indefinite quantity of hormone could cause water intoxication and an action antidiuretic hormone (Osilla & Sharma, 2019). Fetus hazards include hypoxia and academia as a result of too frequent or prolonged contractions that lead to a decrease in placental perfusion and eventually end up in late decelerations and minimal or absent baseline variability (Myles, 2016). Furthermore, when oxytocin is given in dosages that are too large or it is administered too slowly over a 24-hour period, it can lead to extreme water intoxication that might lead to coma, seizures, and even death of the mother (Osilla & Sharma, 2019).

2.4.3 The role of the health care in oxytocin use

Health care providers play an important role in the use of oxytocin in the delivery room. To ensure the safety of both the mother and the fetus, maternal and fetus evaluations are conducted every 4 hours to assess maternal vital signs, uterine contractions, and the FHR pattern. These assessments should be done before the use of oxytocin, as well as during oxytocin administration by continuous electronic FHR monitoring and uterine monitoring (Cadet et al., 2019).

2.4.4 Bishop score

The consistent assessment of cervical status is conducted by calculating the Bishop score (BS), which is generally utilized in deciding whether or not to induce labor (Myles, 2016). The BS helps to predict the success of vaginal delivery. To calculate the BS, the dilatation, effacement, consistency, position of the cervix, and station of the fetal head are assessed by vaginal examination. A score of four indicates that the cervix is not ripe for induction of labor and that the utilization of pre-labor induction agents is required. On the other hand, a score of six and higher is believed to be favorable for a successful vaginal delivery (Cadet et al., 2019). The BS was proposed by Bishop (1964) and enhanced by Burnett (1966). In the original BS, every item was scored from zero to three points and later summed into one score with total of 13 at maximum, as shown in Table 2.1 (Lowdermilk et al., 2015).

Table 2.1
Bishop scoring system

Score	Dilation (cm)	Effacement (%)	Station	Consistency	Position
0	Closed	0–30	-3	Firm	Posterior
1	1–2	40–50	-2	Medium	Mid
2	3–4	60–70	-1,0	Soft	Anterior
3	>= 5	>= 80	>= +1	-----	-----

2.5 Knowledge and practices of health care providers regarding oxytocin induction of labor

Health care providers' knowledge and practices regarding oxytocin are of great importance during the induction of labor and affect the caring process provided to women during labor and in giving birth (Cadet et al., 2019). In the search of the literature, several pertinent studies were found, which are reviewed in the following paragraphs.

The first study of relevance to the present study is that by Ejkema et al. (2019), who conducted a descriptive, cross-sectional study to evaluate health care providers' knowledge and practices regarding oxytocin in a southwestern state in Nigeria. et al. (2019) also found that poor knowledge of oxytocin storage and consequent poor storage practices contributed to the ineffectiveness of oxytocin reported The study sample consisted of 275 doctors and 430 nurses, which is considered to be a large sample size. Ejkema et al. (2019) found inappropriate and inconsistent use of oxytocin, especially overdosing, which was due to the high perception of the medicine's effectiveness among the respondents. Ejkema by some respondents.

In Iraq, Thamer and Abbas (2014) conducted a descriptive-analytic study to evaluate nurses' knowledge of oxytocin use in labor. The sample consisted of 70 nurses who were conveniently selected. The results showed that there was a difference in the level of knowledge among nurses according to their age, educational level, social status, work time (12 hours shifts or 8 hours shifts), and level of experience. However, the authors used a weak design that does not yield to a strong evidence. Also they used a weak sampling method and collected the required data from one hospital only in Iraq, which restricted the generalizability of the results. Further, they focused solely nurses as health care providers even though midwives and physicians also play a significant role in the use of oxytocin.

In a broader study, Poudyal, Shrestha, and Onto (2014) conducted a descriptive, cross-sectional explorative study in Nepal to describe the knowledge and practices of health care providers regarding oxytocin in 40 health care facilities. The sample consisted of 40 health facilities, 136 health care providers and 35 store keepers. The authors used multiple methods for data collection, i.e., interviews with participants, observations of health facilities, and analysis of store records and delivery charts. The authors interviewed all the participants using a semistructured questionnaire. Further, they reviewed 153 health records to get information about indications for the use of oxytocin. The results of their study indicated that there were inconsistences between the knowledge that healthcare providers possessed and the practices they performed. Also, the results revealed that oxytocin was stored in natural conditions at room temperature without special arrangements for cooling. Overall, the participants lacked knowledge of the recommended indications for the use of oxytocin and how to store it. Although the authors used triangulated

data collection methods that enhanced the strength of the study, they did not explain how they conducted and analyzed their observations. Also, they used a semistructured questionnaire, which is more suitable for qualitative rather than quantitative studies without giving a rational for using a semistructured rather than a structured questionnaire.

On the other hand, a qualitative study conducted by Oliver et al. (2018) in Ethiopia, India, and Myanmar aimed to investigate the perspectives and practices of stakeholders in low-income and lower-middle-income countries toward oxytocin, its storage requirements and associated barriers, and the quality of the product available. These countries were selected to represent the regions carrying a high burden of maternal mortality. The sample consisted of 158 participants (pharmacists, midwives, nurses, doctors, and obstetricians) and 40 key informants (supply chain experts, program managers, and policy makers). Data were collected through 12 focus group discussions and 106 in-depth interviews as well as direct observations at healthcare facilities in order to triangulate the responses of the participants about oxytocin storage practices and the cold chain infrastructure. The authors analyzed the collected data using a thematic content analysis framework. The results showed that there was a difference in knowledge between health care providers in the three cities. Also, healthcare providers, policy makers, and supply chain experts in Myanmar, Ethiopia, and India had inadequate knowledge of the heat sensitivity of oxytocin and the potential impacts of inconsistent cold storage on product quality. The study of Oliver et al. (2018) was qualitative in nature and sought to gain an in-depth understanding of the problem under study. However, conducting this study in three different countries at the same time would achieve a purpose of comparison between countries in relation to the problem. Further, the method of analysis adopted for the observations was not described, which makes the observations questionable.

In Egypt, a descriptive study conducted by Roma, Al-Battawi, and Zaki (2014) aimed to determine nurses' level of compliance with oxytocin administration guidelines during labor. The sample size consisted of 120 nurses working in the labor room in four different hospitals in Alexandria. Data were collected through the use of three validated tools: Tool I: Sociodemographic data questionnaire sheet, Tool II: Nurses' knowledge about oxytocic administration questionnaire, and Tool III: Nurses' compliance with oxytocic administration observational checklist. The main study findings revealed that 87% of the participants had fair or poor knowledge and all the them had poor practices. Although the study was descriptive, the validated instrument captured the actual level of knowledge and practices of the participants.

In India, Mousumi (2020) conducted a one group pretest posttest study that aimed to assess the knowledge of staff nurses about induction of labor by pretest and to assess the effectiveness of a self-instructional module by comparing pretest and posttest scores among the staff nurses. The participants

were selected using a nonprobability convenience sampling technique. The instrument of assessment was a structured questionnaire. The sample size was 50 staff nurses, which was considered a small sample for the study and might have affected the external validity of the study. The results revealed that there was a significant increase in knowledge from 90% having inadequate knowledge and 0% having adequate knowledge in the pretest to 74% having moderately adequate knowledge and 16% having adequate knowledge. The results of the pretest reflected the poor knowledge level of staff nurses regarding induction of labor.

Also in India, Deepak et al. (2013) conducted a qualitative research study and applied a case study approach in two districts with contrasting features to investigate evidence gaps in order to document health care providers' and community members' knowledge, attitudes, and practices regarding the use of uterotonics during labor and delivery. A total of 140 health care providers and community members were selected by using the snowball sampling method. The information for the study was obtained by conducting semistructured in-depth interviews. Thematic coding and content analysis was performed using NVIVO 8.0 software. The results of the study showed that a group of factors affected the misuse of a uterotonic drug for pain during labor, the evaluation of the mother while in labor, and the early use of a uterotonic drug. The results also revealed that the participants had incomplete and inconsistent knowledge about uterotonics (oxytocin mainly), including appropriate dosage, required monitoring, and storage requirements. As the study was qualitative in nature, it covered a wide range of perspectives, and was therefore able to generate a comprehensive picture of why and how uterotonics were used during labor and delivery, and how providers and community members perceived this use, which strengthened the study. However, the authors admitted that it was not possible to conduct multiple interviews with subjects, which would have enabled further probing on specific topics that emerged from the interviews with other participants.

Sasagawa et al. (2016) conducted an explorative qualitative study to explore knowledge, attitudes, and practices of health care providers regarding the use of oxytocin for induction in Cambodia. The sample consisted of 10 women (seven primipara and three multipara) and 12 health care providers (three doctors and nine midwives). The sample size was considered adequate. The result revealed that the health care providers showed a lack of knowledge, improper practices, and low attitude regarding oxytocin dosage for inducing labor, and that they performed inappropriate practices during oxytocin administration compared to the global protocol.

In a study conducted in Malawi, Hage, Khuluza, and Heide (2020) appraised the knowledge of health care providers regarding the process of storing oxytocin. The authors found that the method for storing oxytocin was

incorrect and improper in health facilities, which reflected the health care providers' lack of knowledge regarding the method of oxytocin storage.

From the above review of the literature, there is a lack as well as inconsistencies and improper knowledge and practices of oxytocin use as a method of labor induction in several settings.

2.6 Effect of demographics on knowledge and practices of health care providers regarding oxytocin

Sociodemographic factors can be associated with the knowledge and practices of health care providers in respect of induction of labor (Allegranzi et al., 2018). Sociodemographic factors include age, gender, educational level, years of experience, and income. Several studies have been unable to determine the effect on knowledge and practices regarding the use of oxytocin as a method of induction.

In Turkey, Lohani (2020) conducted a study to investigate the relationship between nurses' knowledge and practices regarding oxytocin administration and their demographics (age, education status, work experience, maternity ward experience, and training on oxytocin). The study results showed that age and work experience in maternity ward did not have a significant relationship with level of knowledge and level of practices on oxytocin administration.

However, a study conducted in Alexandria by Roma, Al-Battawi, and Zaki (2014) on the effect of demographic factors on level of knowledge revealed that there was a significant positive relationship between nurses' knowledge about oxytocin administration and their sociodemographic characteristics (position, original residence, and type of family) and the nature of their work (specifically the number of women assigned to each nurse per shift).

Similarly, Esmail Shady et al. (2020) found a statistically significant relationship between the average total knowledge score of nurses and their working shift and years of experience. However, the results showed that there was no statistically significant relationship between the average total practice score of the nurses and their demographic characteristics or work characteristics.

On the other hand, a study conducted in Iraq by Thamer and Abbas (2014) to assess nurses' knowledge regarding oxytocin administration during labor found a statistically significant relationship between the level of knowledge, work time shifts, and implementation of orders, while there was no significant relationship between the level of knowledge and age, experience year, level of education, and training courses in nursing.

From the above discussion, there is a lack of studies that focus on the relationship between the demographics of health care providers and their knowledge and practices of using oxytocin as a method labor induction. Further, there is also inconsistency among the studies on the effects of various

demographics on the level of knowledge and level of practices of using oxytocin as a method labor induction.

2.7 Effect of oxytocin induction on maternity and neonatal outcomes

Using oxytocin as a method labor induction can lead to serious maternal and neonatal outcomes if used improperly. Lopezosa, Hidalgo-Maestre, & Rodríguez-Borrego (2016) conducted a study in South of Spain to assess the outcomes of labor stimulation with oxytocin on maternal and neonatal outcomes. The descriptive and analytical design was used with a sample size of 338 giving birth women, which was considered a large sample size. The primary consequences of oxytocin induction were: increased the rate of cesarean sections, epidural anesthesia, and intrapartum maternal fever in primiparous and multiparous women. However, it no longer had an effect related to the rate of third and four-degree perineal lacerations, episiotomies, neonatal resuscitation, and had not effect in assessing Apgar score of newborns in 5-minute and meconium staining.

On the other hand, Karya et al. (2016) conducted a descriptive and cross-sectional, case-control design study in India to evaluate maternity and neonatal consequences with using intravenous oxytocin. The sample size was 295 pregnant women post-term in the labor ward divided into two groups; 170 women were exposed to oxytocin and 125 women were not exposed to oxytocin. The researchers used an appropriate sample size and case-control design study. The first group exposed to oxytocin were at high risk for maternal and neonatal outcomes in comparison with a control group who did not expose to oxytocin. The maternal outcomes were: cesarean section (22.3%), nausea and vomiting (27.8%), hyperstimulation of uterine contraction 2.9%, and post-partum hemorrhage (12.3%). The neonatal outcomes were: neonatal hyperbilirubinemia (18.24%,) meconium aspiration syndrome (8.25%), respiratory distress (9.28%), 1 min Apgar score <7 (4.7%) while (6%) had 5 min Apgar score <7 and needed admission to neonatal intensive care unit (27.64 %). Similarly, Zenzmaier et al. (2017) in Austria conducted a retrospective cohort study to measure maternal outcomes of oxytocin induction of labor. The study found that maternal outcomes were cesarean delivery and epidural analgesia, while the neonatal outcomes were: 5-min APGAR <7 and umbilical artery pH <7, and needed admission to the neonatal intensive care unit.

2.8 Situation in Jordan

The review of the Jordanian literature on knowledge and practices of oxytocin use as a method of labor induction among health care providers that was conducted for the present study revealed that some Jordanian studies focused on a range of issues related to labor and giving birth, but not specifically on knowledge and practices of oxytocin use. For example, Hatamlah et al. (2013) conducted a prospective cohort study in the North of

Jordan, which aimed to determine the impact of oxytocin as an induction method on maternal and newborn outcomes. The sample for the study consisted of 200 randomly selected primiparous women. The authors found that oxytocin significantly affected newborns through fetal distress leading to a low Apgar score at 1 and 5 minutes and babies needing resuscitation. They also found the following maternal outcomes: increased risk for operative delivery leading to perianal trauma. This type of trauma has a direct effect on postpartum hemorrhage, which then results in the woman suffering from a lack of hemoglobin for 6 weeks after giving birth.

Shaban et al. (2011) conducted a descriptive, explorative research study in Jordan to examine maternity hospital practices during childbirth and assess their consistency with evidence-based maternity care. The authors focused on six practices that are undertaken during labor: augmentation of labor, continuous electronic fetal monitoring, support in labor, episiotomy, position for birth, and oral fluids during labor. A sample of 400 women participated in the study. The participants were selected by the stratified sampling method. The most important results of the study were that many of the common childbirth practices that were routinely followed in the maternity hospitals were not evidence based and that beneficial practices were neglected while harmful practices or practices of unproven benefit were practiced.

Further, Khresheh, Homer, and Barclay (2009) found that the rates of a number of labor and birth practices that differed from the WHO guidelines and evidence-based recommendations were inappropriately high. The rates of augmentation of labor and episiotomy were particularly high, and seemed to be in excess of the WHO recommendations, which state that neither of these practices should be undertaken routinely (Khresheh, Homer, & Barclay, 2009).

2.9 Summary

This chapter provided an overview of the concept of the induction of labor and the different methods that can be employed. Induction of labor using oxytocin is a common practice.

The literature review conducted for this study indicates that a very limited number of studies have been specifically conducted to investigate health care providers' knowledge and practices of oxytocin induction of labor on a national scale. Moreover, there is a lack of studies about induction of labor in general and oxytocin induction in particular in the South of Jordan. This implies that this study is the first of its kind in the southern part of Jordan. In light of the literature review presented in Chapter 2, it seems that this study would make a valuable contribution in assessing health care providers' knowledge and practices of oxytocin induction of labor, and thus improving maternity care and birth outcomes.

Chapter Three
Methodology

3.1 Introduction

This study aimed to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan and to find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction**.**

This chapter presents the research methodology, including the study design, study setting, study population, sampling technique and sample size as well as the data collection procedure, study instrument, pilot study, data analysis technique, and ethical considerations.

3.2 Design

For this study, the researcher used a descriptive, correlational, cross-sectional design to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan. This design was used because the data would be collected at a single point in time. Further, correlational design helps in finding an association between variables that can be detected through statistical analysis (Polit and Beck, 2012).

3.3 Settings

The study was conducted in Al-Karak Governorate in the South of Jordan at two main public hospitals and two main private hospitals. The first public hospital is Al-Karak educational hospital, which is a teaching hospital affiliated to the MOH. It has a labor ward that contains two rooms for the first stage of labor with a capacity of seven beds; and two rooms equipped for the second stage of labor.

The second public hospital is Ghor Al-Safi hospital. It is located in Al-Karak Governorate. It has a labor ward that consists of one room (three-bed capacity) for the first stage of labor; one room for the second and third stages of labor (one-bed capacity); and one room for the fourth stage of labor (four-bed capacity).

The first private hospital is the Italian hospital, which was established in 1935. It has a labor ward that consists of one room (six-bed capacity) for the first stage of labor; one room for the second and third stages (two-bed capacity), and during the fourth stage of giving birth, the woman is transferred to the obstetric ward for observation.

The second private hospital is Al-Salam specialist hospital, which was established in 1965. It has a labor ward that consists of one room (three-bed capacity) for the first stage of labor; one room for the second and third stages

(one-bed capacity), and during the fourth stage, the woman is transferred to the obstetric ward for observation.

All four hospitals in which this study was conducted have a gynecology and obstetrics department. However, each department differs in relation to the number of beds, equipment and the number of referred cases. The hospital that tends to receive the most gynecology and obstetrics cases is Al-Karak hospital and cases are received from Ghor Al-Safi, Al-Salam and Italian hospitals in the event that the infrastructure is not available. The most important cases that are transferred to Al-Karak hospital are previous cesarean, severe preeclampsia, placenta previa, hysterectomy, myomectomy, hysteroscopy, molar pregnancy, ectopic pregnancy, malpresentation, missed abortion with history of previous cesarean and termination of pregnancy. At Al-Karak hospital, the percentage of normal births compared to a cesarean section varies from month to month.

Al-Karak hospital is the largest hospital in Al-Karak Governorate. It is an accredited teaching hospital. Further, it is a huge referral hospital that receives more patients than the other three hospitals included in this study. In comparison to the other public (Ghor Al-Safi) and private (Al-Salam and Italian) hospitals, Al-Karak hospital has a larger capacity and a greater number of medical staff. In the gynecology and obstetrics department, there are 48 nurses of different educational levels and 26 doctors of different educational levels. In 2020, the gynecology and obstetrics department received 4,132 of the 13,375 admissions to Al-Karak hospital.

The other hospitals in this study have between 10 and 15 nurses in their gynecology and obstetrics departments and there are no employed physicians on site. Ghor Al-Safi hospital refers their giving-birth mothers to Al-Karak hospital because it does not have a neonatal intensive care unit. In the private hospitals, specialists come to those hospitals according the mothers' preferences. According to the latest official figures published in 2019, the birth rate in the Al-Karak public hospital was 2,869 live births and in Ghor Al-Safi hospital it was 1,031 lives birth (MOH, 2019). The birth rates at the private (Al-Salam and Italian) hospitals are not known because they are not reported in the annual report published by the MOH.

3.4 Population, sampling technique, and sample size

The study population included nurses, physicians, and midwives from the selected hospitals, who were considered the target population in this study. Health care providers who were working in the selected hospitals were considered to be the accessible population. The convenience sampling method was chosen to select the study population. This method is based on nonprobability selection of the sample to be studied. The sample size was calculated based on Thorndike's rule (Thorndike, 1982), which requires 20 participants for each independent variable to ensure the validity of the statistical

conclusions. As there were seven variables in this study, a minimum of 140 participants was needed (n = 7 x 20 = 140).

Some inclusion and exclusion criteria were applied to select the study population:

Inclusion criteria: Physicians, specialists, registered nurses, midwives, and maternity nurses with work experience of more than 3 months who were working in the obstetrics and gynecology department in the selected hospitals in the South of Jordan. This was because that any new employee at hospitals would be trained for the first three months of his/ her job with a mentor, then he/ she will work independently with accountability.

Exclusion criteria: Health care providers who were working in other departments in the selected hospitals; any health care provider who was present temporarily in the obstetrics and gynecology department and any health care provider who was newly employed with experience of less than 3 months in the obstetrics and gynecology department in the selected hospitals.

3.5 Data collection method

The instrument for this study was adopted from Ejekam et al. (2019). The instrument consists of three parts: The first one is the demographical information sheet, which is used to collect data on the age, level of education, gender, and years of experience of the participant, the name and type of hospital, specialty in which the participant works, and whether the participant has been trained or not on oxytocin administration. The second part consists of seven questions that have more than one correct answer. The maximum obtainable score for this part is 40 points (i.e., 40 correct answers). The questions are designed to obtain information about health care providers' knowledge regarding oxytocin. The third part consists of 11 questions. The maximum score for this part is 11 points (i.e, one point for each correct answer). The questions concern the practices of health care providers regarding oxytocin use as a method of labor induction. In addition, for the purpose of this study, an additional question (composed of six items) was added to ask about the practices of nurses and midwives during oxytocin induction, which was answered only by nurses and midwives. The last question in the instrument was an open-ended question regarding the consequences or implications of poor oxytocin quality that might be seen or experienced in clinical practice. The participants answered this question by listing consequences if listed.

The Ejekam et al. (2019) -author of the original English-language instrument- was contacted for permission to use and modify the instrument. After permission was obtained, four experts in the field of MCH read the questions to validate the content of the questionnaire for use in this study. The instrument was then adjusted based on the revisions suggested by the experts. This involved removing one question and adding two new questions according to the experts' advice. Then, content validity was measured by calculating the

content validity index (CVI). The CVI value was high (0.97), which meant that the instrument was suitable for the purpose of the study. The instrument was not translated into the Arabic language because all of the participants were heath care professionals and were familiar with medical terms in the English language.

The original instrument was mostly descriptive in nature without scoring system. As one of the aims of this study was to find out the effect of demographics on knowledge and practices regarding oxytocin use in labor induction, the researcher sought and gained permission from the lead author of the original instrument to update the instrument and suggest a scoring system that would be useful for interpreting the results of the study. The scoring was based on giving one point for each correct answer to reflect the possession of knowledge, otherwise zero. A similar scoring system was applied to the questions about practices. Further, the median of the total scores was used as a cut-off point to determine whether the knowledge and practice levels were adequate or not. The reliability of the knowledge part (40 items) was 0.85, which is considered high, and the reliability of the practices part (17 items) was 0.7, which is also high (Polit & Beck, 2012), especially when taking into consideration that this is the first time that reliability of this updated version of the instrument has been measured.

3.6 Data collection procedure

The study was started at the beginning of March 2020, after approval of the mini proposal had been obtained and after all the required ethical approvals had been obtained from the MOH and Mut'ah University. Data collection was started in March 2020 and was completed by the end of August 2020.

The researcher approached the managers of the selected hospitals to complete the process of ethical approval. Then the researcher met with the head nurses of the maternity wards at the selected hospitals. The researcher explained the study and agreed with them a proper plan for data collection in their maternity wards. The data collection was performed inside the maternity wards of the selected hospitals because this made it easy to approach the health care providers who were using oxytocin for the induction of labor. At the time of the data collection those health care providers who met the inclusion criteria were approached by the principle investigator who briefly explained the study aim and the data collection procedure and invited them to participate in the study. Upon their agreement, the researcher gave the questionnaire to the participants and waited until the questionnaire was completed. If the participants were not sure about the meaning of any of the questions, they were able to ask the researcher directly to clarify them. This process ensured that all the distributed questionnaires were collected from all participants, as reflected in the response rate of 100%.

3.7 Pilot study

A pilot study was undertaken with 15 participants to test the instrument and modify it based on any comments received. The pilot study was conducted to investigate the following: the clarity of the items in each questionnaire, the time required to complete the questionnaire, and whether participants felt that they had enough opportunity to share their views.

The results of the pilot study signified that the study instrument was understandable and clear including all related responses. The health care providers did not ask for any additional information after piloting, and the time needed to complete the questionnaire ranged between 5 to 10 minutes. As the instrument was not been modified after the pilot study, the participants in the pilot were included in the sample.

3.8 Ethical considerations

Approval to conduct this study was sought and obtained from the Institutional Review Board of Mut'ah University (Appendix A). Then the approval of the manager of each of the four selected hospitals to collect information from their staff was sought and obtained (Appendix B). The participants were fully informed about the study purpose and significance, as well as their right to withdraw at any time and the benefits versus the risks of the study. Moreover, the contact information of the researcher was given to the participants, so that they could contact the researcher if they had any additional questions, remarks or comments to make. Participation was voluntary. Thus, participants were assured that they could withdraw at any time without any penalties. Written consent was given by each participant prior to his/her participation. The anonymity of the participants was maintained because no names were mentioned in the questionnaires. Also, to protect the participants' identity further, the researcher collected the distributed questionnaires at each selected hospital separately. Upon receipt of the completed questionnaires, each participant was assigned an identification number. The information gathered from the participants was kept on the personal computer of the researcher and was used for this study only. No other parties were able to access the participants' data. Further, permission to review the medical records of the women giving birth was obtained from the general managers of the selected hospitals.

3.9 Statistical analysis

The Statistical Package for the Social Sciences version 25 for Windows was used in the data analysis. Descriptive statistics, including mean (M), standard deviation (SD), frequency, and range were used to describe the demographic characteristics and the study dependent variables (knowledge and practice) based on the level of measurement. The question that was answered by nurses and midwives only in the practices part of the questionnaire was

analyzed descriptively and was not included in the total practices score. Also, the open-ended question- regarding the consequences or implications of poor oxytocin quality that might be seen or experienced in clinical practice- was analyzed descriptively then reporting the consequences in the results chapter.

Three inferential statistical techniques were also used. The first was the i independent sample t-test, which was used to compare mean differences between two groups in relation to total knowledge and practice scores (gender, type of health facility, and trained in the use of oxytocin with the total scores for knowledge and practices regarding oxytocin).

The second was the Spearman correlation, which was used to find out the relationship between the variables (age, education level, and work experience with the total scores for knowledge and practices regarding oxytocin).

The third was one-way analysis of variance (ANOVA), which was used to test for differences among more than two groups (occupation and name of hospital with total scores for knowledge and practices regarding oxytocin).

3.10 Summary

This chapter presented the basic strategies that were used to conduct this study. First, it explained how the study design, setting, and population were determined and the sampling method that was used to ensure that a suitable sample size was selected from the accessible population. Then it described the data collection procedure and instrument in detail, as well as the performance and results of the pilot study. The chapter also highlighted the approach that was taken to ensure that ethical considerations were met in respect of the participants. It also presented the details of the data analysis plan.

Chapter Four
Results

4.1 Introduction

This chapter presents the results of the study. The aims of this study were to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan and to find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction**.**

The findings on the participants' demographic characteristics and their knowledge and practice levels regarding oxytocin induction of labor are presented in the form of descriptive statistics. Some further inferential statistical analyses (t-test, ANOVA, and Spearman correlation) are also presented and discussed.

4.1 Data management

Data were checked for any missing values and entry errors before conducting the analysis. The checks showed that there were no missing data). Although the required sample size was 140 according to Thorndike's rule, a total of 131 health care providers were available and approached to participate in the study. The response rate was 100% because all the questionnaires were completed in the presence of the researcher who did not interfere in the process of filling in the questionnaire unless something was not clear, and so the researcher received the completed questionnaires directly.

4.2 Sociodemographic characteristics

The age of the participants ranged between 22 and 51 years (M = 32, SD = 5.8). The majority of the participants were female (n = 124, 94.7%), and held a diploma in midwifery (n = 49, 37%), so most of the participants were midwives. The mean of the participants' work experience was 8 years (SD = 6.6). The majority of the participants were working in public hospitals (n = 97, 74%) and most of them were in Al-Karak hospital (n = 77, 58.8%). More than 90% of the participants (n = 121, 92.4%) had undertaken training on the use of oxytocin. The sociodemographic profile of the participants is provided in Table 4.1 and the results a comparison of their sociodemographic characteristics according to occupational category are given in Table 4.2.

Table 4.1
Sociodemographic characteristics of the participants

Variables	***M (SD)***	***N (%)***
Age	32 (5.8)	131 (100%)
Experience	8 (6.6)	131 (100%)
Education level	16.4 (3.3)	131 (100%)
Gender		
Male		7 (5.3%)
Female		124 (94.7%)
Occupation		
Physician		24 (18.3%)
Registered nurse		47 (35.9%)
Midwife		60 (45.8%)
Type of hospital		
Public		97 (74%)
Private		34 (26%)
Name of hospital		
Al-Karak		77 (58.8%)
Ghor Al-Safi		22 (16.8%)
Al-Salam		16 (12.2%)
Italian		16 (12.2%)
Trained in the use of oxytocin		121(92.4%)
Yes		10 (7.6%)
No		

Table 4.2
Comparison of sociodemographic characteristics of health care providers by occupational category

Variable	**Gender**		**Hospital type**		**Training in the use of oxytocin**	
Occupational category	M (N %)	F (N %)	Public (N %)	Private (N %)	Yes (N %)	No (N %)
Physician	(7 29.2)	(17 70.8)	(23 95.8)	(1 4.2)	(23 95.8)	(1 4.2)
Nurse	-----	(47 100)	(26 55.3)	(21 44.7)	(40 85.1)	(7 14.9)
Midwife	-----	(60 100)	(48 80)	(12 20)	(58 96.7)	(2 0.3)

4.3 Descriptive statistics of health care providers' knowledge about oxytocin induction of labor

Table 4.3 presents the frequencies and percentages for the correct answers to the questions in the knowledge part of the questionnaire. The maximum total knowledge score is 40 points. The total knowledge scores ranged from 0 to 40 points. However, the participants' weakest level of knowledge was five correct answers out of 40 while the highest was 35 correct answers out of 40. The median was used as the cut-off point for adequate knowledge (*M = 16.4, SD = 6.67, median* = 16, n = 131). Sixty-nine (52.7%) of the participants had a total knowledge score <= 16, which means that more than half of the participants had inadequate knowledge. Only 47.3% (n = 62) of the participants achieved a total knowledge score >16, which denotes that they had adequate knowledge.

Table 4.3

Frequencies and percentages of correct answers for the knowledge items

Questions	No. of correct answers	(%)
Action duration of oxytocin (you may tick more than one answer)		
a) Used for induction of uterine	84	64.1
contractions	56	42.7
b) Works immediately after given by IV	72	55
c) Works in 3–5 minutes when given by IM		
Administration routes of oxytocin are (you may tick more than one answer)		
a) Directly into the vein	96	73.3
b) By IM	83	63.4
c) Diluted by intravenous fluids	111	84.7
What are the indications of oxytocin? (you may tick more than one answer)		
a) Stimulation of labor	77	58.8
b) Augmentation of labor	65	49.6
c) Induction of labor	90	68.7
d) Management of postpartum hemorrhage	90	68.7
Adverse effects of oxytocin on mother include	68	51.9
a) Nausea and vomiting	16	12.2
b) Postpartum hemorrhage	71	54.2
c) Tachycardia	47	35.9
d) Fluid retention		
Adverse effects of oxytocin on fetus		

include	16	12.2
a) Brain damage	117	89.3
b) Bradycardia	30	22.9
c) Fetal death	29	22.1
d) Neonatal jaundice		
What are the contraindications of oxytocin use? (you may tick more than one answer)	107	81.7
a) Fetal distress	61	46.6
b) Cephalopelvic disproportion	72	55
c) Abnormal fetal presentation	81	61.8
d) Placenta previa	82	62.2
e) Umbilical cord prolapsed	53	40.5
f) Cesarean section		
What are the side effects you have suspected as a result of oxytocin use? (you may tick more than one answer)		
a) Confusion	40	30.5
b) Hypertension	21	16
c) Hypotension	57	43.5
d) Seizures	22	16.8
e) Heart attack	17	13
f) Epilepsy	17	13
g) Difficulty in breathing	31	23.7
h) Dizziness	40	30.5
i) Palpitations	58	44.3
j) Headache (continuing or severe)	43	32.8
k) Irregular heartbeat	33	25.2
l) Uterine rupture	75	57.3
m) Pelvic or abdominal pain (severe)	56	42.7
n) Skin rashes	17	13
o) Itching	18	13.7

Table 4.3 shows that the majority of the participants (*n* = 84, 64.1%) reported that oxytocin is used for the induction of uterine contractions. However, 57% of them did not agree that oxytocin works immediately after given via the IV route to a woman in labor. In respect of the administration route, most of the participants selected “diluted by intravenous fluids” (*n* = 111, 84.7%). As regards the indications of oxytocin induction, the majority of the participants answered that postpartum hemorrhage is the most common indication (*n* = 90, 68.7%). Moreover, just over half (*n* = 71, 54.2%) of the participants answered that tachycardia is a common side effect for the mother, whereas a greater majority (*n* = 117, 89.3%) the participants answered that

bradycardia is a side effect for neonates. Most (*n* = 107, 81.7%) of the participants answered that oxytocin should not be used in cases of fetal distress. The other result of note was that over half (*n* = 75, 57.3%) of the participants correctly answered that they suspected that a uterine rupture was a result of oxytocin use.

4.4 Descriptive statistics of health care providers' practices regarding oxytocin induction of labor

Table 4.4 presents the frequencies and percentages for the correct answers to the questions in the practices part of the questionnaire. The questionnaire contained 11 questions about practices regarding oxytocin that were answered by all health care providers and one question (consisting of six items) that was answered by nurses and midwives only. So, the total practices score for all participants was 11 points. The median was selected as the cut-off point (*M* = 5.4, *SD* = 1.54, *M = 6, n* = 131) for indicating that proper practices were being performed. The number of correct answers ranged between two and nine points. Nearly three fourths (*n* = 97, 74%) of the participants had a total practices score of <= 6 (i.e., less than the median), which means that they were performing improper practices. Only 26 (*n* = 34) of them got a total practices score >6, which means that they were performing the proper practices.

Table 4.4

Frequencies and percentages of correct answers for oxytocin practices

Questions	**Practices *(correct practices in italics*)**	**(%)**
1) Who can administer oxytocin?		
a. Doctors	28	21.4
b. Nurses	8	6.1
c. Midwives	*6*	*4.6*
d. Doctors, midwives, and nurses	86	65.6
2) Who does often get the oxytocin?		
a. Clients	29	22.1
b. Hospitals	*97*	*74*
3) How is oxytocin stored?		
a. In a refrigerator	*109*	*83.2*
b. On the drug shelves	15	11.5
c. In the dark	6	4.6
d. Others	0	0

Questions	**Practices *(correct practices in italics*)**	**(%)**
4) What is the maximum dose of oxytocin that you use for induction of labor in primiparous women?	58	44.3
a. 5 IU	*57*	*43.5*
b. 10 IU	6	4.6
c. 15 IU	7	5.3
d. 20 IU	2	1.5
e. Others		
5) What is the maximum dose of oxytocin that you use for induction of labor in multiparous women?	*66*	*50.4*
a. 5 IU	28	21.4
b. 10 IU	4	3.1
c. 15 IU	18	13.7
d. 20 IU	15	11.5
e. Others		
6) What dose of oxytocin do you use for prevention of PPH [postpartum hemorrhage]?	7	5.3
a. 5 IU	*32*	*24.4*
b. 10 IU	16	12.2
c. 15 IU	63	48.1
d. 20 IU	10	7.6
e. Others		
7) What do you monitor to ensure that oxytocin is effective when used in labor?		
a. At least three uterine contractions of 40–60 seconds/10 minutes	19	14.5
b. Cervical dilation	10	7.6
c. Both A + B	*98*	*74.8*
d. Others	1	0.8
8) Is there a process (clinical summary, case note or a form) in place to document or report the perceived ineffectiveness of oxytocin used in your practices?	*75*	*57.3*
a. Yes	53	40.5
b. No		
9) If yes to the previous question, please specify where you document or report it		

Questions	**Practices *(correct practices in italics*)**	**(%)**
a. Case note	39	29.8
b. Clinical summary	35	26.7
c. Pharmacovigilance form	4	3.1
10) What do you do when the maximum recommended dose of oxytocin fails?		
a. Double the dose	17	13
b. Change drug	*54*	*41.2*
c. Cesarean section	49	37.4
d. Others	4	3.1
11) If you change drug, which drug do you change to?	10	7.6
a. Ergometrine	10	7.6
b. Misoprostol	*42*	*32.1*
c. Dinoprostone	6	4.6
d. Carbetocin	1	0.8
e. Carboprost		

Table 4.4 shows that the majority of the participants (*n* = 86, 65.6%) answered that doctors, nurses, and midwives can administer oxytocin and that the hospital facility is responsible for getting the oxytocin (*n* = 97, 74%). Moreover, 83.2% (*n* = 109) of the participants responded that they stored oxytocin in a refrigerator. Around one fourth of the participants (*n* = 58, 44.3%) used 5 IU of oxytocin as a maximum dose in primiparous women for induction of labor. The same dose of oxytocin (5 IU) was being used as a maximum dose to induce labor in multiparous women by 50.4% of the participants (*n* = 66). On the other hand, only 63 (48.1%) of the participants answered that they used 20 IU of oxytocin for the prevention of postpartum hemorrhage. The majority of the participants' responses showed that they monitored uterine contractions and cervical dilatation to ensure that the oxytocin was effective when used in labor (*n* = 98 74.8%). Around two thirds of the participants (*n* = 75, 57.3%) answered that there was a system in their hospitals to document the ineffectiveness of oxytocin in case notes (*n* = 39, 29.8%). One fourth of the participants' responded that the action that they took when the maximum dose of oxytocin failed was to change the drug (*n* = 54, 41.2%) as the first option and to change mode of delivery to cesarean section as the second option (*n* = 49, 37.4%). Only about one third of the participants answered that they changed the medication to dinoprostone (*n* = 42, 32.1%).

The last question in the instrument was an open-ended question regarding the consequences or implications of poor oxytocin quality that might be seen or experienced in clinical practice. The participants outlined the following

consequences: cesarean section, change in oxytocin dosage, change in treatment plan, prolonged labor, failed contractions then postpartum hemorrhage due to poor storage of oxytocin, bad management, no specific protocols for induction, and lack of experience, while 72% (n = 94) did not answer this question.

Table 4.5

Frequencies of correct oxytocin practices

Questions	**correct practices** *(Italic)*	**(%)**
12) Who can administer oxytocin		
e. Doctor	28	21.4
f. Nurses	8	6.1
g. Midwifes	*6*	*4.6*
h. Both doctors, midwifes, nurses	86	65.6
13) Who does often get the oxytocin	29	22.1
c. clients	*97*	*74*
d. hospitals		
14) How is oxytocin to be stored:		
e. In refrigerator	*109*	*83.2*
f. On the drug shelves	15	11.5
g. In the dark	6	4.6
h. Others	0	0
15) What is the maximum dose of oxytocin that you use for induction of labor in primiparous women?		
f. 5IU	58	44.3
g. 10IU	*57*	*43.5*
h. 15IU	6	4.6
i. 20IU	7	5.3
j. Others	2	1.5
16) What is the maximum dose of oxytocin that you use for induction of labor in multiparous	*66*	*50.4*
f. 5IU	28	21.4
g. 10IU	4	3.1
h. 15IU	18	13.7
i. 20IU	15	11.5
j. Others		
17) What dose of oxytocin do you use for prevention PPH		
f. 5IU	7	5.3
g. 10IU	*32*	*24.4*
h. 15IU	16	12.2

i. 20IU	63	48.1
j. Others	10	7.6
18) What do you monitor to ensure that the oxytocin is effective when used in labor?	19	14.5
e. at least three uterine contractions of 40-60 second /10 minute.	10	7.6
f. cervical dilation	*98*	*74.8*
g. both A+B	1	0.8
h. Others		
19) Is there process (clinical summary, case note or a form) in place to document or report perceived ineffectiveness of oxytocin used in your practices?	*75*	*57.3*
c. Yes	53	40.5
d. No		
20) If yes to previous question, please specify where did you document or report	39	29.8
d. Case note	35	26.7
e. Clinical summary	4	3.1
f. Pharmacovigilance form		
g.		
21) What do you do when maximum recommended dose of oxytocin fails:	17	13
e. Double the dose	*54*	*41.2*
f. Change drug	49	37.4
g. Caesarean section	4	3.1
h. Others		
22) If you change drug, which drug do you change to:		
f. Ergometrine	10	7.6
g. Misoprostol	10	7.6
h. Dinoprostone	*42*	*32.1*
i. Carbetocin	6	4.6
j. Carboprost	1	0.8

Additionally, because nurses and midwives have a special role to play during oxytocin administration, they were asked a specific question about what they did in this situation. The results in Table 4.6 show that most of them were performing their roles improperly. The proportion of nurses and midwives who correctly performed the necessary tasks during oxytocin administration ranged

between 55% (*n* = 76) and 71% (n = 97) in respect of the following: check the patient's name, check the number of units prescribed, make sure of the type and quantity of the appropriate fluid put it, noticing on a bottle liquid where oxytocin placed, recalculate drops from time to time, and monitor uterine contractions for frequency and intensity. Around only 50% of the nurses and midwives answered that they performed the step "recalculate drops from time to time," even though this is the main task that they must perform during oxytocin infusion.

Table 4.6
Nurses' and midwives' role during oxytocin administration (n = 107)

Nurses' and midwives' role	No. of yes (correct) answers	%
Check the patient's name	76	71
Check the number of units prescribed	66	62
Make sure of the type and quality of the appropriate fluid put it	72	67
Noticing on a bottle liquid where oxytocin placed	68	64
Recalculate drops from time to time	59	55
Monitor uterine contractions for frequency and intensity	67	63

4.5 The association between demographics and total knowledge and total practices scores for oxytocin induction of labor among health care providers (n = 131)

A Spearman correlation was run to determine the relationship between age, experience, education level (continuous variables) and the total knowledge score regarding oxytocin use to induce labor. The demographic variables in this test were tested for normality and it was found that they were not normally distributed, so a nonparametric test was used to assess the correlation. The result showed that there was a weak correlation between total knowledge score and age which was statistically significant (r = 0.1781, n = 122, p = 0.05), total knowledge score and experience (r = 0.258, n = 131, p = 0.005), total knowledge score and education level (r = 0.215, n = 131, p = 0.013) (Table 4.7).

Similarly, a Spearman correlation was run to determine the relationship between age, experience, education level (continuous variables) and the total practices score regarding the use of oxytocin to induce labor. The result showed that there was a weak correlation between total practices score and experience, which was statistically significant (r = 0.2, n = 116, p = 0.018) (Table 4.7).

Table 4.7
Spearman correlation of total knowledge score and total practices score with demographics

Variables		Age	Experience	Education level
Total knowledge score	Spearman correlation (r)	0.178	0.258	0.215
	Sig. 2-tailed (*p*-value)	0.05*	0.005*	0.013*
	N	122	116	131
Total Practices score				
	Spearman correlation (r)	0.13	0.2	0.105
	Sig. 2-tailed (*p*-value)	0.14	0.018*	0.23
	N	122	116	131

***Significant at p<= 0.05**

4.6 Results of independent t-test of relation between demographic data and total knowledge score for oxytocin use to induce labor among health care providers

An independent sample t-test was used to compare the total knowledge scores of male and female participants. The result revealed that the knowledge mean of the males and females was not significantly different (Table 4.8).

Similarly, an independent sample t-test was used to compare the total knowledge scores of public and private hospitals; and of participants who had been trained and who had not been trained in the use of oxytocin. The result revealed that the knowledge mean of participants working in public and private hospitals was not significantly different. Also, the results revealed that the knowledge means of the participants trained to use oxytocin and those who had not been trained to use oxytocin was not significantly different (Table 4.8).

Table 4.8
Independent t-test between total knowledge score and demographics

Demographics	N	M	SD	*t*	*P*
Gender					
Male	7	18.57	4.9	0.81	0.41
Female	124	16.45	6.7		
Type of hospital					
Public	97	17	6.73	1.3	0.195
Private	34	15.3	6.41		
Trained in the use of oxytocin					
Yes	121	16.7	6.77	-0.114	0.9
No	7	17	4.69		

*** Significant at p<= 0.054.7 One-way analysis of variance (ANOVA) between total knowledge score and demographics**

A one-way ANOVA was conducted to determine the impact of health care providers' occupation on the total knowledge score for using oxytocin as a method to induce labor. The results showed that there was a statistically significant difference in the mean between the different occupational categories (physicians, nurses, and midwives) (f (2) = 7.39, p = 0.00), which indicated that the physicians had a better level of knowledge regarding oxytocin use as compared to nurses and midwives (Table 4.8).

Similarly, a one-way ANOVA was conducted to explore the impact of health care facility type on the total knowledge score for using oxytocin as a method of labor induction. The results showed that there was a statistically significant difference in the mean between the Al-Karak, Ghor Al-Safi, Al-Salam, and Italian hospitals (f (3) = 3.42, p = 0.019), which indicated that health care providers at Al-Karak had better knowledge about the use of oxytocin to induce labor as compared to their counterparts in the other hospitals in this study (Table 4.9).

Table 4.9
One-way analysis of variance between total knowledge score compared to demographics

Groups	N	M	SD	F	P
Occupation					
Physician	24	21.8	6.03	7.39	0.00*
Nurse	47	14.6	5.30		
Midwife	60	16	6.88		
Name of hospital					
Al-Karak	77	17.71	6.81	3.42	0.019*
Ghor Al-Safi	22	14.22	5.60		
Al-Salam	16	13.12	3.77		
Italian	16	17.75	7.97		

*** Significant at p<= 0.05**

4.7 Independent t-test of relation between demographics and total practices score regarding oxytocin use to induce labor among health care providers

An independent t-test was used to compare sociodemographic differences (gender, type of hospital, and training in the use of oxytocin) in the means of the total practices score for the use of oxytocin in the induction of labor among health care providers. The result revealed that there was no statistically significant difference in the knowledge mean between male and female participants; between public and private hospitals; or between participants who had been trained and who had not been trained on oxytocin use (Table 4.10).

Table 4.10

Independent t-test between total practices score and demographics

Demographics	**N**	**M**	**SD**	***t***	***P***
Gender					
Male	7	4.1	1.46	-.23	0.05*
Female	124	5.5	1.52		
Type of hospital					
Public	97	5.47	1.59	0.58	0.56
Private	34	5.29	1.42		
Trained in the use of oxytocin					
Yes	121	5.57	1.5	1.6	0.1
No	7	4.52	1.6		

*** Significant at p<= 0.05**

4.8 One-way analysis of variance (ANOVA) between total practices score and demographics

A one-way ANOVA was conducted to determine the impact of health care providers' occupation on the total practices score for the use of oxytocin as a method labor induction. The results showed that there was no statistically significant difference in the mean between the three categories of occupation (physicians, nurses, and midwives).

A one-way ANOVA was also conducted to find out the impact of type of hospital on the total practices score for using oxytocin as a method to induce labor. The results showed that there was a statistically significant difference in the mean of the total practices score between the Al-Karak, Ghor Al-Safi, Al-Salam, and Italian hospitals ($f(3) = 3.08$, $p = 0.03$), which indicated that the health care providers working at Al-Karak hospital had better practices regarding oxytocin usage than those working at the other hospitals in this study (Table 4.11).

Table 4.11
One-way analysis of variance for total practices score compared to demographics

Groups	N	M	SD	F	P
Occupation					
Physician	24	5.33	1.60	1.03	0.361
Nurse	47	5.21	1.58		
Midwife	60	5.63	1.49		
Type of Hospital					
Al-Karak	77	5.55	1.60	3.08	0.03*
Ghor Al-Safi	22	5.22	1.54		
Al-Salam	16	4.5	1.54		
Italian	16	6	0.8		

* significant at p<=0.05

4.9 Summary

This chapter presented the findings and a description of the study variables. The final sample size for the study consisted of 131 participants who were working in the obstetrics and gynecology department of one of the four selected hospitals. The results showed that 52.7% of the participants (n = 69) had inadequate knowledge of the use of oxytocin for labor induction. Further, 74% of the participants (n = 97) were performing improper practices.

The results of the analysis showed that there was a positive correlation between total knowledge score and age, experience, and education level. They also showed that there was a positive correlation between total practices score and experience. Moreover, the results revealed that health care providers who were working at Al-Karak hospital had better knowledge and practice levels than those who were working in the other three hospitals. Also, male health care providers were performing better practices than their female counterparts. Finally, the results also showed that physicians had more knowledge than nurses and midwives in all of the hospitals in this study.

Chapter Five
Discussion and Conclusions

5.2Introduction

The aims of this study were to assess health care providers' knowledge and practices of oxytocin labor induction at public and private hospitals in Al-Karak Governorate in the South of Jordan and to find out the association between selected demographic variables of health care providers and their knowledge and practice levels regarding oxytocin induction**.**

This chapter focuses on discussing the major results of the study in relation to the existing literature on and around the research topic of interest. It also identifies the implications and recommendations for nursing practice, research and education.

The results of the analysis answered the research questions:

1. What are the health care providers' knowledge and practices regarding the use of oxytocin to induce labor at public and private hospitals in Al-Karak Governorate in the South of Jordan?
2. Is there an association between selected demographics of health care providers and their knowledge and practice levels regarding the use of oxytocin to induce labor at public and private hospitals in Al-Karak Governorate in the South of Jordan?

5.2 Health care providers' knowledge and practices regarding the use of oxytocin to induce labor

The results showed that more than half of the sample (52.7%, *n* = 69) had inadequate knowledge about using oxytocin for labor induction and most of the participants (74%, *n* = 97) were performing improper practices. It therefore seems that the participants' improper practices were affected by their low level of knowledge. These results are consistent with the results of Ejekam et al. (2019), who found evidence of inappropriate and inconsistent use of oxytocin through a descriptive cross-sectional study which aimed to assess clinical experiences with the quality of oxytocin used by healthcare providers in Lagos State, Nigeria. The 705 respondents in Ejekam et al. (2019) consisted 275 doctors and 430 nurses who were using oxytocin for obstetrics and gynecological services in 195 health facilities, and who were recruited by using the multistage sampling method. Although Ejekam et al. (2019) used a descriptive, cross-sectional design, this is considered a weak design, this weakness was compensated by the sample size and sampling method which were appropriate for representing the health care providers in the selected hospitals.

Similarly, the results of the present study are also consistent with results of Roma, Al-battawi, and Zaki (2014), who revealed that all subjects (120 nurses) in their study had weak knowledge and poor practices related to oxytocic administration. The authors used a descriptive design to determine the

level of compliance with oxytocin administration guidelines during labor. The finding that nurses had a low level of knowledge can be explained by taking into consideration that nearly half of the sample (45.8%) consisted of midwives who held a diploma degree, which means that their level of knowledge would be lower than that of physicians and nurses who have bachelor's or master degrees in their specialty, which have given them the opportunity to gain a greater level of knowledge.

5.3Impact of demographics on total knowledge score and total practices score for oxytocin induction of labor among health care providers

The results of the present study showed that there was a weak positive relationship between age, experience, and education level and the total knowledge score. The results also showed that there was a positive relationship between work experience and the total practices score. In other words, a greater number of years of work experience was related to an increased level of knowledge and improved practices. These results may be due to healthcare providers having stability in one area of work where their accumulative experience in this area would lead to an increase their level of knowledge and an improvement in their practices. These results support those of Shiny (2017), who, in a study among nurses in India, found a statistically significant association between the level of knowledge of the use of oxytocin with total working experience, experience in a maternity unit, and educational status. Similarly, it has been shown that as education level increases the knowledge level also increases and the practices that depend on knowledge also improve (Lohani, 2020; Shiny, 2017). However, our results contradict those of Thamer and Abbas (2014), who did not find a significant relationship between age, years of experience, and level of education and knowledge in their descriptive-analytic study on nurses' knowledge of oxytocin use in labor that was conducted among a convenience sample of 70 nurses.

In the present study, the health care providers fell into three occupational categories: nurses, midwives, and physicians (doctors). The results showed that knowledge and practices were different between health care providers according to occupational category. Specifically, it was found that physicians had more knowledge and better practices than nurses and midwives. The higher level of knowledge that was shown by physicians could be the result of the greater number of years of study required to become qualified in their area of specialization and the requirement to pass an annual examination. In contrast, nurses and midwives spend fewer years in undergraduate education without specialization at the level of a bachelor degree. Further, physicians are involved in continuous education and professional development courses to a greater extent than nurses and midwives (Abuidhail et al., 2021), so opportunities for nurses and midwives to update their knowledge and improve their practices are restricted. These results are consistent with Poudyal, Shrestha, and Onta (2014),

who reported similar findings. However, the results contradict those of Ejkema et al. (2019) for Nigeria, where it was found that nurses have more knowledge than physicians, but both nurses and physicians suffer from poor practices.

The results of the present study showed that the majority of the participants (92%) were working in Al-Karak public hospital. Also, the results showed that there was a statistically significant relationship between the name (type) of hospital and the level of knowledge and level of practices. The health care providers who were working in Al-Karak public hospital exhibited a higher level of knowledge and more proper practices than those in the other hospitals. This is likely to be due to the fact that Al-Karak hospital is the largest hospital in Al-Karak Governorate. In comparison to the other public (Ghor Al-Safi) and private (Al-Salam and Italian) hospitals, Al-Karak hospital has a larger capacity, as well as a greater number of medical staff than the other hospitals. It is also an accredited teaching hospital. Further, it is a huge referral hospital that receives more patients than the other hospitals in this study (MOH, 2019).

5.4 Practices of nurses and midwives when using oxytocin for labor induction

The results showed that there were differences between the nurses and midwives in terms of the proper performance of their specific roles when oxytocin was being used for the induction of labor (Table 4.5). Around 30% to 45% of them did perform the tasks that should perform (check the patient's name, check the number of units prescribed, make sure of the type and quantity of the appropriate fluid put it, noticing on a bottle liquid where oxytocin placed, recalculate drops from time to time, monitor uterine contractions for frequency and intensity). The results of the present study regarding the nurses and midwives' roles contradict the results of Thamer and Abbas (2014), who, in their study among nurses in Iraq, found that nurses knew about the need to observe mothers in the maternity ward and to perform the abovementioned practices. They are also contrary to the results reported by Cadet et al. (2019) in their study on nurses in India, where they found that nurses assessed mothers and their fetuses during oxytocin administration every 4 hours for maternal vital signs, uterine contractions and the FHR pattern. Indian nurses might follow a protocol to assess maternal and fetal responses during oxytocin induction.

These findings highlight the importance of providing continuous education and staff development courses for nurses and midwives to refresh their knowledge and enhance their practices.

5.5 Oxytocin dosage

One of the results regarding the practices performed by the participants in the present study was the administration of inappropriate doses of oxytocin in primiparous and multiparous women and in cases of postpartum hemorrhage. These doses were prescribed by physicians and administered by nurses or

midwives. The participants in the present study used a similar dose (5 IU of oxytocin) for both primiparous and multiparous women, whereas the recommended dose according WHO (2018) is different between these two groups. These results indicate that maternal care practices during labor and birth are not evidence-based practices, a finding that was also reported by Abuidhail et al. (2021). Further, other evidence-based guidelines (UK and Canada) recommend a low dose of oxytocin for induction and augmentation. The participants in the present study used 20 IU of oxytocin for the prevention postpartum hemorrhage, whereas WHO (2018) recommends 10 IU (IV/IM) for the prevention and treatment of this condition. The results of the present study also revealed that different doses of oxytocin (low and high) were used by healthcare providers. This result supports that of Ejekam et al. (2019) in Nigeria and that of Dhanya et al. (2019) in India, who found that health care providers (physicians) use different doses of oxytocin to prevent postpartum hemorrhage. However, the result of the present study contradicts that of Charles et al. (2019) in Egypt, where health care providers were found to use the recommended 10 IU dose of oxytocin for the prevention of postpartum hemorrhage.

5.6 Strength of the study

The study is considered to be the first study in South of Jordan that has focused on the use of oxytocin for induction of labor and on assessing the knowledge and practices of health care providers in respect of oxytocin-based induction. Further, this study included all heath care providers who were working in the obstetrics/gynecology departments in the selected hospitals at the time of the study.

5.7 Limitations

The most important limitation of this study was the sample size. Although the response rate was 100%, the sample size was 131 health care providers, which was less than the required sample size of 140 participants. This shortfall was because some health care providers were transferred to other hospitals in the South of Jordan during the timeframe of the study March to August 2020 . Another limitation of this study was that it was conducted in only one southern governorate (Al-Karak); however, there another four governorates are in the South of Jordan. So the results of this study cannot be generalized to all the governorates in the South of Jordan. The last limitation was that the researcher was one of the maternal nurses working in the obstetrics/gynecology department of Al-Karak hospital, however, the researcher role was only for answering queries of the participants.

5.8 Implications and recommendations of the study

1. **For nursing practice**

This study recommends developing and implementing an educational program for health care providers in the form of a continuous education program about oxytocin administration. It is also recommended that nurses and midwives should seek to participate in continuing education, as well as attend pre-service and in-service training programs on the guidelines for the safe administration of oxytocin administration both periodically and regularly.

Such an educational program should be implemented for health care providers in MOH, RMS and private sector hospitals to increase knowledge and enhance practices regarding oxytocin use to induce labor. Additionally, well-trained health care providers should be employed in obstetrics/gynecology departments to enhance the performance of proper practices related to oxytocin administration.

2. **For nursing education**

Nursing and midwifery education should focus on the evidence-based protocols and guidelines for the administration of uterotonic drugs such as oxytocin to induce labor so that nursing and midwifery students will be familiar with their roles during their clinical practice.

3. **For policy makers**

The MOH should develop national protocols based on the international protocols for oxytocin administration during labor and giving birth in order to raise awareness among for health care providers about the issues related to knowledge and practices regarding oxytocin as a method for the induction of labor.

4. **For nursing research**

Further studies are needed to assess the effectiveness of education sessions about knowledge and proper practices regarding oxytocin induction of labor among health care providers. Additionally, more studies can be performed on the application of updated guidelines on labor and giving birth in public and private hospitals in Jordan to build an evidence base for maternal care practices. It would be beneficial for further research to use an observation check list so that administration techniques are applied in the right manner and so that the occurrence of errors can be detected during the performance of such practices.

5.9 Conclusion

This study is the first study in the South of Jordan that has assessed the knowledge and practices of health care providers regarding oxytocin as a method of labor induction. It is also one of the few studies in Jordan to have studied this problem in depth. Based on the results of this study, it can be concluded that health care providers at public and private hospitals in Al-Karak Governorate in the South of Jordan have inadequate knowledge and perform improper practices of oxytocin labor induction. Some demographics (age, work

experience, and education level) were found to be associated with a higher level of knowledge. Also, work experience was found to be positively associated with performing proper practices. It was also found that gender (male) and type of hospital (public) enhanced the knowledge and practice levels regarding the use of oxytocin as a method of labor induction. Therefore, developing and implementing an educational program for health care providers in the form of a continuous education program about oxytocin administration is urgently needed.

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Appendix (I)
Ethical Approval From Research Ethical Committee

بسم الله الرحمن الرحيم

كلية التمريض
Faculty of Nursing
Ethical Committee

جامعة مؤتة
Mu'tah University

Date: 21th May 2020

Dear Azhar Faries Zayadeen

In reference to the proposal entitled " **Health Care Providers' Knowledge and Practices of Oxytocin Induction of Labor in Southern of Jordan " (Proposal No EC6/2020)**

You are Kindly informed that the Ethical committee at Faculty of Nursing / Mutah University, has reviewed and approved the final version of following documents that have been submitted on the 5/05/ 2020:

1. Proposal
2. Information sheet
3. Consent form
4. Questionnaire

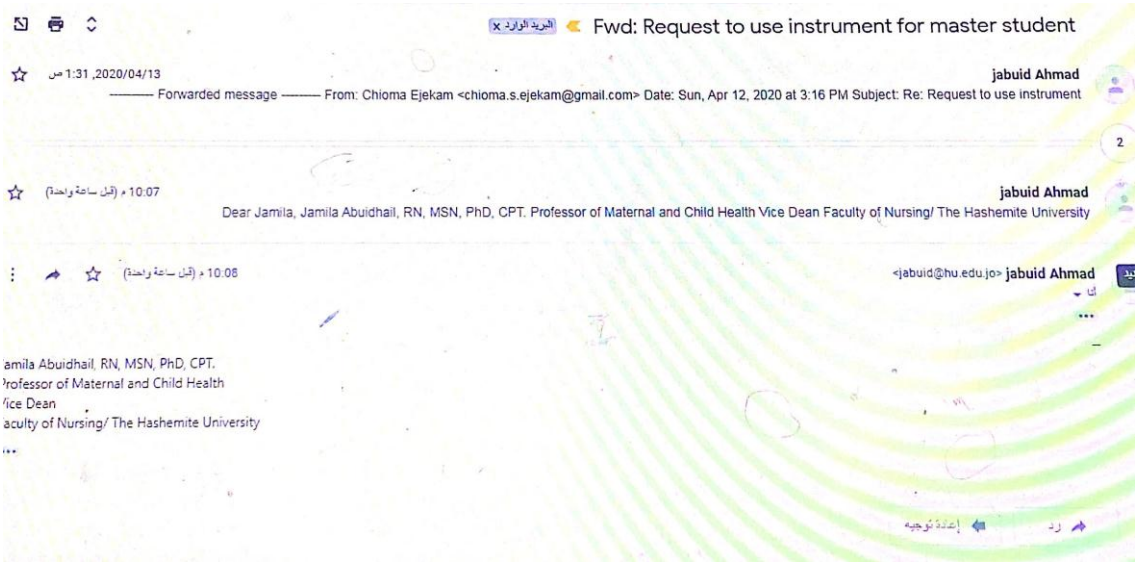
Please inform the ethical Committtee of any publication that may result from this study. The Ethical Committee at Faculty of Nursing wish you a successful study.

Sincerely

Chief of Scientific Ethics Committee

Associate Professor Reham Khresheh

Appendix (II)
Ejkema approval to use the questionnaire


البريد الوارد
Fwd: Request to use instrument for master student
jabuid Ahmad
ص 1:31 ,2020/04/13
-------- Forwarded message --------- From: Chioma Ejekam <chioma.s.ejekam@gmail.com> Date: Sun, Apr 12, 2020 at 3:16 PM Subject: Re: Request to use instrument
2
jabuid Ahmad
م 10:07 (قبل ساعة واحدة)
Dear Jamila, Jamila Abuidhail, RN, MSN, PhD, CPT. Professor of Maternal and Child Health Vice Dean Faculty of Nursing/ The Hashemite University
jabuid Ahmad <jabuid@hu.edu.jo>
م 10:08 (قبل ساعة واحدة)
amila Abuidhail, RN, MSN, PhD, CPT.
rofessor of Maternal and Child Health
ice Dean
aculty of Nursing/ The Hashemite University
إعادة توجيه
رد

Appendix (III)

Letter to facilitate the study from Mutah University to mangers

MUTAH UNIVERSITY
College of Graduate Studies

جامعة مؤتة
كلية الدراسات العليا

Re.................. الرقم: ك.د.ع/ ٩٧/١٧/٩٧

Date:.................... التاريخ: ....هـ

الموافق: ...٨.../...٥.../...... م

السادة مستشفى غور الصافي المحترمين

تحية طيبة وبعد،،،

فارجو التكرم بتسهيل مهمة الطالبة ازهار فارس زيادين، الرقم الجامعي (620181411013) والتي تدرس في جامعة مؤتة ماجستير / تخصص صحة الام وحديثي الولادة وذلك من اجل الحصول على المعلومات والبيانات اللازمة لاعداد دراستها والموسومة بـ" **Health Care Providers Knowledge and Practice of Oxytocin Induction of Labor in Southern of Jordan** " والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

شاكرين لكم اهتمامكم وحرصكم على التعاون مع جامعة مؤتة، ودعمها لتحقيق أهدافها في خدمة هذا الوطن في ظل حضرة صاحب الجلالة الهاشمية الملك عبدالله الثاني ابن الحسين المعظم يحفظه الله ويرعاه.

وتفضلوا بقبول فائق الاحترام ،،،

عميد كلية الدراسات العليا

أ.د. عمر نواف المعايطة

وزارة الصحة
مستشفى غور الصافي
الرقم:
التاريخ:

MUTAH-KARAK-JORDAN
Postal Code: 61710
TEL: 03/2372380-99

مؤتة - الكرك - الأردن
الرمز البريدي: 61710
تلفون: 03/2372380-99
فرعي: 6131-4050

بخصوص مضمون كتابكم رقم 90/107/973 تاريخ

الطالب احمد اكرم جميل ابو الرقم

جامعة مؤتة
كلية الدراسات العليا

MUTAH UNIVERSITY
College of Graduate Studies

100

الرقم: ك د ع / ٩٧٧/١٠٧/٩٧ Re.................

التاريخ: ....هـ Date:.....................

الموافق: ٦/٥/٢٠٢١م

السادة مستشفى السلام المحترمين

تحية طيبة وبعد،،،

فارجو التكرم بتسهيل مهمة الطالبة ازهار فارس زيادين، الرقم الجامعي (620181411013) والتي تدرس في جامعة مؤتة ماجستير / تخصص صحة الام وحديثي الولادة وذلك من اجل الحصول على المعلومات والبيانات اللازمة لاعداد دراستها والموسومة بـ"(**Health Care Providers Knowledge and Practice of Oxytocin Induction of Labor in Southern of Jordan)** " والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

شاكرين لكم اهتمامكم وحرصكم على التعاون مع جامعة مؤتة، ودعمها لتحقيق أهدافها في خدمة هذا الوطن في ظل حضرة صاحب الجلالة الهاشمية الملك عبدالله الثاني ابن الحسين المعظم يحفظه الله ويرعاه.

وتفضلوا بقبول فائق الاحترام ،،،،

عميد كلية الدراسات العليا

أ.د. عمر نواف المعايطة

ن س / تسهيل مهمه

مؤتة – الكرك – الأردن
الرمز البريدي: 61710
تلفون: 03/2372380-99
فرعي 6131-4050

MUTAH-KARAK-JORDAN
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Ext. 6131-4050
FAX:03/2375694

جامعة مؤتة
كلية الدراسات العليا

MUTAH UNIVERSITY
College of Graduate Studies

الرقم :ك.د.ع/٩٧٧/١٠٧/٩٧
التاريخ : ....هـ
الموافق: ....٢٠٢٠/٥/٢٠...م.

Re................
Date:....................

السادة مستشفى الايطالي المحترمين

تحية طيبة وبعد،،،

فارجو التكرم بتسهيل مهمة الطالبة ازهار فارس زيادين، الرقم الجامعي (620181411013) والتي تدرس في جامعة مؤتة ماجستير / تخصص صحة الام وحديثي الولادة وذلك من اجل الحصول على المعلومات والبيانات اللازمة لاعداد دراستها والموسومة بـ"(**Health Care Providers Knowledge and Practice of Oxytocin Induction of Labor in Southern of Jordan**) " والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

شاكرين لكم اهتمامكم وحرصكم على التعاون مع جامعة مؤتة، ودعمها لتحقيق أهدافها في خدمة هذا الوطن في ظل حضرة صاحب الجلالة الهاشمية الملك عبدالله الثاني ابن الحسين المعظم يحفظه الله ويرعاه.

وتفضلوا بقبول فائق الاحترام ،،،،

عميد كلية الدراسات العليا
أ.د. عمر نواف المعايطه

ن س / تسهيل مهمه

مؤتة – الكرك – الأردن
الرمز البريدي :61710
تلفون :99-03/2372380
فرعي 6131-4050
فاكس 03/2 375694
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TAH-KARAK-JORDAN
tal Code: 61710
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جامعة مؤتة
كلية الدراسات العليا

MUTAH UNIVERSITY
College of Graduate Studies

الرقم: ك.د.ع ٩٧/١٠٧/٩٨٧٤
التاريخ: ....هـ
الموافق: ٢٠٢١/٥/٢٠م

Re.................
Date:....................

السادة مستشفى الكرك الحكومي المحترمين

تحية طيبة وبعد،،،

فارجو التكرم بتسهيل مهمة الطالبة ازهار فارس زيادين، الرقم الجامعي (620181411013) والتي تدرس في جامعة مؤتة ماجستير / تخصص صحة الام وحديثي الولادة وذلك من اجل الحصول على المعلومات والبيانات اللازمة لاعداد دراستها والموسومة بـ"(**Health Care Providers Knowledge and Practice of Oxytocin Induction of Labor in Southern of Jordan**) " والتي تقوم بها استكمالاً لمتطلبات الحصول على درجة الماجستير.

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وتفضلوا بقبول فائق الاحترام ،،،،

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الموقع الالكتروني http://www.mutah.edu.jo/gradest/derasat.htm

Appendix (IV)

Questionnaire Consent Form

Title of the study: "Health Care Providers' Knowledge and Practices of Oxytocin Induction of Labor in Southern of Jordan"

العنوان:**" المعرفة والممارسات لمقدمي الرعاية الصحية بما يخص استخدام الأوكسيتوسن في تحريض المخاض في جنوب الاردن"**

عزيزي المشارك \ عزيزتي المشاركة :

أنا طالبة ماجستير في تخصص تمريض صحة الأم وحديثي الولادة في كلية التمريض / جامعة مؤتة، تهدف هذه الدراسة إلى: التعرف على معرفة وممارسات مقدمي الرعاية الصحية بما يخص استخدام الأوكسيتوسن في تحريض المخاض في المستشفيات الحكومية والخاصة في محافظة الكرك/ جنوب الأردن، كما تهدف إلى معرفة تأثيراستخدام الأوكسيتوسن في تحريض المخاض عند السيدات الحوامل على نتائج عملية الولادة في المستشفيات الحكومية و الخاصة في محافظة الكرك/ جنوب الأردن

دورك في الدارسة :

كل ما عليك عمله هو أولا تعبئة الورقة الخاصة بالمعلومات الشخصية وطلب المساعدة من الباحث ، ثانيا : الاجابة على أسئلة الباحث فيما يخص موضوع البحث من خلال الاستبانة .

الفائدة والضرر المترتبة على المشارك في هذا البحث :

بالرغم من أنه لا يوجد فائدة مباشرة من مشاركتك ، الا أ ن معلوماتك قد تفيدنا في التعرف على اهم اسباب المشكله . ومن المؤمل أن هذه الدراسة سوف تقدم نتائج قيمة يمكن أن تكون نقطة بداية لدراسات قادمة بخصوص هذا الموضوع .

سرية المعلومات : لن يتطلب كتابة الاسم على ورقة المعلومات ، سيتم التعامل مع المعلومات بمنتهى السرية وسيتم حفظها في مكان آمن .

علما بان المشاركة اختيارية ويمكنك الانسحاب من المشاركة في أي لحظة دون شرح الأسباب ولن يطلب منك المشاركة مرة أخرى .

شاكرين لكم الاستجابة مسبقا

الباحثة :ازهار فارس الزيادين كلية الدراسات العليا \ جامعة مؤتة

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Questionnaire Consent Form

نموذج الموافقة على المشاركة في البحث :

عنوان الدراسة: **"المعرفة والممارسات لمقدمي الرعاية الصحية بما يخص استخدام الأوكسيتوسن في تحريض المخاض في جنوب الاردن"**

لقد قرأت وفهمت كامل المعلومات في ورقة معلومات البحث و أوافق على استكمال المشاركة في تعبئة الاستبانة ، واعلم ان المشاركة في البحث اختيارية ويمكنني الانسحاب بأي وقت ودون شرح الأسباب ، وأعلم أن المعلومات ستعامل بسرية تامة .

أوافق على المشاركة في البحث

التوقيع.....

التاريخ.....

شكرا لتعاونك والموافقة على الاشتراك

Health Care Providers' Knowledge and Practices of Oxytocin Induction of Labor in Southern of Jordan

SECTION A: SOCIO-DEMOGRAPHICS OF RESPONDENTS

2. Age ……..
3. Gender
   a) Male
   b) female
4. Education level: …….

SECTIONB: OCCUPATIONAL HISTORY OF RESPONDENTS

5. Job
   a) Doctor
   b) Nurse
   c) Midwife
6. Years of working experience……
7. What type of health facility do you practice in?
   a) Governmental
   b) Private
8. Name of hospital:
   a) Al- Karak hospital
   b) Ghor Al-Safi
   c) Asalam hospital
   d) Italian hospital
9. Have you been trained using of Oxytocin?
   a) Yes
   b) No

SECTION C: GENERAL KNOWLEDGE

10. Action duration of Oxytocin (you may tick more than one answer)
    a) Uses for induction of uterine contractions
    b) Works immediately after giving I.V.
    c) Works through (3-5) minutes when given I.M.

11. Administration routes of Oxytocin are (you may tick more than one answer)
    a) Directly in vein
    b) By I.M
    c) Diluted by intravenous fluids
12. What are the indications of oxytocin? (you may tick more than one answer)
    a) Stimulation of labour
    b) Augmentation of labour
    c) Induction of labour
    d) Management of post-partum Haemorrhage
    e) Others, please specify ……
13. Adverse effects of Oxytocin on mother include
    a) Nausea and vomiting
    b) Postpartum haemorrhage
    c) Tachycardia
    d) Fluid retention
14. Adverse effects of Oxytocin on fetus include
    a) Brain damage
    b) Bradycardia
    c) Fetal death
    d) Neonatal jaundice
15. What are the Contraindications of oxytocin use? (you may tick more than one answer)
    a) Fetal distress
    b) Cephalopelvic Disproportion
    c) Abnormal fetal presentation
    d) Placenta previa
    e) Umbilical cord prolapsed
    f) Cesarean section
16. What are the side-effects you have suspected as a result of oxytocin use? (you may tick more than one answer)
    a) Confusion
    b) Hypertension
    c) Hypotension
    d) Seizures

e) Heart attack

f) Epilepsy

g) Difficulty in breathing

h) Dizziness

i) Palpitations

j) Headache (continuing or severe)

k) Irregular heartbeat

l) Uterine rupture

m) Pelvic or abdominal pain (severe)

n) Skin rashes

o) Itching.

SECTION D: CLINICAL EXPERIENCE WITH OXYTOCIN (PRACTICES)

17. Who can administer oxytocin in your practice?

a) Doctors

b) Nurse

c) Midwives

d) Both doctors and nurses/midwives

18. Who does often get the oxytocin?

a) Clients

b) Hospital facilities

19. How is oxytocin to be stored?

a) In refrigerator

b) On the drug shelve

c) In the dark

d) Others ……

20. What is the maximum dose of oxytocin that you use for Stimulation/augmentation/induction of labour in primiparous women?

a) 5 IU

b) 10 IU

c) 15 IU

d) 20 IU

e) Others

21. What is the maximum dose of oxytocin that you use for stimulation/augmentation/induction of labour in multiparous women?

a) 5 IU
b) 10 IU
c) 15 IU
d) 20 IU
e) Others

22. What dose of oxytocin do you use for the prevention of primary postpartum hemorrhage?

a) 5 IU
b) 10 IU
c) 15 IU
d) 20 IU
e) Other

23. What do you monitor to ensure that the oxytocin is effective when used in labour?

a) At least three uterine contractions of 40 to 60 seconds each in over 10 minutes
b) Cervical dilatation
c) Both a. and b.
d) Others…….

24. Is there a process/system (e.g. clinical summary, case note or a form) in place to document or report perceived ineffectiveness of oxytocin or drugs used in your practice?

a) Yes b) No

25. If 'yes' to question 23, please specify where did you document or report this?

a) Case note
b) Clinical Summary
c) Pharmacovigilance form

26. What do you do when maximum recommended dose of oxytocin fails?

a) Double the dose
b) Change drug
c) Caesarean section
d) Others ……

27. If you change drugs, which drug do you change to?
    a) Ergometrine
    b) Misoprostol
    c) Dinoprostone
    d) Carbetocin
    e) Carboprost
28. Nurse's and midwife's role in Oxytocin administration: (you may tick more than one answer)
    a) Ensure of the patients' name
    b) Ensure of the number of units prescribed
    c) Make sure of the type and quantity of the appropriate fluid put it
    d) Spotting on a bottle liquid where Oxytocin placed
    e) Re-calculate drops from time to time
    f) Monitoring uterine contractions in case of frequency and intensity

29. Please, outline the consequences or implications of poor oxytocin quality that may you have seen or experienced in your clinical practice.

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المعلومات الشخصية

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الكلية: التمريض

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