Active versus Expectant Management of Third Stage of Labor: A Plane of Nursing Action

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Abstract

Background: Expectant management of the third stage of labor is known as conservative or physiological or passive management. Active management of the third stage of labor as a prophylactic intervention is composed of a package of three components: Administration of a uterotonic agent within one minute after the baby is born; after the cord is clamped; delivery of the placenta by controlled cord traction with counter-traction on the fundus; and fundal massage after delivery of the placenta. **Aim:** to compare the effects of active management versus expectant management of the third stage of labor and evaluate the effect of an educational programs on nurses' knowledge about the management of the third stage of labor. **Subjects and methods:- Research-designs:** Two research designs were used: ***The first is a*** cross-sectional descriptive survey. ***The second is*** a quasi-experimental intervention study. **Sample:** A total of 300 pregnant women; group (1) 150 women using active management compared with group (2) 150 ones using expectant management were randomly recruited for this study. As well as 20 nurses. **Setting**: The current study was conducted at the delivery unit in Beni-Suef University Hospital. **Tools**: Four tools were used, namely the interview questionnaire form, maternal assessment record, partograph, and nurses' knowledge questionnaire (pre- and post-test). **Results:** The results revealed that all women in the two groups had vaginal deliveries; the third stage was shorter in the active group, but the difference was not statistically significant. Women in the active group had significantly less blood loss at the second and third stages. The active group had significantly lower hemoglobin levels before delivery, but after delivery, this difference disappeared. **Conclusion:** Active management of the third stage of labor is associated with a shorter duration of the third stage, less blood loss, and less decline in the hemoglobin level. Post-intervention, there was a significant improvement in the nurse's knowledge about management of the third stage of labor. **Recommendations:** Active management of the third stage is a safe and effective procedure that should be used in the health care setting providing delivery care services.

Key word: Active management, Expectant Management, Third stage of labor

Introduction

Pregnancy and childbirth involve significant health risks, even for women with no preexisting health problems. Approximately 40% of pregnant women experience pregnancy-related health problems, and 15% of all pregnant women suffer long-term or life-threatening complications. More than half of all maternal deaths occur within 24 hours of delivery, mostly from excessive bleeding **(Cunningham et al., 2018)**.

Most cases of postpartum hemorrhage (PPH) occur during the third stage of labor. The third stage of labor is the period of time from the birth of the child until the placenta is delivered. The muscles of the uterus contract and the placenta begin to separate from the uterine wall. The amount of blood lost depends on how quickly it occurs. The third stage typically lasts between 5 and 15 minutes. After 30 minutes, the third stage of labor is considered prolonged, indicating a potential problem. The third stage of labor is associated with a significant risk of PPH, and there is a six-fold increase in PPH when the third stage of labor lasts longer than 30 minutes **(Hassan et al., 2017; Hofer et al., 2023)**.

Postpartum hemorrhage (PPH) remains the most common complication of childbirth and leads to significant maternal morbidity and mortality when diagnosis and management are delayed. Postpartum hemorrhage affects around

5–10% of deliveries worldwide and is responsible for more than 25% of deaths annually. Postpartum hemorrhage can be instigated by excessive blood loss, which occurs frequently after delivery and can result in volume depletion and catastrophic complications **(Ahmed et al., 2020; Hassan et al., 2020; Ibrahim et al., 2017)**.

An interesting aspect of the third stage is the marked discrepancy in what is believed to be appropriate and optimal conduct. A clear division exists between authorities who advocate the physiological approach and those who advocate the active approach to management. However, PPH is a preventable obstetric emergency prohibited by active management of the third stage of labor (AMTSL), which is prophylactic management based on an evidence-based, low-cost intervention **(Baltaji et al., 2023)**.

Active management of the third stage of labor as a prophylactic intervention is composed of a package of three components: Administration of a uterotonic agent within one minute after the baby is born; after the cord is clamped; delivery of the placenta by controlled cord traction (gently pulling on the umbilical cord) with counter-traction on the fundus; and fundal massage after delivery of the placenta **(Hassan, 2017; Vermeulen et al., 2022)**.

World Health Organization (WHO) recommendations have supported active management of the third stage of labor (AMTSL) as a critical intervention for PPH prevention. Active management of the third stage of labor has become a central component of the PPH reduction strategies of governments around the world. An active approach could have some advantages in the prevention of postpartum hemorrhage compared to expectant or physiological management. It provides a better balance of benefits and harm. **(World Health Organization, 2022)**

A key component of AMTSL is the use of a uterotonic medication, such as oxytocin, which is administered either intramuscularly or intravenously immediately following the birth of the baby. In settings where oxytocin is unavailable, misoprostol can be used, which has the advantage of being heat-stable and can be administered orally, rectally, or sublingually. Oxytocin and misoprostol are life-saving uterotonic medications for the treatment of PPH in cases of uterine atony **(McKinney et al., 2021).**

Other AMTSL strategies include uterine massage, removal of retained tissue, administration of isotonic crystalloid fluids, intrauterine balloon tamponade for refractory bleeding, bimanual and aortic compression, and the use of non-pneumatic anti-shock garments (garments are a temporary measure until definitive care is available). Surgical intervention should be undertaken immediately when bleeding persists despite efforts taken to control it (**Chandraharan & Arulkumaran, 2021).**

Expectant management of the third stage of labor is also known as conservative or physiological or passive management, also is best described as a "hands off" or-watchful waiting-approach, where signs of placental separation are awaited and the placenta is birthed spontaneously or with the aid of gravity, maternal pushing or, sometimes, nipple stimulation hence aprophylactic uterotonic agent is not administered; ideally, the umbilical cord is neither clamped nor cut until the placenta has been delivered but, at a minimum, caregivers have waited until cord pulsation has ceased and the placenta is delivered spontaneously with the aid of gravity and sometimes by maternal effort (**Hashem et al., 2022).**

There can be variations within expectant management. For example, some caregivers will wait for the placenta to be delivered before clamping and cutting the cord, while others, for convenience, just wait until pulsation has finished. Breastfeeding or other means of stimulating the physiological release of oxytocin, such as nipple stimulation, is sometimes also used, but is not an essential component of expectant management. Some 'expert' midwives will use gentle traction on the cord once the placenta is seen to be in the vagina, with good results (**Mavis & Schorn, 2020).**

Midwives must be competent in both supporting the physiological third stage and implementing active management. Midwives must also recognize the need to change from physiological to active management when appropriate. When there has been an identified intervention in labor or birth or when the woman has an increased risk of postpartum hemorrhage (PPH), active management of the third stage must

be considered as the first option (**Gupta et al., 2023).**

Significance of the study

The third stage of labor is usually uneventful, although significant complications can occur. The most common is postpartum hemorrhage (PPH). About 14 million women around the world suffer from PPH every year (**World Health Organization, 2021).** The maternal mortality ratio in Egypt was estimated at 37 deaths per 100,000 live births. PPH accounted for 20% **(Demographics, 2021a)**. Postpartum hemorrhage, ultimately contributing to anemia. Anemia may cause weakness and fatigue. Hospitalization may be prolonged.

Reducing maternal mortality is a priority in the third goal of the 2030 Sustainable Development Goals, which is achieving health and well-being for all. Strategies for Ending Preventable Maternal Mortality (EPMM), published by the WHO, focus on reducing the inequities that cause disparities in access and quality of health care among countries. Ending Preventable Maternal Mortality Strategies are essential in creating high-performing healthcare systems needed to ensure high-quality care services. PPH, as a major cause of maternal death in practice, can be prevented by effective AMTSL **(Muzeya & Julie, 2020; Center of Excellence in Maternal and Child Health, 2021)**.

Compelling evidence suggests that active management of the third stage results in a decrease in complications of the third stage, especially PPH and morbidity. The practice of prophylactic oxytocin administration with delivery of the baby and controlled cord traction (CCT) with counter traction when the uterus is well contracted is strongly advocated. There is an absence of studies assessing the impact of intervention in developing countries. Poignantly, in developing countries, where PPH is a significant problem, the active management of the third stage of labor could have a considerable impact.

Aim of the Study

The study was conducted to:

- Compare the effects of active management versus expectant management in the third stage of labor.
- Plan and implement a program for upgrading nurses' knowledge pertaining to the management of the third stage of labor.

Specific objectives:

1.Determine (active management) whether early placental drainage plus cord traction reduces postpartum blood loss compared to expectant management.

2.Identify risk factors associated with blood loss after delivery.

3.Plan and implement a program for upgrading nurses' knowledge pertaining to the management of the third stage of labor.

Research hypothesis:-

1.H1: Active management of the third stage of labor will reduce the incidence of postpartum blood loss compared to expectant management.

2.H2: Nurses' knowledge about the third stage of labor will progress after they plan and implement the program pertaining to the management of the third stage of labor.

Subject and Method:

Design:- Two research designs were used:

The first cross-sectional descriptive survey was used to compare the effects of active management versus expectant management in 3rd stage of labor.

The second was a quasi-experimental intervention study that was used to plan and implement the program for upgrading nurses' knowledge pertaining to the management of 3rd stage of labor.

Research Setting: This study was conducted at the delivery unit in Beni-Suef University Hospital. This ward was affiliated with the department of obstetrics and gynecology during the period from 1st December 2023 to the end of February 2024.

Subjects' type and size:

A convenient sample consist of two samples were selected for this study, namely a sample of pregnant women's coming for normal delivery who attended the study setting and agreed to participate in the study from the previous mentioned settings during the study period, and another sample of nurses.

1. **Parturient women:** The sample size was taken according to a statistical equation with a confidence interval (CI = 95%), power = 80%, and odds ratio (G2/G1 = 1). A total of 300 parturient women (group 1 is a study group of "150 women") who were using active management compared with the other 150 (group 2 is a control group of "100 women") using expectant management were randomly recruited for this study.

Exclusion criteria

- Placenta previa
- Abnormal presentation
- Multiple pregnancy
- Intrauterine fetal death
- Uterine fibroid
- Anti-coagulant therapy

2. **Nurses:** All (20 nurses) working in the previously mentioned setting who agreed to participate in the study were recruited for this study.

Tools for data collection

- **Interview questionnaire:**

This questionnaire sheet was developed by researchers in Arabic based on current related literature **(Smith & Brennan, 2020) and** included socio-demographic data such as age, level of education, obstetrical data such as gravidity, parity, history of postpartum hemorrhage, and current pregnancy detail.

- **Maternal assessment record:**

It includes the findings of:

1. General examinations on admission to the labor room, such as height, weight to calculate the body mass index, and maternal vital signs
2. Abdominal examination to determine fetal heart rate and to assess the frequency, duration, and intensity of uterine contractions
3. Local examinations (P.V. examinations) to determine the cervical dilation, effacement, and station. Ultrasonography: to assess the gestational age, fetal viability, and fetal weight; measurement of blood loss; and inspection of placental parts.

- **Partograph:**

This was used to evaluate fetal and maternal conditions as well as labor progress.

- **Nurses' knowledge questionnaire(pre- and post-test):**

This tool was designed by the researcher in Arabic mainly to collect data to assess the nurses' knowledge regarding the third stage of labor, such as definition, signs of placental separation, importance of placenta examination and its technique, effective management for the third stage of labor, and nursing role at the third stage of labor.

Scoring system

For the knowledge items, a correct response was scored 1 and the incorrect one was zero. For each part, the scores of the items were summed up and the total divided by the number of items, giving a mean score for the part. These scores were converted into a percent score, and means and standard deviations were computed.

Ethical and administrative considerations

Official permission was obtained by the submission of an official letter from the Faculty of Nursing to the responsible authorities of the study setting to obtain permission for data collection. All ethical issues were taken into consideration in the study; the investigator maintained the anonymity and confidentiality of every woman. The investigator introduced herself to the women and briefly explained the nature and aim of the study to every mother before her participation. Ethical approval was obtained from the Research Ethics Committee at the Faculty of Medicine at Beni-Suef University.

Pilot Study:

The pilot study was carried out on 10% of the sample (30 pregnant women) and 2 nurses in the study setting that were excluded from the study sample to test the applicability and clarify the feasibility of the study tools and estimate the time needed to complete the tools.

Operational Design:

Fieldwork

After securing official permissions, the investigator started to collect data from pregnant women using the finalized tools. Every participant woman was approached individually; the aim of the study was explained, and verbal consent was obtained. After the interview, the woman was examined upon admission and

assigned either to the active or expectant group.

After collecting data on personal and obstetrical history, as well as the current pregnancy, blood samples were taken for assessment of the hemoglobin and hematocrite values at the time of admission. This was repeated after labor, not later than 24 hours after the time of delivery.

Full active management was defined as the administration of a prophylactic uterotonic as soon as possible after delivery of the anterior shoulder, within two minutes of birth, followed by immediate clamping and cutting of the cord and delivery of the placenta by controlled cord traction with no maternal effort.

Full expectant management was defined as no use of uterotonic drugs, no clamping of the cord until pulsation had ceased, and delivery of the placenta within 30 minutes by maternal effort. The estimated blood loss was calculated by taking the weight of the sponge before and after it was soaked with blood. The difference was the amount of blood loss. Alternatively, a large, soaked sponge was considered to have 80 ml of blood loss, and a small one was considered to have 10 ml of blood loss. The data collection period was from 1st December 2023 to the end of February 2024.

Concerning the intervention study, all maternity nurses (20 nurses) working in the previously mentioned settings was selected. The investigator explained the purpose to nurses and obtained their verbal consent after ensuring that any obtained information would be confidential. The pre-test knowledge questionnaire was distributed and self-administered. Observation was done for each nurse three times, and the average was obtained. These data served as an assessment to design the training program. Post-tests were then done for both knowledge.

Implement a program conducted in Arabic to be easily understood by the nurses. The general objective of the nursing program was to upgrade nursing knowledge and increase their awareness of management for the third stage of labor. Specific objectives were that the nurses should be able to identify the following: definition, signs of placental separation, importance of placenta examination and its technique, effective management for the third stage of labor, and nursing role at the third stage of labor.

Supported material (a guide booklet) was used for upgrading nurses' knowledge; a booklet pertaining to the management of the third stage of labor was designed and implemented by the researcher. The program consisted of 12 sessions, and the total time of the sessions was 13 hours. The number of nurses in each session was only 5 in order to facilitate the learning process and allow each nurse to participate in training as well as ensure adequate supervision. Two sessions were conducted daily, one for each nursing shift (morning and afternoon shifts). The session began at 11 a.m. and ended at 4 p.m. It was the most suitable time for the nurses after they had completed their duties. At the beginning of the first session, an orientation to the program is given, such as the purpose, contents, activities, time, location, and establishing communication with participants.

Statistical analysis

The collected data was processed and analyzed using the statistical package for social science (SPSS) version 20. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means and standard deviations for quantitative variables. Quantitative continuous data were compared using the Student t-test in cases of comparisons between two independent groups. When a normal distribution of the data could not be assumed, the non-parametric Mann-Whitney test was used instead. Qualitative categorical variables were compared using the chi-square test. Whenever the expected values in one or more of the cells in a 2x2 table were less than 5, the Fisher exact test was used instead. - In larger than 2x2 cross-tables, no test could be applied whenever the expected value in 10% or more of the cells was less than 5. To identify the independent predictors of blood loss and hemoglobin and hematocrit values, multiple stepwise backward linear regression analyses were used, and analysis of variance for the full regression models was done. Statistical significance was considered at a p-value <0.05.

Results

Table 1 describes the socio-demographic characteristics of parturient women's in the two study groups. They had similar mean ages of 26.5±5.3 and 26.5±5.9 years. A minority of them was illiterate and read-write and the majority of both groups were working (8.0% and 10.0%, 78.7% and

86.0%, respectively). More women in the expectant group had ideal weight compared to the active group (18.7% and 4.0%, respectively). There is a statistically significant difference between the two groups in their area of residence, family monthly income, and crowding index. It is evident that less than half of the active group were from rural areas (43.3%), compared to less than three-quarters of the expectant group (72.0%). Families in the expectant group had lower monthly income and a higher crowding index.

Table 2 demonstrates that there are no differences in statistical significance in the obstetrics history of women in the two groups. The active group had higher percentages of primigravidas and nulliparas compared to the expectant group. Meanwhile, the history of previous abortions was higher in the expectant group, with no statistical significance. The same table demonstrates that the mode was normal vaginal in the majority of women's in both groups. Women in the expectant group had more home deliveries, 57.6% versus 31.6% in the active group. They also had statistically significantly more complications; they had significantly more obstructed labor, postpartum hemorrhage, and puerperal sepsis.

Figure 1 points out that more than half of the expectant group of women had a history of postpartum hemorrhage, compared to 39.5% of those in the active group. Meanwhile, more women in the active group had a history of episiotomy compared to those in the expectant group, and the difference was statistically significant.

Concerning the details of the current pregnancy, Table 3 shows that the active and expectant groups had close mean gestational ages of 39.1±2.3 and 38.5±2.8 weeks, respectively, with no statistically significant difference. As for current pregnancy disorders, less than half of women in the active group (41.3%) had such problems, compared to 21.3% of those in the expectant group, and the difference was statistically significant. However, the distribution of these disorders among women in the two groups according to their types did not reveal statistically significant differences. Meanwhile, statistically significantly more women in the active group had ANC, 73.3% versus 58.0% in the expectant group. However, no statistically significant differences were revealed in the number of ANC visits between the two groups.

Figure 2 compares women's conditions upon admission in the two groups. It is evident that more women in the active group had ruptured membranes. More than half of the active group women had irregular uterine contractions (58.7%), compared to about one-third of the expectant group (29.3%). The great majority of women in both groups had vertex presentations, and a small minority had twin pregnancies.

Table 4 demonstrates that all women in two groups had vaginal deliveries. However, nearly one-half of the active group had episiotomies, compared to more than one-third of the other group. Only a small minority in two groups needed manual separation of the placenta. Meanwhile, the great majority of women in two groups had a full placenta on examination. The same table shows that the duration of the third stage was shorter in the active group (53.4±26.1 minutes) compared to the expectant group (65.3±41.5 minutes), although the difference could not reach statistical significance. However, the mean duration of time between the delivery of the baby and the delivery of the placenta was longer in the active group (18.1±9.6 minutes) compared to the expectant group (16.1±6.8 minutes), and the difference was statistically significant. Conversely, the time between delivery of the placenta and perineal repair was significantly shorter in the active group.

Concerning blood loss during labor, Table 5 demonstrates that women in the active group had statistically significantly less blood loss at both the second and third stages of labor. The mean total blood loss in the active group was 323.2±95.5 cc, compared to 532.5±253.6 cc in the expectant group. Also, the same table indicates that women in the active group had significantly lower hemoglobin levels before delivery ($p<0.001$). However, after delivery, this difference disappeared. Similarly, before delivery, the hematocrit value was significantly lower in the active group compared to the expectant group. This significant difference still persisted after delivery.

Table 6 indicates that the amount of blood loss was positively predicted (higher) by expectant technique, twin pregnancy, previous labor complications, parity, previous abortions, and education. Conversely, it was negatively predicted (decreased) by increased gestational weeks and increased gravidity. As the value of the standardized beta coefficient shows, the most important predictor of the amount of blood loss was the expectant technique. The model explains 37% of the amount of blood loss, as evident from the value of r-square. Other factors such as age, residence, income, crowding index, history of postpartum hemorrhage, ANC start and number of visits, BMI, presentation, and mode of delivery had no statistically significant

effect on the amount of blood loss.

Table 7 describes the best-fitting multiple linear regression models for the hemoglobin level post-delivery. It is evident that the hemoglobin level after delivery was positively predicted (higher) by the woman's age and pre-labor hemoglobin level. On the contrary, it was negatively predicted (decreased) by twin pregnancy and a history of postpartum hemorrhage. As the value of the standardized beta coefficient shows, the most important predictor of the post-labor hemoglobin level was the pre-labor hemoglobin level. The model explains 84% of the amount of blood loss, as indicated by the value of r-square. The technique of placenta delivery had no statistically significant effect on the post-labor hemoglobin level.

Table 8 points to statistically significant improvements in nurses' knowledge about the third stage of labor throughout the program (p<0.001.- As the table shows, the percent knowledge scores at the pre-test ranged between 41.0±6.7% and 69.5±10.6% for the first-line uterotonic drug used in AMTSL, the recommended dose, route, definition, duration of the third stage of labor, and signs of placental separation, respectively. - At the post-test, the range rose up to 83.0±16.0 for the first-line uterotonic drug used in AMTSL, the recommended dose, the route for each technique, and 93.0±6.2% for the definition of a cesarean section.

Table (1): Socio-Demographic characteristics of parturient-women in-the two study groups (n=300)

Items	Group				X^2 Test	p-value
	Active (n=150)		Expectant (n=150)			
	No.	%	No.	%		
Age (years):						
- <20	19	12.7	28	18.7	t=1.07	0.56
- 20-	42	28.0	38	25.3		
- 25+	89	59.3	84	56.0		
Range	18.0-42.0		18.0-45.0			
Mean±SD	26.5±5.3		26.5±5.9			
Level of education:						
- Illiterate and read write	12	8.0	15	10.0	2.28	0.16
- Primary school	47	31.3	61	40.7		
- Secondary school	71	47.3	58	38.7		
- University	20	13.3	16	10.7		
Job status:						
- Working	118	78.7	129	86.0		
- Housewife	32	21.3	21	14.0	0.89	0.30
Residence:						
- Rural	65	43.3	108	72.0	16.92	<0.001*
- Urban	85	56.7	42	28.0		
Body mass index (BMI)						
- ideal weight (BMI<25)	6	4.0	28	18.7	24.36	<0.001*
- Overweight (BMI25-<30)	79	52.7	66	44.0		
- Obese (BMI 30+)	65	43.3	56	37.3		
Family monthly income						
- In debt	19	12.7	48	32.0	33.40	<0.001*
- Just sufficient	71	47.3	89	59.3		
- Saving	60	40.0	13	8.7		
Mean±SD	836.5±366.0		567.3±209.2			
Crowding index:						
- <2	48	68.0	76	50.7	12.51	0.001*
- 2+	102	32.0	74	49.3		
Mean±SD	1.3±0.6		1.5±0.6			

(t) Student t-test- (*) statistically significant at p<0.05

Table (2): Obstetrics history for parturient women in the two study groups

Items	Group				X^2 Test	p-value
	Active (n=150)		Expectant (n=150)			
	No.	%	No.	%		
Gravidity						
Primigravida	74	49.4	58	38.7	3.65	0.13
2-4	44	29.3	50	33.3		
5+	32	21.3	42	28.0		
Parity						
Para 0	74	49.4	58	38.7	4.15	0.21
Para 1	29	19.3	34	22.7		
2-3	41	27.3	49	32.7		
4+	6	4.0	9	6.0		
Abortion "n"	**(n=76)**		**(n=92)**			
Negative	56	73.7	54	58.7	1.91	0.36
Positive	20	26.3	38	41.3		
Mode of the last delivery	**(n=76)**		**(n=92)**			
Normal vaginal	69	90.8	86	93.5	0.54	0.43
Instrumental	7	9.2	6	6.5		
Place of the last delivery:	**(n=76)**		**(n=92)**			
Hospital	45	59.2	23	25.0	11.16	0.002*
Private clinic	7	9. 2	16	17.4		
Home	24	31.6	53	57.6		
Complications of last delivery:	**(n=76)**		**(n=92)**			
Yes	16	21.1	35	38.0	4.63	0.03*
No	60	78.9	57	62.0		
Type of complications:	**(n=16)**		**(n=35)**			
Postpartum hemorrhage	1	6.3	8	22.8	Fisher	0.04*
Puerperal sepsis	0	0.0	5	14.3	Fisher	0.04*
Obstructed labor	11	68.7	7	20.0	18.74	<0.001*
PROM	1	6.3	3	8.6	Fisher	0.51
NICU admission	3	18.7	9	25.7	Fisher	0.51
Stillbirth	0	0.0	3	8.6	Fisher	- 0.71

n Not applicable for primigravida women (*) Statistically significant at p<0.05

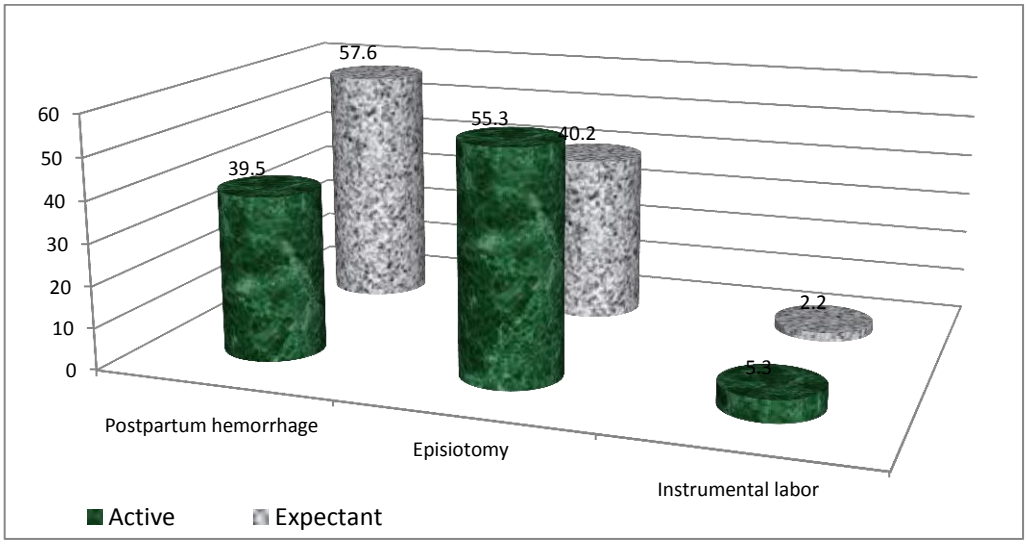

Figure (1):-Percentage distribution of parturient women according to their history of postpartum hemorrhage (PPH), episiotomy, and instrumental delivery in two study groups

Table (3): Distribution of parturient women according to their current pregnancy data in the-two study groups- (n= 300)

Items	Group				X^2 Test	p-value
	Active (n=150)		Expectant (n=150)			
	No.	%	No.	%		
Gestational age (weeks):						
<37	11	7.3	26	17.3	H=2.44	0.06
-37+	139	92.7	124	82.7		
Mean±SD	39.1±2.3		38.5±2.8			
Pregnancy disorders:						
No	88	58.7	118	78.7	**12.26**	**<0.001***
Yes	62	41.3	32	21.3		
Disorders:	**(n=62)**		**(n=32)**			
Persistent vomiting	12	19.3	15	46.9	1.05	0.21
Bleeding	2	3.2	5	15.6	Fisher	0.51
Gestational diabetes	16	25.8	4	12.5	0.92	0.31
Preeclampsia	21	33.9	7	21.9	0.16	0.61
Oligohydramnios	11	17.8	1	3.1	Fisher	0.065
Mode of delivery:						
Normal vaginal	78	52.0	92	61.3	14.22	<0.001*
Episiotomy	72	48.0	58	38.7		
Had manual separation	6	4.0	10	6. 7	0.04	0.83
Antenatal care received	**110**	**73.3**	**87**	**58.0**	**14.71**	**<0.001***
Number of ANC-visits						
Un ideal	40	36.4	28	32.2	2.78	0.24
Ideal	70	63.6	59	67.8		

(H) Mann Whitney test *(*) Statistically significant at p<0.05*

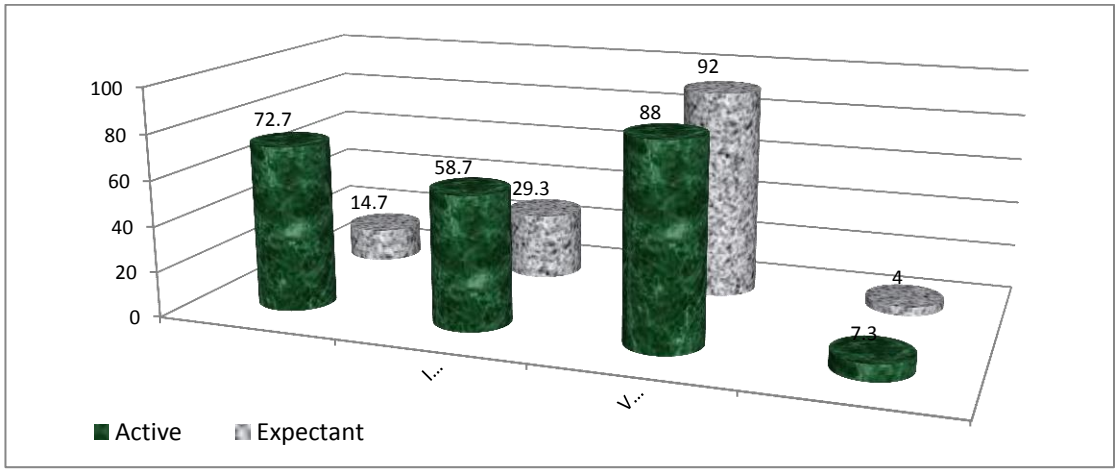

Figure (2):-Percentage distribution of parturient women according to assessment of labor upon admission in two study groups

Table 4: Distribution of parturient women according to their mode of delivery, placental separation, duration of third and fourth stages of labor in the study groups.

Items	Group				X^2 Test	p-value
	Active (n=150)		Expectant (n=150)			
	No.	%	No.	%		
Mode of delivery:						
Normal vaginal	78	52.0	92	61.3	14.22	<0.001*
Episiotomy	72	48.0	58	38.7		
Had manual separation	6	4.0	10	6. 7	0.04	0.83
Reason:						
Adherence to uterus	5	83.3	10	100.0	Fisher	1.00
Adherence of twin placentae	1	16.7	0	0.0		
Full placenta on exam	144	96.0	140	93.3	1.67	0.16
Duration of the third stage (min):						
<30	13	8.7	21	14.0	4.43	0.19
30-	82	54.7	70	46.7		
60+	55	36.7	59	39.3		
Mean±SD	53.4±26.1		65.3±41.5		H=1.62	0.23
Time between delivery of baby and placenta (min.):						
<10	32	21.3	39	26.0	2.38	0.33
10-	73	48.7	54	36.0		
20+	45	30.0	57	38.0		
Mean±SD	18.1±9.6		16.1±6.8		H=6.86	0.03*
Time between delivery of placenta and perineal repair-(min.):						
<10	102	68.0	106	70.7	12.91	0.006*
10-	18	12.0	8	5.3		
20+	30	20.0	36	24.0		
Mean±SD	8.7±2.5		10.8±3.6		H=11.96	<0.001*

(H) Mann Whitney test *(*) Statistically significant at p<0.05*

Table 5. Distribution of parturient women according to their amount of blood loss, Levels of hemoglobin-and hematocrit values before and after delivery in the-two study groups

Items	Group				X^2 Test	p-value
	Active (n=150)		Expectant (n=150)			
	No.	%	No.	%		
Blood loss at stage II:(cc):						
<50	25	16.7	29	19.3	256.72	<0.001*
50-	111	74.0	4	26.7		
100+	14	9.3	117	78.0		
Mean±SD	77.0±24.6		125.7±58.9		H=62.41	<0.001*
Blood loss at stage III:						
<200	56	37.3	26	17.3	81.28	<0.001*
200	94	62.7	83	55.3		
500+	0	0.0	41	27.3		
Mean±SD	229.4±73.5		378.3±212.6		H=76.56	<0.001*
Total blood loss						
<300	72	48.0	24	16.0	123.45	<0.001*
300-	77	51.3	67	44.7		
500+	1	0.7	59	39.3		
Mean±SD	323.2±95.5		532.5±253.6		H=66.77	<0.001*
Hemoglobin level (pre):						
Range	9.0-13.5		8.8-14.5		t=23.04	<0.001*
Mean±SD	11. 7±1.2		12.3±1.4			
Hemoglobin level (post):						
Range	8.9-12.8		8.4-13.6		t=2.93	0.07
Mean±SD	10.6±1.1		10.7±1.2			
Hematocrit value (pre):						
Range	31.6-37.7		32.3-37.3		t=13.37	0.001*
Mean±SD	36.5±1.6		37.2±1.3			
Hematocrit value (post):						
Range	33.1-38.6		32.7-38.3		t=32.66	<0.001*
Mean±SD	35.3±1.4		36.2±1.1			

(H) Mann Whitney test *(t) Student t-test* *(*) Statistically significant at p<0.05*

Table 6: Distribution of parturient women according to their best fitting multiple linear regression model for the total amount of blood loss

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error			
Constant	711.6	241.6		2.073	0.003*
Gestational weeks	10.6	4.3	-0.19	2.932	0.040*
Education	43.4	9.1	0.49	4.697	<0.001*
Gravidity	273.6	133.5	-2.06	2.204	0.030*
Parity	254.3	125.7	1.23	2.003	0.048*
Previous abortion	295.6	123.0	1.35	2.405	0.018*
Previous labor complications	81.2	27.6	0.26	3.003	0.003*
Twin pregnancy	154.0	53.0	0.25	2.982	0.004*
Group (reference: active)	133.8	35.0	0.48	5.787	<0.001*

r-square=0.37 Model ANOVA: F=8.77, p<0.001

Table 7. Best fitting multiple linear regression model for the post-labor hemoglobin level-.

	Unstandardized Coefficients		Standardized Coefficients	t-test	p-value
	B	Std. Error			
Constant	0.95	0.43		2.187	0.031*
Age	0.03	0.02	0.11	2.652	0.008*
History of PPH	-0.16	0.07	-0.11	2.733	0.007*
Twin pregnancy	-0.28	0.15	-0.09	1.742	0.084*
Pre-labor hemoglobin level	0.76	0.03	0.91	21.823	<0.001*

r-square =0.84 Model ANOVA: F=138.22 p<0.001

Table 8: Distribution of nurses knowledge about about third stage of labor-throughout the program (n=20)

Knowledge areas	Percent knowledge score (mean±SD)		Paired t-test	p-value
	Pre (n=20)	Post (n=20)		
Definition, duration of third stage of labor, and signs of placental separation	69.5±10.6	93.0±6.2	7.77	<0.001*
Most common complication of TSL	66.5±7.5	92.5±10.2	9.11	<0.001*
Three main components of AMTSL	60.0±14.9	91.5±8.8	8.01	<0.001*
First line uterotonic drug, used in AMTSL, recommended dose, and route	41.0±6.7	83.0±16.0	13.69	<0.001*
Harmful practice when performing AMTSL	46.0±9.9	89.5±13.2	9.62	<0.001*
Care during management of-third stage of labor-	53.5±7.5	90.5±11.5	11.48	<0.001*

(*) Statistically significant at p<0.05

Discussion:

Egypt has an improved but relatively high maternal mortality ratio of 84 maternal deaths per 100,000 live births, although 60% of births are medically assisted and 49% are facility-based. Postpartum hemorrhage is the leading factor contributing to 27% of maternal deaths, with poor obstetric management cited as the most frequent avoidable factor, contributing to 43% of maternal deaths **(Demographics, 2021b).**

Effective implementation of evidence-based health care practices remains a significant challenge. Evidence-based inpatient care supports continuity of care, a reduction in episiotomy rates, and active management of the third stage with 10 IU syntocinone. Experts recommend that all women should benefit from active management of the third stage of labor, the only intervention known to prevent postpartum hemorrhage (**Krishnamoorthy et al., 2022).**

The present study's findings revealed that women in the two groups had similar socio-demographic characteristics. However, more women in the expectant group, from rural areas, had lower monthly income and a higher crowding index. This could be attributed to the fact that a higher crowding index and lower monthly income reduce access to medical care and are often associated with greater exposure to unhealthy lifestyles. These factors could influence the labor stages and outcomes.

The present study's findings revealed no statistically significant differences between women's obstetric histories in the two groups. This similarity between the two groups was important since these factors could influence labor stages and outcomes. - These findings were corroborated by **Adane et al. (2019***)* in North Ethiopia, who reported that nulliparous labor is more likely to fail

to progress than labor in multiparous women. Moreover, administration of high dosages of oxytocin in active management is safer in nulligravid women since the nulligravid uterus is virtually immune to rupture regardless of the dose of oxytocin used.

Concerning the history of the last delivery, the majority of women in both groups had normal vaginal This factor is important to be equally distributed between the two groups as it influences the decision-making about the subsequent delivery. In congruence with this, **Schorn & King (2019)** reported that women with a previous vaginal birth were more likely to select a trial of labor in a subsequent pregnancy when compared with women who had not had a previous vaginal birth.

The use of antenatal care (ANC) services during pregnancy is an important factor that had to be similar in the two groups. The present study findings showed that more women in the active group had ANC compared to the expectant group, but no statistically significant differences were shown in the number of ANC visits between the two groups. In this respect, **Mavrides et al. (2016)** reported that having less than four prenatal visits increased the risk for postpartum hemorrhage. This underscores the importance of providing quality antenatal and natal care to this group.

According to the present study findings, more women in the active group had ruptured membranes and had irregular uterine contractions compared to the expectant group. Premature rupture of membranes constitutes a risk for the mother and fetus and would need more active rather than expectant management.

The rates of pre-mature rupture of membranes in the expectant group of the current study (14.7%) are very close to those reported by **Robertsm et al. (2018),** who indicated that rupture of the membranes prior to the onset of labor occurred in 20% of all births and 40% of all preterm births. However, the rate in the active group (72.7%) was higher even when compared to the pre-terms cited by these authors, who emphasized that when pre-labor rupture of the membranes occurs at term, there is good evidence that early delivery is associated with a lower incidence of maternal infection and increased maternal satisfaction compared with expectant management.

All women in two groups had vaginal deliveries. However, high rates of episiotomy were demonstrated in nearly one-half of the active group and more than one-third of the expectant group. These rates are in the same line as those reported by **Gabbe et al. (2017)** in South Asia. The high rates of use of episiotomies are in disagreement with **Viswanathan et al. (2016),** who stressed that routine use of episiotomies is harmful to women's health.

Only a small minority of the two groups in the current study needed manual separation of the placenta. The finding is in congruence with **Begley et al. (2019),** who revealed that the incidence of retained placentas requiring manual removal was not significantly different among women who did and did not receive active management.

The present study findings showed that the duration of the third stage was shorter in the active group compared to the expectant group, although the difference did not reach statistical significance. The finding is in agreement with **Prendiville et al. (2014),** who analyzed five randomized controlled trials comparing active and expectant management and found that active management was associated with a shorter third stage.

The findings of the current study demonstrated that the mean duration of time between the delivery of the baby and the delivery of the placenta was longer in the active group compared to the expectant group. This might be explained by the active maneuvers done, which include early clamping of the cord, administration of a uterotonic agent, and controlled traction of the cord. In addition, the current study revealed that the time between delivery of the placenta and perineal repair was significantly shorter in the active group, which explains the lower loss of blood among them.

One of the main advantages of active third-stage management is the reduction of blood loss during labor. According to the present study findings, women in the active group had statistically significantly less blood loss at both the second and third stages of labor.

This was confirmed through multivariate analysis, which indicated that the amount of blood loss was higher among expectant women adjusted for the other factors such as twin pregnancy, history of previous labor problems, parity, abortions, gestational weeks, and increased gravidity. Moreover, the analysis revealed that the

most important predictor of the amount of blood loss was the expectant technique.

In this respect, **Smit et al. (2014)** stated that active management of the third stage of labor reduces maternal blood loss without increasing the risk of retained placenta. On the same line, **Bihan et al. (2023)** mentioned that good evidence shows that active management of the third stage of labor provides a better balance of benefits and harms and should be practiced routinely to decrease the risk of postpartum hemorrhage.

According to the current study findings, other factors were revealed that predicted blood loss and lower hemoglobin levels. These included twin pregnancies, previous labor complications, higher parity, previous abortions, education, and lower gestational weeks and gravidity. The lower hemoglobin levels after labor were predicted by younger age, twin pregnancy, and a history of postpartum hemorrhage.

This finding is supported by the study of **Kebede et al. (2019)** in Southern Ethiopia, who mentioned that the history of postpartum hemorrhage and consecutive deliveries predicted blood loss and lower hemoglobin levels. Likewise, **Habitam et al. (2019) highlighted that** postpartum hemorrhage was reported as a frequent complication in twin pregnancies. It was also significantly more likely in cases with a higher gestational age.

This result was contraindicated by **Gudeta et al. (2018),** who found a low socioeconomic background and previous delivery by caesarean section, which had no effect on the present study. Furthermore, **Schorn et al. (2018)** demonstrated that greater blood loss was associated with preterm birth and grand multiparity.

In addition, **Onong et al. (2016)** uncovered substantial global variation in the use of active management as an intervention to reduce maternal postpartum hemorrhage, especially in the use of oxytocic drugs and controlled cord traction. This is in spite of previous research showing that it was an effective evidence-based practice. The variation might be partly due to different levels of knowledge about active management.

Concerning the laboratory findings among women's in the present study, they demonstrated that women in the active group had better hemoglobin levels after delivery compared to the level before delivery. However, multivariate analysis revealed that the most important predictor of the post-labor hemoglobin level was the pre-labor hemoglobin level and that the technique of placenta delivery, whether active or expectant, had no statistically significant effect on the post-labor hemoglobin level. The finding is in disagreement with **Gupta et al. (2023),** who stated that active management was associated with a significantly lower incidence of 3 g/dl postpartum hemoglobin decline and postpartum hemoglobin of 9 g/dl.

Maternal mortality and morbidity are avoidable with effective obstetric interventions. Relying on risk factors to identify women at risk for hemorrhage has not decreased postpartum hemorrhage mortality, as two-thirds of such cases globally occur in women with no identifiable risk factors. The literature suggests that where maternal mortality from hemorrhage is high, evidence-based practices that reduce hemorrhage incidence, such as active management of the third stage of labor, should always be followed (McKinney **et al., 2021).**

The second part of the present study consisted of an intervention to explore the role of the maternity nurse in the management of the third stage of labor. Therefore, the ultimate goal of the present educational program is to upgrade and improve nurses' knowledge regarding the management of the third stage of labor. The study findings have revealed that the percent knowledge scores at the pre-test, before program implementation, were low. However, statistically significant improvements in nurses' knowledge about the management of the third stage of labor were noticed at the post-test.

These findings are in agreement with the results of the study carried out by **Chou et al. (2022)** in London, who have similarly reported improvements in clinical knowledge following the simulation of scenarios. This result is supported by **Metwally et al. (2021),** who clarified that the majority of studied maternity nurses (96.0%) had unsatisfactory knowledge about primary postpartum hemorrhage pre-competency nursing intervention. This is also confirmed in a study by **Naga et al. (2021)** conducted in Alexandria to assess the effectiveness of an educational program based on competency regarding the care of patients

with stroke on the knowledge, skills, and attitudes of nurses. It revealed a highly statistically significant improvement in the nurses' knowledge immediately and two months after the implementation of the program.

Similarly, in a study titled "Nursing Care of the Third and Fourth Stages of Labor: Protocol of Care" conducted in Egypt, **Wasef et al. (2018)** found that more than two-thirds of the nurses studied had poor knowledge of the third and fourth stages of labor in the pre-intervention test but improved to more than three-quarters in the post-intervention test. The foregoing findings confirm the positive effect of the educational program in improving nurses' knowledge about the management of the third stage of labor. This may be attributed to the fact that the researcher used simple applications and simulations in order to simplify the information and help nurses apply their knowledge for practice.

Furthermore, in line with the present study, Brooten **et al. (2018),** who have studied patient problems, advanced practice nurse interventions, time, and contacts among five patient groups, have demonstrated that groups with greater mean nurse time and contacts per patient had greater improvements in patients' outcomes. Health teaching, guidance, and counseling were the second most frequent category of nursing intervention in four of the five groups. The authors concluded that the dose of nurse time and contacts makes a difference in improving patient outcomes and reducing health care costs. Skills needed by nurses in providing care include well-developed skills in assessing, teaching, counseling, communicating, collaborating, knowing health behaviors, negotiating systems, and having condition-specific knowledge about different patient problems.

In contrast, Bhutia **et al. (2018)** conducted their research in Gangtok, Sikki, titled "Knowledge and Practice of Active Management of the Third Stage of Labor (AMTSL) among Nursing Students in Selected Hospitals," and found that the majority of nursing students had a good level of knowledge about AMTSL. Differences in attending nurse-renewal courses on the third stage of labor could explain the disparity between the previous studies and the current one.

Conclusion

In light of the study findings, it is concluded that active management of the third stage of labor is associated with many positive outcomes. These included a shorter duration of the third stage, significantly less blood loss, and a lower decline in the hemoglobin level. Therefore, results suggest that active management of the third stage of labor is as safe and effective among Egyptian women as it has been among women in other clinical trials. Clinicians serving the Egyptian female population should consider the use of active management of the third stage of labor as a means for preventing postpartum hemorrhage. Post-intervention, there was a significant improvement in nurses' knowledge about the management of the third stage of labor. That means the current study results support the stated hypothesis.

Recommendations:

On the basis of the most important findings of the study, the following recommendations are suggested:

- Active management of the third stage of labor (AMTSL) is a safe and effective procedure and should be used in health care settings providing delivery care services.

Application of the AMSTL requires a skilled attendant at delivery; therefore, training programs are suggested for attendant practitioners in order to master the required skills for this procedure

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