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"The effect of using partogram on the success of normal vaginal delivery in primigravida "

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ABSTRACT:

Objective: The objective of this study was to evaluate role of partogram in spontaneous labour in primigravida to decrease intrapartum fetal death and decrease early neonatal complication.

Methods: This observational study included 100 Primigravida who were selected from attendee of The Obstetrics and Gynecology outpatient at Mansoura University Hospital and Minia AL Nasr Hospital. All patients were divided into: Group A: 50 women without partogram and Group B: 50 women with partogram.

Results: There was statistically significant differences between two groups as regards NICU admission, need for oxygen therapy or ventilation, respiratory distress and Apgar score p= 0.009, 0.019, 0.022, 0.026 respectively, but there was no significant difference as regards Sex of neonates and neonatal fetal weight p= 0.685, 0.875 respectively. There was highly Statistical significant difference between two groups as regards patients` satisfaction p<0.001, the majority of participants reported being "very satisfied" (16.0%) and "neither satisfied nor dissatisfied" (40.0%). A significantly larger proportion of the case group achieved shorter labor duration, with 52.0% delivering within <6 hours compared to 30.0% of controls (p=0.001).

Conclusion: The newborn status, as evaluated by the Apgar score immediately after birth, is also improved when labor is tracked with the Partograph. The Partograph precisely assesses the fetal state as labor progresses, enabling appropriate measures to ensure a healthy baby. Hence, it is imperative to incorporate the utilization of partograph as a fundamental requirement during the process of executing births in all labor wards.

Key words: Partogram, Spontaneous Labour, Primigravida

Introduction

A natural physiological process called labor is defined by gradual rise in uterine contraction frequency, intensity, and length. This gradual increase leads to a gradual effacement and dilation of the cervix and gradual descent of the fetal head via the birth canal. However, the fetus's passage through the birth canal may be exceedingly hazardous, increasing the risk of illness and death for both the mother and the fetus (1).

2 million infant deaths per year due to difficulties after delivery, including 1.02 million stillbirths and 904000 neonatal deaths attributable to intrapartum. In low- and middle-income countries, maternal mortality and morbidity account for the majority of the burden (99%). Low-income nations have still birth rates that are up to 50 times higher than average and intrapartum linked newborn death rates that are 25 times higher (2).

Both in the developing and industrialized worlds, the management of sporadic labor has grown in importance. Long labors with high rates of morbidity and death are still frequent in underdeveloped countries due to a lack of proper healthcare, including the availability and usage of services, transportation and communication, and surgical facilities required for caesarean sections (3).

The partograph, often spelled partogram, is typically a pre-printed paper form used to record labor observations. The partograph's purpose is to provide a visual representation of labor and to notify midwives and obstetricians of any changes in the mother's or fetus' health or the course of the labor. Traditionally, alert and action lines were pre-printed on charts (4).

A composite visual representation of labor progress is called an obstetric partogram. In order to regulate intrapartum care, it is employed in developing confluent regions together with recording of crucial obstetric vital signs (3).

This study aimed to evaluate role of partogram in spontaneous labour in primigravida to decrease intrapartum fetal death and decrease early neonatal complication.

Patients and methods

This observational trial included 100 Primigravida who were selected from attendee of The Obstetrics and Gynecology outpatient at Mansoura University Hospital and Minia AL Nasr Hospital. **All patients were divided into: Group A:** 50 women without partogram and **Group B:** 50 women with partogram.

Inclusion Criteria: Primigravida, according to the history, clinical assessment, and ultrasound, term gestation (37–42 weeks), confirmation of labor determined by cervical dilation more than 4 cm, head station, and uterine activity, Vertex is the presenting component of a cephalic presentation. After obtaining comprehensive information about the setting and objective of the research, patients sign a signed permission form.

Exclusion criteria: Patients with a possible cephalopelvic imbalance, high-risk expectant mothers and those with a poor obstetric history, Pregnant women with illnesses including heart disease and pregnancy-induced hypertension, twin pregnancy and abnormal presentation.

Methods

All patients were subjected to the following:

Complete history taking: Personal history, menstrual history, any complaint, Present history of chronic diseases, past history, Family history and history of allergy to any medication. **Examination:** General examination, Abdominal and local clinical examination through Inspection: to observe signs of pregnancy**.**

Vaginal examination: is an internal physical examination that assesses the uterine cervix, fetal presenting part, and state of the amnion. It is typically conducted with the woman lying in a supine, semi-recumbent, or lateral position, with appropriate infection control techniques used. The healthcare practitioner inserts two fingers into the vagina to assess the cervix's thickness and dilation, the fetal presenting part's descent into the maternal pelvis, intact fetal membranes, pressure applied to the part, and the fetal presenting part's position and flexion.

Cervical Scoring (Bishop Score): The Bishop Score is a tool that assesses if a cervix is ready for labor by assigning points to five factors: cervix dilation, cervix emasculation, cervix consistency, cervix position, and fetal position. A higher Bishop score indicates a higher likelihood of successful labor induction.

Abdomen palpation during pregnancy: Fundal grip, lateral or umbilical grip, pelvic grip and auscultation were assessed.

Procedure

The study used a simplified partogram to chart labor progression and record fetal and maternal data. The protocol was customized for each patient, with a partogram showing cervical dilatation over 4 cm. The WHO Simplified Partogram, which included cervicograph, maternal, and fetal data, was used. The partogram's warning line was green for normal progress, while the action line was highlighted red for dangerously slow labor. The partogram's boxes corresponded to intervals of 30 minutes, with the first cervical dilatation found at 4 cm. Intrapartum information was monitored one hour after crossing the alert line.

Patient satisfaction assessment: To assess the patient view on received care, the treatment process, and related factors in a standardized way, patient-reported outcome measures (PROM) and patient-reported experience measures (PREM) are commonly used. Whereas PROM usually question specific aspects of treatment outcome by means of questionnaires, e.g., on health-related quality of life, PREM gather information on patient view of their health service experience and thus allow direct feedback to healthcare providers with the intention of improving the system and achieving integrative care.

Follow up:

Control group was followed only by ultrasound and vaginal examination. cases were randomly selected from Mansoura University Hospital where partogram was used and rest of cases were selected from Minia AL Nasr Hospital where partogram was not used. The main idea of this research was to encourage the use of partogram at university hospitals through focusing on its advantages.

Ethical Consideration

The protocol was applied based on the approval of the Research Ethics Committee at the Faculty of Medicine, Port Said University. We had 100 patients agreed to be involved in the study, they were randomized after their names was put and sealed in envelops, 50 cases were allocated for partogram and the remaining 50 cases were taken as control. Each participant was provided with information regarding the objective of the inquiry as well as its advantages for both them and the community. Prior to their inclusion in the study, written agreement was obtained from all participants, and they were given the option to decline without any impact on their treatment. All subjects received appropriate medical treatment. The data collected from participants was exclusively used for research purposes. Ensuring the data collected remains confidential and is not utilized beyond the scope of this study without individual consent. No injurious maneuver was executed or employed. In order to get an explanation, the researcher presented various communication methods to the participants. The study's findings determined all participants' selection. Everyone who participates in the research had the freedom to leave at any time and without explanation.

Data management and Statistical Analysis

Data collected over time, standard clinical examinations, laboratory tests, and outcome measures were organized, input, and analyzed by Microsoft Excel software. We subsequently imported the data into the Statistical Package for the Social Sciences (SPSS version 20.0) program for analysis. Numbers and percentages represent qualitative data, while the mean and standard deviation represent quantitative data. We employed the following tests to determine the significance of variations: We assessed the correlation using either Pearson's or Spearman's correlation. To determine statistical significance, we used a p-value less than 0.05, and to indicate highly significant results, we used a p-value less than 0.001.

Results

There were no statistically significant differences among the two groups in terms of age (mean 31.54 vs 30.56 years, p=0.358 and BMI (mean 27.30 vs 27.81, p=0.473) (**Table 1)**.

Table 1: Demographic data in examined groups.

Variables	Group		p value
	Control (N=50)	Case (N=50)	
Age (year)			0.358
Mean ±SD	31.54 ± 5.21	30.56 ± 5.43	
Median (IQR)	31.00 (27.00 - 35.00)	30.00 (26.00 - 35.00)	
BMI (kg/m^2)			0.473
Mean ±SD	27.30 ± 3.21	27.81 ± 3.25	
Median (IQR)	26.02 (25.20 - 29.27)	27.49 (25.46 - 29.30)	

IQR: Inter quartile range, SD: Standard deviation, p: p value for comparing among both examined groups. *: Statistically significant at $p \leq 0.05$

A significantly larger proportion of the case group achieved shorter labor duration, with 52.0% delivering within <6 hours compared to 30.0% of controls (p=0.001). Conversely, a higher percentage of the control group had longer, more complicated deliveries of between 8-9 hours (30.0%) relative to 10.0% of the case group **(Table 2)**.

Table 2: Duration of labor (hours) in the two examined groups.

Variables		Group				p value
		Control (N=50)		Case (N=50)		
		n	%	n	%	
Duration of labor (hours)	<4	7	14.0%	11	22.0%	**0.001***
	4-6	8	16.0%	15	30.0%	
	6-8	20	40.0%	19	38.0%	
	8-9	15	30.0%	5	10.0%	

A significantly higher percentage of the case group required no labor augmentation (94.0%) contrasted to control group (64.0%) (p<0.001). Specifically, only 4.0% of the case group needed oxytocin versus 22.0% of controls, while 2.0% underwent artificial rupture of membranes versus 14.0% of controls. Spontaneous vaginal delivery was also higher in the case group (90.0%) versus controls (64.0%). Cesarean section rates were lower in the case group (10.0%) than control group (36.0%) **(Table 3)**.

Table 3: Augmentation of labour & Mode of delivery in the two examined groups.

Variables		Group				p value
		Control (N=50)		Case (N=50)		
		n	%	n	%	
Augmentation of labour	No	32	64.0%	47	94.0%	**<0.001***
	Artificial rupture of amniotic membranes	7	14.0%	1	2.0%	
	Oxytocin	11	22.0%	2	4.0%	
Mode of delivery	Spontaneous vaginal delivery	32	64.0%	45	90.0%	**0.021***
	C.S	10	20.0%	5	10.0%-	

There was statistically significant differences between two groups as regards NICU admission, need for oxygen therapy or ventilation, respiratory distress and Apgar score p= 0.009, 0.019, 0.022, 0.026 respectively, but there was no significant difference as regards Sex of neonates and neonatal fetal weight p= 0.685, 0.875 respectively **(Table 4)**.

Table 4: Neonatal outcome in the two studied groups.

Variables		Group				p value
		Control (N=50)		Case (N=50)		
		n	%	n	%	
Sex of neonates	male	28	56.0%	26	52.0%	0.685
	female	22	44.0%	24	48.0%	
NICU admission		14	28.0%	4	8.0%	**0.009***
Need for oxygen therapy or ventilation		17	34.0%	7	14.0%	**0.019***
Respiratory distress		14	28.0%	5	10.0%	**0.022***
Neonatal fetal weight (gm) Mean ±SD Median (IQR)		2969.62 ±371.7 3020.0 (2723.0-3290.0)		2922.48 ±400.29 2868.0 (2627.0 -3335.0)		0.875
Apgar score Mean ±SD Median (IQR)		8.80 ± 1.20 9.00 (8.00 - 10.00)		9.30 ± 1.05 10.00 (9.00 - 10.00)		**0.026***

There was no significant difference between two groups as regards Atonic PPH p=0.081 **(Table 5)**.

Table 5: Maternal outcome in examined groups.

Variables	Group				p value
	Control (N=50)		Case (N=50)		
	n	%	n	%	
Atonic PPH	17	34.0%	7	14.0%	0.081

There was highly Statistical significant difference between two groups as regards patients` satisfaction p<0.001, the majority of participants reported being "very satisfied" (16.0%) and "neither satisfied nor dissatisfied" (40.0%) **(Table 6)**.

Table 6: Likert score in examined groups.

Variables	Group				p value
	Control (N=50)		Case (N=50)		
	n	%	n	%	
1 = very satisfied.	8	16.0%	26	52.0%	**<0.001***
2 = satisfied.	7	14.0%	7	14.0%	
3= neither satisfied nor dissatisfied.	20	40.0%	12	24.0%	
4= dissatisfied.	11	22.0%	5	10.0%	
5= very dissatisfied.	4	8.0%	0	0.0%	

Discussion

Maternal mortality continues to be a significant global public health issue. Each year, a significant number of women perish as a result of difficulties arising from pregnancy, childbirth, and delivery. Despite a decrease in worldwide maternal death rates over the past 15 years, the current level is still considered unacceptably high (5, 6).

The main results of our study were as following:

To eliminate the contribution of any confounding factor that may affect the final outcome the current study enrolled two well-matched groups in baseline data, as there was no statistically significant variance among the examined groups regarding demographic data.

Regarding duration of labor, the present research revealed that in control group, 14.0% had duration <4 hours, 16.0% between 4-6 hours, 40.0% between 6-8 hours, and 30.0% between 8-9 hours. In the case group, distribution was 22.0% <4 hours, 30.0% for 4-6 hours, 38.0% for 6-8 hours, and 10.0% for 8-9 hours. A significantly larger proportion of the case group achieved shorter labor duration, with 52.0% delivering within <6 hours compared to 30.0% of controls (p=0.001). Conversely, greater percentage of the control group had longer, more complicated deliveries of between 8-9 hours (30.0%) relative to 10.0% of the case group.

Along with the current research , Sharma et al. (7) who aimed to assess the efficacy of the partograph in terms of maternal & perinatal results, as well as its practicality. Their study included a sample of 400 women in labor, selected through non-randomized control study. case group (n=200) got care using a partograph, while the control group (n=200) received routine care only. Both groups had similar baseline

data. They found a notable decrease in length of 1st & 2nd stage of labor (P=0.023 and 0.006 respectively) & the frequency of vaginal exams conducted during labor (P=0.017) amongst mothers in portogram group.

Also, Ninama and Gandhi (8), who aimed to compare usefulness of modified WHO Partograph in management of labour at one of the rural teaching institutes of Gujarat. Their study was conducted on 150 women who had uncomplicated full-term pregnancies with cephalic presentation in active labor. Their study utilized the WHO partograph, and these women were compared to 150 historical matched controls. They found that the usage of a partograph considerably decreased the occurrence of protracted labor compared to the group that did not use it. In the present study, around 7.3% of the control group experienced extended labor lasting more than 16 hours, but none of the cases had such prolonged labor.
Regarding augmentation of labour and mode of delivery, the current research revealed that a significantly higher percentage of the case group required no labor augmentation (94.0%) compared to the control group (64.0%) ($p<0.001$).

Specifically, only 4.0% of the case group needed oxytocin versus 22.0% of controls, while 2.0% underwent artificial rupture of membranes versus 14.0% of controls. Spontaneous vaginal delivery was also higher in the case group (90.0%) versus controls (64.0%). Cesarean section rates were lower in the case group (10.0%) than the control group (36.0%).

In other words, the use of WHO partogram resulted in significant reduction in the need for labor augmentation and cesarean section rates.

In line with the present research Ninama and Gandhi (8) demonstrated a substantial decrease in the caesarean section rate, with 38.7% in the control group and 24.7% in the experimental group, following the implementation of the partogram.

A quasi-experimental research conducted by Magnus (9) who examined the impact of a modified partograph on the results of 544 women , they reported that an observable decrease was seen in the rate of LSCS births, which decreased from 16.2% to 10.3%. Additionally, there was a decrease in operational deliveries, with a statistical significance of $P = 0.019$.
In contrast to the findings of the present research , Sharma et al. (7) demonstrated that there was no statistically significant distinction between the groups under investigation in terms of delivery method and the requirement for augmentation. The disparity in the present study might be attributed to the variation in sample size.

Regarding neonatal outcome, the current research revealed that the case group had significantly lower rates of NICU admission (8.0% vs 28.0%, p=0.009), need for respiratory support (14.0% vs 34.0%, p=0.019), and respiratory distress (10.0% vs 28.0%, p=0.022) compared to controls. Mean Apgar scores were also significantly higher in the case group (9.30 vs 8.80, p=0.026). However, there was not statistically significant between the studied groups as regard neonatal sex, also, the mean neonates fetal weight (gm) in the case group was higher than controls but without statestical signficance (2522 gm vs 2460 gm, p=0.095).

Anokye et al., (10) conducted a retrospective study which found that the use of a partograph was linked to improved delivery outcomes, resulting in a lower number of nonasphyxiated infants (Adjusted Odds Ratio [95% CI 4.29 [1.35–14.81]). The utilization of partograph was associated with a 5.3-fold reduction in the likelihood of asphyxiated newborns.

In line with the present research , Ahmed et al. (11) who found that the use of partograph was also associated with a significant improvement in neonatal outcomes, resulting in a considerably lower number of neonates with Apgar scores below 7 ($p <0.05$). Nevertheless, the partogram group had 19 NICU hospitalizations, which accounted for 9.5% of the total, whereas the control group had 40 admissions, making up 20% of the total. However, this difference was not statistically significant ($p>0.05$).
However, Umakant et al., (12) who found that there was no significant variance among the groups with & without partogram as regard neonatal complications.

Regarding maternal outcome, the current research revealed that atonic PPH was nonsignficatly lower in case group compared to controls (14.0% vs 34.0%, p=0.081).
Magnus, (9) observed a reduction in maternal morbidities as perineal lacerations (P = 0.0001) & PPH (P = 0.047).

Regarding patients' satisfaction, the present research revealed that the use of WHO partogram was related with higher satisfaction rates compared to control group. In the Control group (N=50), (16.0%) were "very satisfied" and (40.0%) were "neither satisfied nor dissatisfied". On the other hand, in the Case group (N=50), a substantial proportion of participants reported being "very satisfied" (52.0%), while fewer individuals indicated being "neither satisfied nor dissatisfied" (24.0%).

The superiority of the use of partogram as regard patients' satisfaction was attributed to the better outcome in partogram group including the reduced neonatal and maternal complications. But to our knowledge this is the first study compared the satisfaction between the studied groups.

Conclusion

The newborn status, as evaluated by the Apgar score immediately after birth improved when labor is tracked with the Partograph. The Partograph precisely assesses the fetal state as labor progresses, enabling appropriate measures to ensure a healthy baby. Hence, it is imperative to incorporate the utilization of partograph as a fundamental requirement during the process of executing births in all labor wards.

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