Nurses' Performance Regarding the Guidelines for Prevention of Postpartum Hemorrhage

Hend Magdy Mohamed (1), Nevein Mohamed Hasanein (2), Hend Ali Mohamed (3), Nora Refat Mohamed (4)

(1) Demonstrator in Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt

(2) Assist. Professor of Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt.

(3) Lecturer of Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt.

(4) Lecturer of Obstetrics and Gynecological Nursing, Faculty of Nursing, Suez Canal University, Egypt.

Abstract

Background: Postpartum hemorrhage (PPH) remains the leading cause of maternal morbidity and mortality worldwide. Nurses play a critical role in prevention, early recognition and adequate management of PPH in the early postpartum period. **Aim**: to assess nurses' performance regarding the guidelines for prevention of postpartum hemorrhage. **Design:** A descriptive design was utilized to conduct the current study. **Settings:** labor and postpartum units at Suez Canal University Hospitals, Ismailia, Egypt. **Sample:** A convenient sample of 75 nurses who provide direct care for laboring and postpartum women. **Tools of data collection:** Three tools were utilized: 1) structured self-administered questionnaire about nurses' personal characteristics and knowledge, 2) Observational checklist and 3) Nurse's attitude Likert Scale. **Results:** More than half of the studied nurses (54.7%) had an average level of total knowledge regarding PPH in which about half (50.7%) of them had correct knowledge regarding nurses' role in third stage of labor to prevent postpartum hemorrhage. The majority of the studied nurses (86.7%) had a poor level of total practice regarding guidelines for prevention of postpartum hemorrhage. Most of the studied nurses (84%) showed a positive attitude. There was statistically significant positive correlation between nurses' practice, and their attitude (r=0.251; P= 0.03*). **Conclusion:** The studied nurses had an average level of knowledge and a poor level of practice regarding the prevention of PPH, while the great majority of them had a positive attitude towards the prevention of PPH. **Recommendations:** Providing periodic training programs and workshops about prevention of PPH to improve the performance of nurses working in labor and postpartum units along with periodic evaluation of nurses' knowledge, practice and attitude.

Keywords: Nurses' Performance, Postpartum hemorrhage, guidelines, Prevention.

1. Introduction

Pregnancy and childbirth are transformative and beautiful experiences, but they also carry inherent risks for both the mother and the baby. Every day in 2020, almost 800 women died from preventable causes related to pregnancy and childbirth. The four major causes of maternal deaths

that account for nearly 75% of all maternal deaths are obstetric hemorrhage (mostly bleeding after childbirth), infections, hypertensive disorders and obstructed labor ***(WHO, 2023)***.

Efforts to reduce maternal mortality and improve maternal health require a comprehensive approach that addresses both medical and socio-economic factors. This includes ensuring access to prenatal care, skilled attendance during childbirth, emergency obstetric care, family planning services, and postpartum support **(*Olonade et al., 2019).***

The postpartum period, often referred to as the "fourth trimester," is a critical time in a woman's life that follows childbirth. It typically begins immediately after the delivery of the baby and lasts for approximately six weeks. During this time, a woman's body undergoes various physical and emotional changes as it recovers from pregnancy and childbirth ***(Bonde et al., 2021).***

Postpartum hemorrhage is a leading cause of maternal morbidity and mortality, contributing to a substantial number of deaths each year that accounting for about 27% of all maternal death, and it is responsible for 19.7% of maternal death in Egypt and it is defined as blood loss of more than 500 mL following vaginal delivery or more than 1000 mL following caesarean delivery ***(James et al., 2022)***.

The hemorrhage that occurs during the first 24 hours after delivery is called primary or early PPH. Whether it occurs after 24 hours of birth until six weeks it is called secondary or late PPH. Most PPH cases or maternal deaths caused by PPH occur within the first 24 hours of delivery ***(Guerrero et al., 2022).***

The causes of PPH can be classified into four main categories: Uterine atony: refers to inability of the uterus to contract effectively after childbirth. It is the most common cause of PPH, responsible for at least 80% of cases, and it can occur due to prolonged labor, multiple pregnancies, large baby size, placental abnormalities, bladder distention, or the use of certain medications during labor ***(Zheng et al., 2023).*** Other aetiologies of hemorrhage should be considered, such as genital tract trauma including lacerations or uterine rupture, retained placental tissue and pre-existing or Acquired coagulopathy increasing the risk of bleeding during and after childbirth

(McLintock, 2020).

PPH can lead to a number of complications, including maternal anemia, hypovolemic shock, disseminated intravascular coagulation (DIC), organ dysfunction such as the kidneys, liver, lungs, and heart, Sheehan syndrome, infection, difficult maternal care of the new-born, and even death ***(Manganye, 2022)***.

The WHO provides evidence-based guidelines for the prevention of PPH during the third stage of labor and postpartum period which include AMTSL: administering a prophylactic uterotonic drug immediately after delivery of the baby, followed by controlled cord traction and uterine massage, and delaying cord clamping for at least one minute, especially for preterm infants. Uterotonic drugs: oxytocin is the preferred uterotonic drug for PPH prevention due to its effectiveness and safety profile. If oxytocin is not available, other uterotonic drugs like IM or IV ergometrine, or IM oxytocin can be used. Prevention of retained placenta by examination of the placenta. Postpartum period monitoring: conducting regular assessments of vital signs, uterine tone, and vaginal bleeding during the immediate postpartum period, encourage early initiation of breastfeeding to promote uterine contractions and reduce the risk of PPH ***(Kalu & Chukwurah, 2022).***

Labor and postpartum nurses play a key role in prevention, early recognition, and management of PPH, especially in the third stage of labor and early postpartum period by adequate management of third stage and careful observation of the mother in the early postpartum period includes recording pulse and blood pressure, palpating the uterus every 15 minutes to ensure that it is well contracted, checking temperature, examining the lochia for amount and consistency, regular evacuation of urinary bladder, initiation of breast feeding, and administration of prophylactic antibiotic prescribed for the risk of infections ***(Elhabashy & Hafez, 2019).***

1.2. Significance of the study:

Postpartum haemorrhage continues to be a leading cause of maternal deaths worldwide ***(McLintock, 2020).*** According to the World Health Organization (WHO), PPH is the speediest of maternal killers this is the case in both developed and developing countries. Even for a healthy woman, PPH can be

deadly within two hours, if not detected early. It is a potentially fatal situation that may occur without any warning and is frequently missed until the mother develops serious symptoms ***(Hossain et al., 2023).***

Worldwide, each year, PPH is diagnosed in 14 million women; 140,000 of them die, and 1.6 million will become anemic. ***(Handayani, 2021).***

In Egypt, PPH is still one of the main causes responsible for maternal morbidity and mortality. It's responsible for about 19.7% of maternal deaths ***(Onambele et al., 2022).*** According to ***(WHO, 2017)*** maternal mortality rate in Egypt become 37 maternal deaths per 100,000 live births.

Nurses may be the first and only professionals present when bleeding occurs; their prompt and competent action will be essential in controlling blood loss and reducing the risk of maternal morbidity and mortality ***(El-Khawaga et al., 2022),*** so assessing nurses' performance regarding the guidelines for prevention of PPH can help identify gaps in knowledge and practice and areas for improvement.

The aim of the study: This study aimed to assess nurses' performance regarding the guidelines for prevention of postpartum hemorrhage.

Objectives of the study:

1. Assess nurses' level of knowledge regarding prevention of postpartum hemorrhage.
2. Assess nurses' level of practice regarding guidelines for prevention of postpartum hemorrhage.
3. Assess nurses' attitude regarding prevention of postpartum hemorrhage.
4. Determine the relationship between nurses' knowledge, practice and attitude towards the prevention of postpartum hemorrhage.

Research questions:

1. What is the nurses' level of knowledge regarding prevention of postpartum hemorrhage?
2. What is the nurses' level of practice regarding guidelines for prevention of postpartum hemorrhage during third stage of labor and early postpartum period?
3. What is the nurses' attitude towards prevention of postpartum hemorrhage?
4. Is there a relationship between nurses' knowledge, practice, and

attitude towards prevention of postpartum hemorrhage?

2. Subjects and Methods

Study design: A descriptive study design was used in this study.

Study setting: This study was conducted at obstetrics and gynecologic departments; labor and postpartum units at Suez Canal University Hospitals, Ismailia, governorate, Egypt.

$$CI' = \bar{p} \pm z \times \sqrt{\frac{\bar{p}(1-\bar{p})}{n'} \times \frac{N-n'}{N-1}}$$

where
z is z score
p̄ is the population proportion
n and **n'** are sample size
N is the population size

The sample of the study: A convenient sample of (75) nurses recruited in the study. Sample was calculated based on the following equation: by using an epidemiological information system with total nurses' size 90, confidence level 95%, margin of error 5%, population proportion 5% and drop factor 10%.

According to previous equation, estimated sample size was 75 nurses after addition of 10% to compensate for dropout.

Tools of data collection:

Three tools were utilized to collect data pertinent to the current study.

Tool I: A structured self-administered questionnaire developed by the researcher and written in a simple clear Arabic language after extensive review of recent & relevant literature to collect basic data about the study subjects which included the following two parts:

Part (1): Nurses' profile: it was composed of 7 closed ended question including :

a. section I: Personal characteristic of nurses such as age, level of education, employment position, years of experience in obstetrics and gynecology departments.

b. section II: Postpartum hemorrhage training courses: it included attendance of postpartum hemorrhage training courses, number of courses, the last training courses (years).

Part (2): Nurses' postpartum hemorrhage knowledge questionnaire: It consisted of (57) questions of closed questions: (39) questions regarding postpartum hemorrhage, (9) questions about nurses' role in the third stage of labor to prevent postpartum hemorrhage and the last (9) questions regarding nurses' role in the early postpartum period to prevent postpartum hemorrhage. The questions were written in accordance to the contents of the related

evidence-based guidelines, textbooks and related previous studies in the form of closed ended questions ***(Powers, 2021; Zerwekh, 2020; Linnard-Palmer & Coats, 2016; Holloway, 2022; Groll, 2022 and Jacob, 2018).***

Scoring system of nurses' knowledge: The Total score ranged from zero to 57 grades, based on each correct answer was given one grade, while incorrect answer was given a zero grade ***(El-hamid, et al., 2021).***

- Good knowledge: 75 -100% (for total score 43 - 57).
- Average knowledge: 50 - to less than 75% (for total score 29 - 42).
- Poor knowledge: 0 - to less than 50% (for total score 0 – 28)**.**

Tool II: Observational checklist to assess Nurses' practice to guidelines for prevention of postpartum hemorrhage:

It was adopted from the WHO guidelines (updated in 2020) and ministry of health guidelines in Egypt for prevention of postpartum hemorrhage during third stage of labor and early postpartum period. Nurses were observed during normal deliveries through an observational checklist that included 21 items grouped into two main sections as follow: first section comprised, nurse's practice during third stage of labor (8 items) such as (giving Oxytocic, late cord clamping, performing controlled cord traction, examination of placenta, utero-vaginal canal and perineum etc...). While the second section comprised, nurse's practice during early postpartum period (13 items) such as (pulse, blood pressure and temperature recording, fundal and lochia assessment and immediate initiation of breast feeding etc...) ***(Elhabashy & Hafez, 2019) (WHO, 2020).***

Scoring system of nurses practice: The total score ranged from zero to 42 grades. Nurses' practice with each item of the guidelines was scored as: completely done (2); incompletely done (1) and not done (0)

- Poor level of practice for a total score of less than 21 (0 % - < 50%).
- Average level of practice for a total score of 21 to less than 32 (%75 > - %50)).
- Good level of practice for a total score of 32 or more (75-100 %).

Tool III: Nurse's attitude Likert Scale: A self-administrated scale was designed by the researcher in the light of relevant literature and then translated in a simplified Arabic language to be clear and understandable to the studied nurses. It was used to assess

nurses' attitude toward the prevention of postpartum hemorrhage. The scale consisted of 18 statements that reflect nurses' attitudes ***(Elkholy, 2017 & Olowokere, et al., 2020).***

Scoring system of nurses' attitude: Likert-scale was utilized in which answers ranged from 'Agree' take (3), 'uncertain' take (2) and 'Disagree' take (1) and each statement scored a scale from 1 to 3 ***(Elkholy, 2017).*** The total score of the scale was 54 grades and calculated as:

- Positive attitude: ≥75% (for total score 41-54) .
- Negative attitude: < 75% (for total score less than 41).

Tool validity and reliability:

The tool was revised by a panel of 5 experts in the field of obstetrics and gynecological nursing (2 lecturers, 1 assistant professor, 1 professor) and obstetric medicine (1 assistant professor) to review the tools' clarity, relevance, applicability, comprehensiveness, understanding, and appropriateness to achieve the aim of the study. The essential modifications were done according to panel's opinions.

Coefficient of reliability of the evaluating tools was measured by Cronbach's α alpha test. The reliability scores of the knowledge, practice and attitude assessment tools were (0.88, 0.7 and 0.71 respectively), which indicate high tool internal consistency.

Field work:

The actual field work was carried out over a period of five months, which started from the beginning of January, 2023 to the end of May, 2023. The researcher was available at Obstetrics and gynecology department; labor and post-partum units at Suez Canal university hospitals, three days weekly, (Saturday, Monday and Wednesday per week) from 9 am to 8 pm to collect data .

Nurses who participated in the study were met the researcher individually in the nurses' office and first, the researcher introduced herself to the nurses, then starting with explaining the aim of the study and give them a brief idea about the study and its expected outcomes to enhance better cooperation and get informed written consent from nurses to participate.

A structured self-administered questionnaire and Likert type rating scale ***(Tool I and tool III)*** were distributed to collect the required data using a simplified Arabic language to be suitable for the studied nurses. The time needed to complete the questionnaire ranged between 25-35

minutes. Two nurses were met per day.

The researcher observed nurses' practices during the third stage of labor and early postpartum period to assess their level of practice regarding the guidelines using the observational checklist ***(tool II).*** Each nurse was observed during three different shifts (in the morning, afternoon and night shifts) and the average level of nurse's practice was calculated. The time needed to complete observation during third stage of labor ranged between 10-30 minutes according to duration of third stage of labor, observation during early postpartum period start from admission of woman to postpartum department. The researcher meets the studied nurses and provides appreciation for their cooperation as well as contacts.

Pilot Study:

A pilot study was conducted over a period of one month, from the beginning of November, 2022 up to the beginning of December, 2022 on 10% (8 nurses) of the total sample to evaluate the research plan, clarity, applicability of the study tool and to estimate the time needed to fulfill these tools. Data collected from the pilot study was analyzed and nurses enrolled in the pilot study was excluded from study sample.

Ethical considerations:

Ethical approval was obtained from the Ethical Committee code No 161 in August 2022, Faculty of Nursing, Suez Canal University. Official permission to conduct the study was granted from hospital administrators. The aim, significance of the current study and methods of data collection were explained for each nurse. Nurses were informed that they have the right to refuse participation or withdraw from the study whenever they want without any harm. Anonymity and confidentiality were secured by data coding. Moreover, nurses were informed that these data will not be reused in another study without their permission. Written informed consent was obtained from the nurses who participated.

Statistical design:

Data collected through the questionnaire were coded, entered and analyzed using Statistical Package for the Social Sciences (SPSS version 23). Chi-square test was used to test the relation between categorical variables and Monte Carlo correction was used for low cell value. Correlations were used to test relationships between different variables. Linear regression was used to model the relationships between variables.

P value was set at <0.05 for significant results**.**

3. Results:

Results of the present study are presented in the following sequence:

Table (1): clarifies that 48.0% of the studied nurses age ranged between 26 to less than 31 years with mean age 26.64±4.03. According to their level of education, it was noticed that more than half (52.0%) of nurses had diploma in nursing and the majority of them (95.7%) had a staff nurse position and less than half (46.7%) of them had years of experience ranged between 1 to less than 5 years. Concerning the studied nurses' attendance of postpartum hemorrhage training courses. A large proportion of the studied nurses (92.0%) didn't attend any training courses related to postpartum hemorrhage.

Table (2): shows the studied nurses' knowledge regarding prevention of PPH. More than half of them had correct knowledge regarding signs and symptoms of postpartum hemorrhage, risk factors of PPH and definition of PPH (62.5 %, 61.7% and 61.3%, respectively). Also, more than half (56.3%), (55.3%), (52%) and (50.7%) of the studied nurses had correct knowledge regarding causes of PPH, nursing care of PPH, prevention of PPH, nurses' role in third stage of labor to prevent PPH respectively. Finally, the mean score of the total nurses' knowledge was 30.5±6.05.

Figure (1): clarifies the level of knowledge of the studied nurses regarding prevention of postpartum hemorrhage, as more than half (54.7%) of them had an average knowledge, while about two-fifths (42.7%) of them had a poor level of knowledge about prevention of postpartum hemorrhage.

Table (3): describes that the mean score of nurses' practices during the third stage of labor was 6.74±2.05 and the mean score of nurses' practices during the early postpartum period was 11.31±2.48. Finally, the mean score of total practice was 18.05±2.95 with percentage of 42.98%.

Figure (2): illustrates the level of practices of the studied nurses regarding prevention of postpartum hemorrhage, as the majority of them (86.7%) had a poor level of practice. While, only 13.3% of them had an average level of practice regarding guidelines for prevention of postpartum hemorrhage.

Figure (3): demonstrates the level of attitude of the studied nurses towards prevention of postpartum hemorrhage; the

highest percentage of them (84%) had a positive attitude towards the prevention of postpartum hemorrhage, while only 16% of them had a negative attitude.

Table (4): illustrates that there was linear regression between total attitude score and total practice score with each increase one unit in total attitude score, total practice score increased by.730, and the relationship was significant.

4. Discussion

Postpartum hemorrhage (PPH) is a significant obstetric complication characterized by excessive bleeding after childbirth and is one of the leading causes of maternal morbidity and mortality worldwide. However, with effective prevention strategies, the incidence and severity of PPH can be significantly reduced, ensuring the well-being and safety of mothers ***(Goffman et al., 2019).***

Every attendant at birth needs to have the knowledge, skills, attitude, and critical judgement to carry out active management of the third stage of labor and early postpartum period, as well as access to required supplies and equipment, and to follow evidence-based guidelines and protocols to optimize outcomes ***(Mihretie et al., 2023).***

Therefore, the present study aimed to assess nurses' performance regarding the guidelines for prevention of PPH. To fulfil the objective of this study, the discussion of the current study findings will cover five main parts in the following sequence: Part I, nurses' profile characteristics of the studied nurses; Part II, nurses' level of knowledge regarding prevention of PPH; Part III, nurses' level of practice regarding the guidelines for prevention of PPH; Part IV, nurses' level of attitude towards prevention of PPH and Part V, relation and correlations between the study variables.

Regarding the personal characteristics of the studied nurses, the finding of the current study showed that less than half of nurses' age was between 26 to less than 31 years. The finding agrees with ***Abdelwahed and Farahat (2022)*** who found that, less than half of the nurses' age was between 25 to less than 30 years. While this disagrees with ***Ibrahim and Abdel-Menim (2016)*** who reported that, about less than half of the nurses' age ranged from 30-40 years.

Concerning the level of education of the studied nurses, the present study found that more than half of them had a diploma in Nursing. This finding is supported by the

findings of ***Ibrahim and Abdel-Menim (2016)*** who indicated that more than three-quarters of the studied nurses had a diploma in nursing. On the other hand, this result disagrees with ***El-Khawaga et al. (2019),*** who reported that less than one-third of the studied nurses had a diploma in nursing. The study results might be due to the fact that, the majority of nurses working in health facilities in Egypt are graduated from technical institutes of nursing, while the minorities of them graduated from faculties of nursing.

Regarding nurses' position, most of the studied nurses were staff nurses, the finding of the present study agrees with ***Ibrahim and Abdel-Menim (2016)*** who revealed that most of nurses were working as staff nurses.

It was cleared from this study that, about less than half of the studied nurses' years of experience ranged between 1 to less than 5 years, this finding agrees with ***Abdelwahed and Farahat (2022)*** who indicated that, about more than one third of the studied nurses' years of experience ranged between 1 to less than 5 years. This result disagrees with ***Abd-Elgany et al. (2019)*** who reported that, about half of the studied nurses' years of experience were equal to 10 years or more. This result may be related to the fact that most of the studied nurses were recently graduated.

In relation to the nurses' attendance of training programs, this study found that most of the studied nurses didn't attend training programs. This finding agrees with ***Elhabashy and Hafez (2019)*** who revealed that the majority of the studied nurses didn't attend training programs.

As regards nurses' knowledge about prevention of postpartum hemorrhage, the present study reveals that less than one quarter had a good level of knowledge regarding nurses' role in third stage of labor to prevent postpartum hemorrhage. this finding disagrees with ***Elhabashy and Hafez (2019)*** who found that about one-third of the studied nurses had good knowledge regarding nurses' role in third stage of labor. This may be related to the lack of training opportunities to provide the nurses with adequate practical knowledge regarding care of women in third stage of labor. Which was reported by the majority of the studied nurses.

Concerning nurses' total level of knowledge regarding nurses' role in early postpartum period. The present study revealed that more than half of the studied

nurses had poor knowledge. These results in accordance with ***Abd Elrhman Ali et al. (2022),*** who stated that about half of the studied nurses had poor knowledge. These results may be attributed to the lack of continuous education and preparation prior to work or training concerning to care of such group of women in early postpartum period. In addition to lack of the studied nurses' motivation to update their knowledge.

The current study results clarified that about more than half of the studied nurses had an average level of knowledge regarding prevention of postpartum hemorrhage and about less than half of the nurses had a poor level of knowledge. This might be related to a lack of in-service training about PPH, non-availability of education resources in labor and postpartum units, and non-availability of access for knowledge refreshment. In addition, nurses experience exhaustion and burnout due to long work hours and an increased workload, which hinders their ability to read and update their knowledge.

In the same line with over results, ***ATAEW et al. (2019)*** study reported that about half of the studied nurses had an average level of knowledge and about less than half of the nurses had a poor level of knowledge about postpartum hemorrhage. In the same context, ***Ahmed Elkholy et al. (2017)*** reported that the majority of the studied nurses had an average level of knowledge regarding postpartum hemorrhage. Also, ***Elbadrawy et al. (2022)*** revealed that more than half of the nurses had poor knowledge about postpartum hemorrhage. While this disagrees with Abd ***Elhakm and Elbana (2018)*** study which indicated that one-third of the studied nurses had an average level of knowledge. This is also in line with ***ATAEW et al. (2019)*** findings which state that more than one-third of nurses had a poor level of knowledge about postpartum hemorrhage.

Concerning nurses' practices during the third stage of labor, the present study revealed that less than half of the studied nurses incompletely performed late cord clamping and these results are supported by the results of ***Oladapo et al. (2009)*** and it is consistent with the results of ***Oyetunde and Nkwonta (2015)*** Who found that the majority of study subjects performed early cord clamping. This similarity may be attributed to non-updated nurses' knowledge and not implementing the recommendations of delaying the umbilical cord clamping in term and preterm infants for at least 1 minute after

birth and this has the benefit of increasing iron stores and decreasing anemia, which is especially important in preterm infants and in low-resource settings and preventing postpartum hemorrhage

As regard to controlled cord traction with uterine support, the current study showed that less than three-quarters of the study nurses didn't do it completely and attributed to the fact that most of controlled cord traction was done by physician, this agrees with ***Esan et al. (2023)*** study who reported that less than three-quarters of the study subjects didn't deliver the placenta by controlled cord traction. This is in contrast to the result of ***Muyanga and Joho (2022)*** who found that the majority of the study subjects performed it completely and also in contrast to the current study ***Yaekob et al. (2015)*** study which found that controlled cord traction was completely done by most of the study subjects as they interested with performance of nurses.

The present study clarified that more than three-quarters of the current study subjects didn't examine the placenta and membranes. This finding supported by ***Abdelwahed and Farahat (2022***), who reported that about two thirds of the studied nurses didn't examine placenta and membranes and it is also consistent with the results of ***Ahmed Shahin et al. (2021***), who revealed that less than two -thirds of nurses were incompetent in placental examination. These results are not in accordance with findings of ***Nuriy and Ahmed (2018))*** where the majority of subjects in these studies examine placental and membranes completely. This may be attributed to the fact that placental examination was mostly done by physicians in the current study, and they are not a part of our sample size and the subjects in the present study are nurses only.

Concerning nurses' practices during early postpartum period, the current study observed that that assessment of fundal level, consistency, position and shape every 15 minutes after delivery was incompletely done by nearly three quarters of the studied nurses. this result in accordance with ***Elhabashy (2019),*** who stated that, all of nurses were incompletely done the assessment and this disagrees with the result of ***Yaekob et al. (2015***) study who found that it was done with majority of study subjects. From the researcher point of view that due to pressure of the work and shortage of nurses compared to number of women.

Regarding uterine massage, it was observed that it was incompletely done by less than two thirds of the current study subjects, this could be attributed to the fact that uterine massage in the current study was done only in case of uterine atony as it is first choice in management of uterine atony while it was done by the majority of study subjects to all postpartum woman in the study of ***Muyanga and Joho.(2022)***

In relation to examination of lochia for amount and consistency in early postpartum period, the present study showed that majority of the studied nurses didn't do it completely and these are similar to the findings of ***Hafez (2019),*** who found that the most of study subjects didn't examine completely to lochia for amount and consistency in early postpartum period. While these findings are contradicted with studies of ***Yaekob et al. (2015) and Taha (2014)*** which found that examination of lochia for amount and consistency were completely done by the majority of the student subjects in these studies. This may be related to pressure of the work and increased number of cases according to number of nurses and shortage of staff besides lack of knowledge of the importance and technique of lochia assessment.

Moreover, it was reported that encouraging mother to evacuate urinary bladder regularly was incompletely done by nearly two-thirds of the current studied nurses, and more than two-thirds of them didn't check their temperature every 4 hours completely. This is similar to the finding of ***Hassan et al. (2019)*** who found that most of study subjects did not encourage mother to evacuate urinary bladder regularly and around three-fifths of study subjects did not check temperature in the early postpartum period. This may be attributed to nurses' overload, where they are assigned to a large number of postpartum mothers, and this disagrees with the result of ***Eldien and Ahmed (2019)*** who revealed that approximately two thirds of nurses help emptying the bladder and more than half of nurses check temperature.

Concerning nurses' total level of practices regarding the guidelines for prevention of postpartum hemorrhage. The present study clarified that the majority of the studied nurses had a poor level of practice. This finding supported with the study of ***Angelina et al. (2019),*** who reported that more than half of the study subjects had inadequate

level of practice. These results are not in accordance with ***Ahmed Elkholy et al. (2017) and Ibrahim and Abdel-Menim (2016)*** studies, which indicated that the majority of study subjects had obtained an average total score of practice. This may be attributed to many causes, which include the lack of guidelines, Lack of continuous supervision and annual evaluation of their performance, lack of motivation absence of job specifications, and a shortage in staffing, all lead to overlapping when it comes to providing some items of care and neglecting others. and inadequate training about the prevention of PPH. These training programs are very important to improve nurses' performance and increase awareness about their role in preventing and reducing postpartum hemorrhage. In addition, early discharge after delivery decreases the time needed to provide the instructions necessary for parturient mothers. Finally, it cannot be ignored that working nurses are overloaded with administrative duties besides their duties as health care providers.

As regards data analysis, the present study determined nurses' level of attitude regarding prevention of postpartum hemorrhage, the highest percentage of the studied nurses had a positive total attitude score. This result was consistent with the study carried out by ***Shinyongo et al. (2022)*** who reported that, the majority of studied nurses had positive attitude towards PPH. A possible interpretation of this result could be due to the fact that, nurses have an enthusiasm towards maintenance and practicing clinical procedures effectively but actually not interpreted in actual practice.

Also, these study findings are similar to ***Medoh (2017)*** study who stated that most of the study subjects had a positive attitude towards postpartum hemorrhage.

On investigating the relationship between nurses' knowledge and demographic characteristics. The finding of this study showed that there was no statistically significant relation between nurses' personal characteristics and their total level of knowledge. This may be related to increased years' experience assign supervision role to nurses that exclude them from clinical work and low-quality training. This result is not in the same line with ***Ibrahim and Abdel-Menim (2016)*** which demonstrated that there was highly statistically significant correlations between nurse's knowledge and their demographic characteristics.

The present study found that there was a statistically significant relation between the studied nurses' age, attendance of courses, and their total level of practice. This result could be attributed to the fact that the level of practice increases with increasing age and attendance of courses related to postpartum hemorrhage. The findings of the present study are in accordance with ***Abdel-Menim (2016),*** who revealed that there were statistically significant correlations between nurses' total practice scores and their age.

Concerning the relation between nurses' total practice and their attitude regarding the prevention of postpartum hemorrhage, the result of the present study revealed that there was a statistically significant positive correlation between nurses' practice, and their attitude. This is in the same line with ***Ahmed Shahin et al. (2021)*** who clarified that there was a strong association between the nurses' attitude scores and performance scores.

In conclusion, lack of training programs about the prevention of PPH and absence of opportunities to access postpartum hemorrhage prevention guidelines are the main reasons for this study findings. Nurses in particular need to keep up with the latest research and guidelines for postpartum hemorrhage prevention. Finally, it cannot be ignored that working nurses are overloaded with administrative duties besides their duties as health care providers. Thus, early discharge after delivery decreases nurse's workload and provides them with time and effort to offer the instructions necessary for parturient mothers.

5. Conclusion:

The results of the current study concluded that more than half of the studied nurses had an average level of knowledge regarding prevention of PPH and a poor level of practice regarding the guidelines for prevention of PPH, while the great majority of the studied nurses had a positive attitude towards the prevention of PPH.

Moreover, there was statistically significant positive correlation between nurses' total practice, and their total attitude score.

6. Recommendations:

Based upon the findings of the present study, the following recommendations can be deduced:

1. Periodic evaluation of nurses' performance regarding prevention of

PPH.

2. Training programs and workshops regarding prevention of PPH should be provided to nursing staff working in labor and postpartum units to improve the quality and safety of women.
3. Competency based standards for nurse's practice and support guidance should be established .
4. Educational posters in the labor and postpartum units include an outline concerning the early prevention and management of PPH which is beneficial for nurses.
5. Designing innovative training programs for nurses regarding the early prevention and management of PPH
6. Replication of the study on a larger probability sample selected from different geographical areas in Egypt to be generalizable data.

Tables and Figures

Table (1): Percentage distribution of the studied nurses according to their personal characteristics (n=75).

Nurses' Profile data	N	%
Age (Years)		
21-<26	33	44.0
26-<31	36	**48.0**
31-<36	3	4.0
36-<41	3	4.0
Mean ±SD Min-Max	26.64±4.03 21-40	
Level of education		
Diploma in Nursing	39	**52.0**
Nursing Technical Institute	27	36.0
Bachelor of Nursing	8	10.7
Post graduate	1	1.3
Employment position		
Head Nurse	7	9.3
Nurse	68	**90.7**
Years of experience		
<1 y	9	12
1-<5 y	35	**46.7**
5-<10 y	20	26.7
≥10 y	11	14.7
Training courses		

Yes	6	8.0
No	69	**92.0**
If the answer is yes (n=6), number of courses		
one	6	100
>1	0	0
Time since last training course (years):		
Less than a year	0	0
More than a year	6	100

SD: Standard Deviation

Table (2): Mean scores of the studied nurses' knowledge regarding prevention of postpartum hemorrhage and composite percentage of correct knowledge (n=75).

Items	Mean±SD	Composite percentage of correct knowledge (%)
Definition of postpartum hemorrhage	1.84±.67	**61.3**
Types of postpartum hemorrhage	0.73 ±.75	36.7
Risk Factors of postpartum hemorrhage	7.4±1.87	**61.7**
Causes of postpartum hemorrhage	2.25±.87	**56.3**
Signs and symptoms of postpartum hemorrhage	4.37±1.57	**62.5**
Complications of postpartum hemorrhage	0.93 ±.62	46.7
Prevention of postpartum hemorrhage	1.56±.86	**52**
Treatment of postpartum hemorrhage	1.86±1.01	46.7
Nursing care of postpartum hemorrhage	1.11±.71	55.3
Nurses' role in third stage of labor to prevent postpartum hemorrhage	4.26±1.30	**50.7**
Nurses' role in early postpartum period to prevent postpartum hemorrhage	3.86±1.04	42.8
Total Score (57 Questions)	**30.5±6.05**	**53.5**

Figure (1): Level of knowledge of the studied nurses regarding prevention of postpartum hemorrhage (n=75).

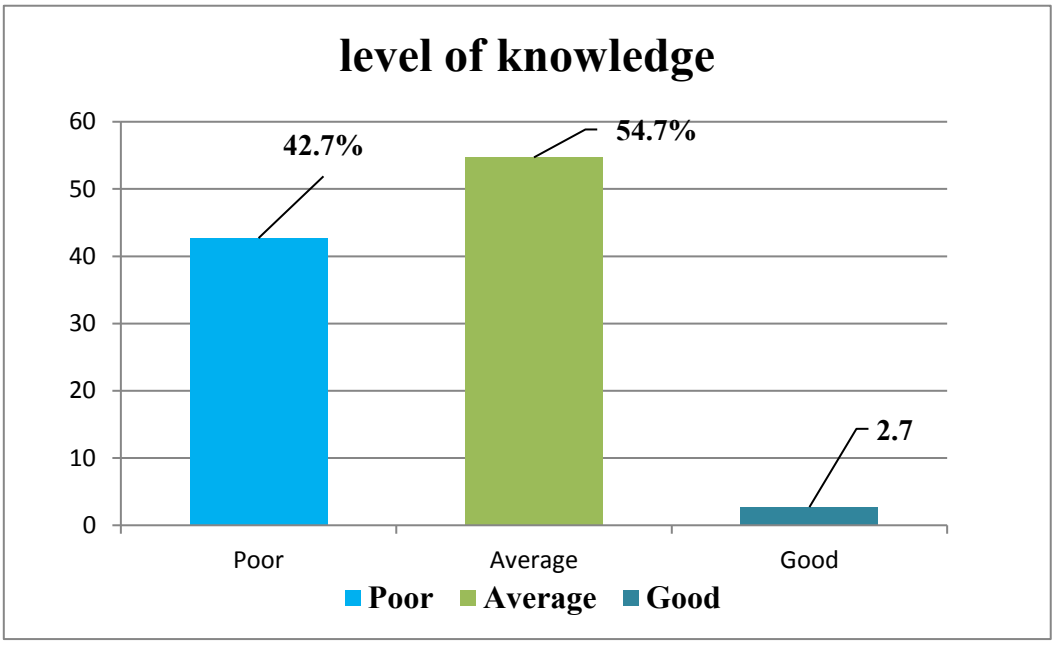

Table (3): Mean scores of the studied nurses regarding guidelines for prevention of postpartum hemorrhage (n=75).

Items	Mean±SD	Composite percentage (%)
1) Nurses' practice during third stage of labor	6.74±2.05	42.2
2) Nurses' practice during early postpartum period	11.31±2.48	43.48
Total practice	**18.05±2.95**	**42.98**

Figure (2): level of total practices of the studied nurses regarding guidelines for prevention of postpartum hemorrhage (n=75).

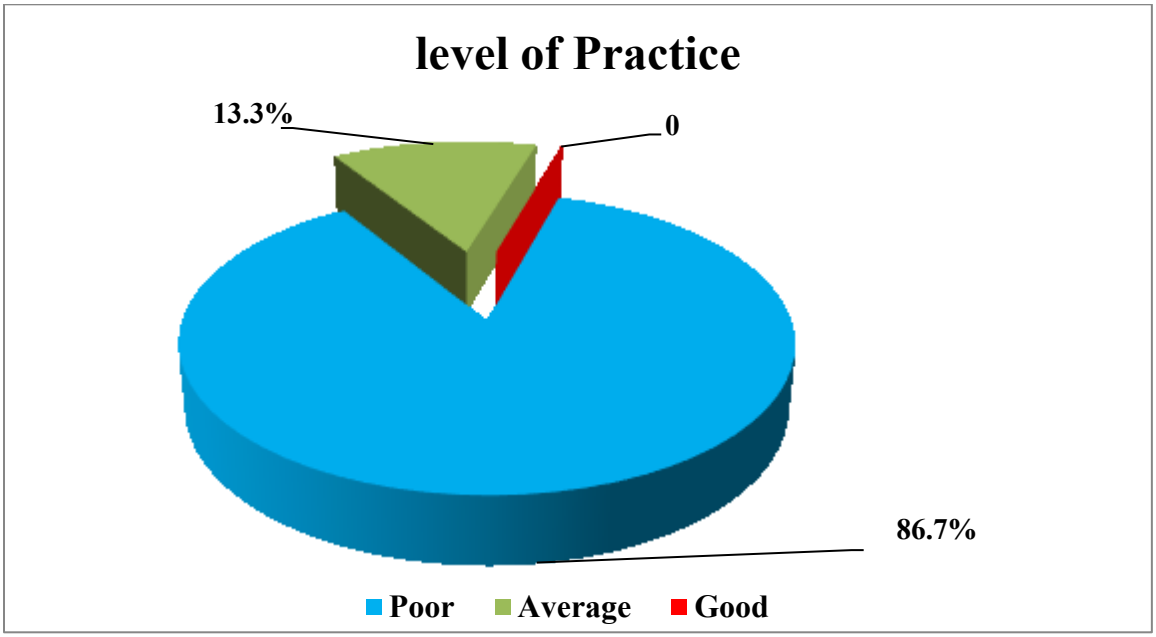

Figure (3): level of attitude of the studied nurses towards prevention of postpartum hemorrhage (n=75).

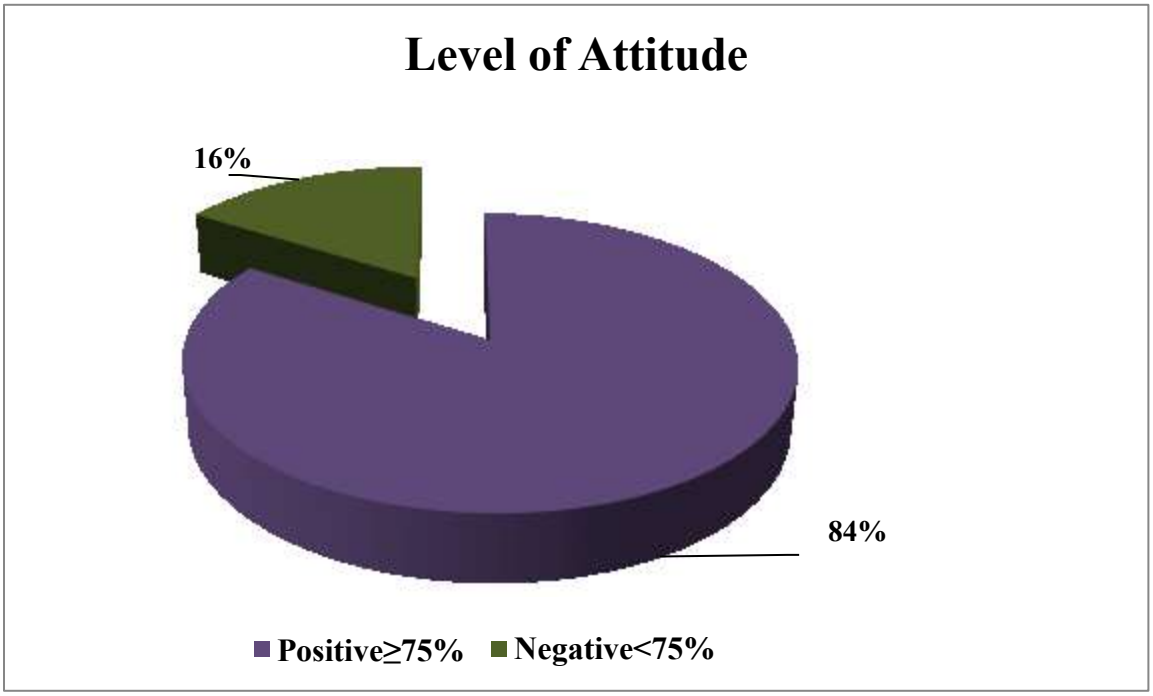

Table (4): Regression analysis between total nurses' attitude and their total practice score (n=75).

Dependent factor	Independent Factor	Unstandardized coefficients		Beta	t	P value	95% CI	
		B	Std.Err					
Total practice score	**Constant**	14.312	1.723		8.305	**<.001***	10.88	17.74
	Total attitude score	.113	.051	.251	2.213	**03***	.011	.215

t is independent t test & P value is significant (two tailed significance) ≤.05

7. References

Abd Elhakm, E. M., & Elbana, H. M. (2018). Effect of simulation based training on maternity nurses' performance and self-confidence regarding primary postpartum hemorrhage management. *American Journal of Nursing*, *6*(6), 388-397.

Abd Elrhman Ali, H., Metwally Mohamed, S., & Abd Elhameed Attia Alla, N. (2022). Assessment of Nurses Knowledge and Practice Regarding Postpartum Period at Abshaway central Hospital. *Egyptian Journal of Health Care*, *13*(4), 270-280.

Abd-Elgany, L. K., Zahran, K. M., Ahmed, N. H., & Abd-Elhafez, H. A. (2019). Assessment of Nurses Knowledge About Preventive and Therapeutic Measures of Postpartum Hemorrhage. *Assiut Scientific Nursing Journal*, *7*(18), 22-31.

Abdelwahed, A. A., & Farahat, F. Z. (2022). EFFECT OF NURSING CAREPROTOCOL ON NURSES'PERFORMANCE DURING THIRDSTAGE OF LABOR. *Port Said Scientific Journal of Nursing*, *9*(1), 1-22.

Ahmed Elkholy, G., Abd Elsalsm Ramadan, S., Ouda, S., & Abdel Fatah Ahmed, A. A. E. (2017). Assessment of Nurse's Practical Skills Regarding avoidance of Postpartum Hemorrhage. *Egyptian Journal of Health Care*, *8*(3), 219-233.

Ahmed Shahin, M., Mostafa Abd El Monem Desoky, M., & Morsy Salim, H. (2021). Developing Competences for Maternity Nurses during Labor and Immediate Postpartum Period Regarding Prevention of Postpartum Hemorrhage.

Egyptian Journal of Health Care, *12*(4), 618-634.

Angelina, J. A., Kibusi, S. M., & Mwampagatwa, I. (2019). Factors influencing nurses' knowledge and skills in the prevention and management of postpartum haemorrhage. *African Journal of Midwifery and Women's Health*, *13*(4).

ATAEW, E., Sharkawy, A. R. S., & Abd El Hady, R. M. (2019). Application of Iowa model evidence-based practice on maternity nurses regarding postpartum hemorrhage. *Journal of Critical Reviews*, *7*(5), 2020.

Bonde, H. A.-S., Cupelin, E., Dettori, O., & Geene, K. (2021). Rebirth of the 40-Day Postpartum Period: Review of Existing Research and Steps Forward.

Elbadrawy, S. E., Elmoneim, E. F. A., & Mohamady, S. H. (2022). Assessment of nurses' knowledge and skills toward postpartum hemorrhage prevention. *International journal of health sciences*, *6*(S4), 10013-10031. https://doi.org/10.53730/ijhs.v6nS4.11288

Eldien, H. A., & Ahmed, S. I. (2019). Effect of the Intervention Design of Nursing Practices on the Monitoring and Management of Postpartum Hemorrhage. *International journal of Nursing Didactics*, *9*(07), 01-08.

Elhabashy, M. M. I., & Hafez, S. K. (2019). Nurses' compliance with guidelines for the reduction of postpartum hemorrhage.

El-hamid, A., Mahmoud, S., Ahmed, M. H., Abo-zaid, E. H., & El-adham, A. F. (2021). Effect of High Fidelity Simulation Based Training Program on Nursing Students' Performance, Self-efficacy and Confidence regarding Prevention of Postpartum Hemorrhage. *Tanta Scientific Nursing Journal*, *23*(4), 233-267.

El-Khawaga, D. S. A. E.-Y., Ahmed, M. H., & Elwelely, M. Z. (2019). Effect of Implementation of a Teaching Program about Immediate Postpartum Care on Nurses' Knowledge and Practice. *Tanta Scientific Nursing Journal*, *16*(1), 95-112.

El-Khawaga, D. S. A. E.-Y., ElAbeden, M. Z., Abou Romia, F. A., Gaheen, M. A., & Shaaban, R. E. (2022). Effect of Educational Program on Nurses' Performance Regarding Bleeding in Late Pregnancy. *Tanta Scientific Nursing Journal*, *26*(3), 119-138.

Esan, D. T., Ayenioye, O. H., Ajayi, P. O., & Sokan-Adeaga, A. A. (2023). Traditional birth attendants' knowledge, preventive and management practices for postpartum haemorrhage in Osun State, Southwestern Nigeria. *Scientific Reports*, *13*(1),

12314.

Goffman, D., Friedman, A. M., Sheen, J.-J., Kessler, A., Vawdrey, D., Green, R., D'Alton, M. E., & Oberhardt, M. (2019). A framework for improving characterization of obstetric hemorrhage using informatics data. *Obstetrics & Gynecology*, *134*(6), 1317-1325.

Groll, C. G. (2022). *Fast Facts for the L&D Nurse: Labor and Delivery Orientation*. Springer Publishing Company.

Guerrero, C. C. G., Mendoza, J. C. A., Mercado, L. P. N., Alarcón, A. C. M., Golon, J. A. H., Rosero, M. A. G., Marin, L. P. V., Acosta, M. I. R., & Rodriguez, R. A. G. (2022). Bakri balloon as last non-surgical therapeutic action to control postpartum hemorrhage. *Health Science Journal*, *16*, 1-7.

Handayani, S. (2021). Post Partum Haemorrhage: A Review of Prevention And Management. *Jurnal Keperawatan GSH*, *10*(1), 12-18.

Hassan, M., El-Seman, A., Taha, N., & Mohammed, N. (2019). Re-Audit of immediate normal postpartum nursing care at woman's health university hospital, assiut, Egypt. *Journal of Nursing and Health Science*, *5*(1), 52-65.

Holloway, B. W., Moredich, C., Kratovil, A., & McMullan, T. (2022). *OB/GYN Peds Notes: Nurse's Clinical Pocket Guide*. FA Davis.

Hossain, A. T., Siddique, A. B., Jabeen, S., Khan, S., Haider, M. M., Ameen, S., Tahsina, T., Chakraborty, N., Nahar, Q., & Jamil, K. (2023). Maternal mortality in Bangladesh: Who, when, why, and where? A national survey-based analysis. Journal of Global Health, 13.

Ibrahim, H., & Abdel-Menim, S. (2016). Improving maternity nurses' performance regarding prevention and control of postpartum hemorrhage. *Novelty Journals*, *3*(3).

Jacob, A. (2018). *A comprehensive textbook of midwifery & gynecological nursing*. Jaypee Brothers Medical Publishers.

James, A. H., Federspiel, J. J., & Ahmadzia, H. K. (2022). Disparities in obstetric hemorrhage outcomes. *Research and practice in thrombosis and haemostasis*, *6*(1), e12656.

Kalu, F. A., & Chukwurah, J. N. (2022). Midwives' experiences of reducing maternal morbidity and mortality from postpartum haemorrhage (PPH) in Eastern Nigeria. *BMC pregnancy and childbirth*, *22*(1), 1-10.

Linnard-Palmer, L., & Coats, G. H. (2016).

Safe maternity and pediatric nursing care. FA Davis.

Manganye, S. (2022). *Exploring the Knowledge of Midwives Regarding Early Warning Signs of Primary Postpartum Haemorrhage in KwaMhlanga Hospital* University of Pretoria (South Africa)].

McLintock, C. (2020). Prevention and treatment of postpartum hemorrhage: focus on hematological aspects of management. *Hematology 2014, the American Society of Hematology Education Program Book*, *2020*(1), 542-546.

Medoh, L. N. (2017). *Postpartum Hemorrhage Evidenced-Based Registered Nurse Staff Education Project* (Doctoral dissertation, Walden University).

Mihretie, G. N., Ayele, A. D., Liyeh, T. M., Beyene, F. Y., Kassa, B. G., Arega, D. T., Belay, H. G., & Worke, M. D. (2023). Active management of the third stage of labour in Ethiopia: A systematic review and meta-analysis. *Plos one*, *18*(4), e0281343.

Muyanga, D. L., & Joho, A. A. (2022). Knowledge and skills on active management of third stage of labor for prevention of post-partum haemorrhage among health care providers in Lake Zone, Tanzania: a cross sectional study. *BMC women's health*, *22*(1), 36.

Nuriy, L. A.-H. M., & Ahmed, H. M. (2018). Nurse/Midwives' practices during labor and delivery in Maternity Teaching Hospital in Erbil City. *Erbil Journal of Nursing and Midwifery*, *1*(1), 23-32.

Oladapo, O. T., Fawole, A. O., Loto, O. M., Adegbola, O., Akinola, O. I., Alao, M. O., & Adeyemi, A. S. (2009). Active management of third stage of labour: a survey of providers' knowledge in southwest Nigeria. *Archives of gynecology and obstetrics*, *280*, 945-952.

Olonade, O., Olawande, T. I., Alabi, O. J., & Imhonopi, D. (2019). Maternal mortality and maternal health care in Nigeria: Implications for socio-economic development. *Open access Macedonian journal of medical sciences*, *7*(5), 849.

Olowokere, A. E., Olajubu, A. O., Ayeni, I. E., & Aremu, O. O. (2020). Healthcare workers' knowledge and attitude towards prompt referral of women with postpartum haemorrhage in Nigeria: a community based study. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, *9*(1), 335-342.

Onambele, L., Ortega-Leon, W., Guillen-Aguinaga, S., Forjaz, M. J., Yoseph, A.,

Guillen-Aguinaga, L., Alas-Brun, R., Arnedo-Pena, A., Aguinaga-Ontoso, I., & Guillen-Grima, F. (2022). Maternal Mortality in Africa: Regional Trends (2000–2017). *International journal of environmental research and public health*, *19*(20), 13146.

Organization, W. H. (2023). Trends in maternal mortality 2000 to 2020: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division: executive summary.

Oyetunde, M., & Nkwonta, C. (2015). Assessment of midwives' competenc e in active management of third stage of labour in primary health centres i n Anambra state, Nigeria. *Journal of Applied Medical Sciences*, *4*(2), 17-29.

Powers, P. (2021). PRIORITY CONCEPTS Oxygenation, Perfusion. *Elsevier's Canadian Comprehensive Review for the NCLEX-RN Examination-E-Book*, 303.

Shinyongo, V., Nashandi, H. L., & Amakali-Nauiseb, T. (2022). Assessment of knowledge, attitude and practice towards management of postpartum hemorrhage among third year nursing students at University of Namibia, main campus. *International Journal of Community Medicine and Public Health*, *9*(5), 2015.

Taha, F. A. N. (2014). Knowledge and Practice of Nurse Midwives Regarding Management and Prevention of Postpartum Hemorrhage in Three Selected Teaching Hospitals-Khartoum State-Sudan 2014.

WHO, U. (2017). UNFPA, World Bank Group, and United Nations Population Division Maternal Mortality Estimation Inter-Agency Group. Maternal mortality in 1990–2015. *World Health Organization.[cited 2017 Dec 7]. Available from: http://www. who. int/gho/maternal_health/countries/mwi. pdf*.

Yaekob, R., Shimelis, T., Henok, A., & Lamaro, T. (2015). Assessment of knowledge, attitude, and practice of midwives on active management of third stage of labour at selected health centers of Addis Ababa, Ethiopia, 2014. *Assessment*, *5*(11).

Zerwekh, J. (2020). *Zerwekh-Women's Health Nurse Practitioner and Midwifery Certification Review-E Book*. Elsevier Health Sciences.

Zheng, F., Wen, H., Shi, L., Wen, C., Wang, Q., & Yao, S. (2023). Incidence of postpartum hemorrhage based on the improved combined method in evaluating blood loss: A retrospective cohort study. *Plos one*, *18*(7), e0289271.