Original Article

Maternal and Neonatal Outcomes Using WHO Labour Care Guide versus Modified Partograph in Mansoura University Hospital

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ABSTRACT

Background: Compare the application of the WHO Labour Care Guide and its impact on the Maternal and Neonatal outcome to WHO Modified Partograph.
Design: Randomized clinical controlled study.
Setting: Department of obstetrics and gynecology, Mansoura University Hospitals.
Methods: 60 primigravida women were assessed for eligibility during the study period (30 in Modified partograph group and 30 in labour care guide group).
Results: Labour Care Guide group had a slightly higher oxytocin intake and a slightly longer duration of labour, but these differences were not statistically significant. Rates of normal vaginal delivery, cesarean section, postpartum hemorrhage, maternal mortality, and neonatal outcomes (Apgar scores, birth weight, NICU admissions) were similar between the two groups (p>0.05). No maternal or neonatal deaths occurred.
Conclusion: In contrast to the modified Partograph, the WHO Labour Care Guide offers a more thorough and adaptable method of labor monitoring during the first and second stage labour. This will help midwives and junior obstetricians to identify early complications and to make the right decisions to ensure that every pregnant woman has a positive childbirth experience and to lower the rate of CS, particularly in settings with limited resources.

Key Words: Maternal and neonatal Outcomes, modified partograph, NICU admissions, WHO Labour Care Guide.

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INTRODUCTION

Labour has been described as the most dangerous journey a woman could take. Though it is a physiological phenomenon leads to childbirth, complications can occur at any time during the birth[1]. Approximately one third of maternal mortality, an estimated 42.3% of stillbirths and 11.6% of neonatal deaths were caused by complications during childbirth. Most of these deaths occur in low-resource communities and can be largely prevented by avoiding unnecessary interventions[2].

In (1954), Freidman introduced the concept of partograph by graphically showing the dilatation of cervix during childbirth[3]. In (1972), Philpott and Castle modified this concept by adding the 'action line and alert line' in the graph. Currently, the modified partograph is approved by the World Health Organization (WHO). The Partograph is usually a pre-printed paper form on which progress of labour is recorded. It provides a pictorial overview of labour to alert midwives and obstetricians to any changes in maternal or fetal well-being and the progress of labour[4].

WHO introduced Labour Care Guide in December 2020 to implement WHO guidelines on intrapartum care for a positive childbirth experience[5]. It is a tool to facilitate the introduction of quality, evidence-based, women-centered care for a positive childbirth experience in the context of a wider rights-based approach[6].

The rapidly rising global rates of caesarean section (CS) use without clear evidence of a positive impact on maternal or neonatal morbidity or mortality has raised serious concerns about the overuse of CS[7]. Egypt is among the top five countries with the highest rate of CS (51.8%), after the Dominican Republic (58.1%), Brazil (55.7%), Cyprus (55.3%)[8]. The implementation of the modified Partograph or the Labour Care guide can help to reduce the level of CS in Egypt, particularly in general hospitals of the Ministry of Health and in tertiary institutions. Our institute has introduced a modified partograph for pregnant women admitted after verification that they are in the active phase of the labour, but we still do not have the

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routine use of WHO labor care guide. The aim of this work was to compare between Applying Labour Care Guide and evaluating its impact on the maternal and neonatal outcomes versus WHO Modified Partograph.

PATIENTS AND METHODS

This study was a randomized controlled trial in 60 pregnant primigravida women, conducted at obstetric emergency unit, Obstetrics and Gynecology department, Mansoura University Hospitals from July 2023 to March 2025. The study was performed after obtaining approval from the Mansoura Faculty of Medicine Institutional Research Board (Code MS.23.03.2330; Date:15/04/2023) and written informed consent of all participants. All pregnant women were primigravida, full term singleton pregnancy with a vertex presentation, admitted to hospital in the active phase of first stage of labour, and were assigned to the study. Pregnant women with malpresentation, previous vaginal or caesarean deliveries were excluded from the study.

Randomization:

Pregnant women who agreed to participate in the study were randomly assigned after admission into two groups: group 1 (modified partograph; *n*= 30) and group 2 (labour care guide; *n*= 40). The randomization was balanced (1:1), determined by the patient identification numbers, stored in sealed envelopes. Pregnant women with odd identification numbers were assigned to modified partograph, while pregnant women with even numbers were assigned to labour care guide.

Methods:

All pregnant women, admitted to obstetric emergency units and who met the inclusion criteria were subjected to the following: Written informed consent, detailed obstetric history taking, full general examination (chest, heart, and abdominal examination), vital signs (blood pressure, pulse, temperature and respiratory rate) and body mass index. Local vaginal examination was performed to determine cervical dilation in cm, condition of liquor if membrane ruptured, and presentation. All women underwent investigations including blood group and Rh typing, hemoglobin level, random blood sugar testing, and obstetric ultrasound examination. In the study groups, the active phase of labour was defined as starting at 4cm cervical dilatation in modified partograph and 5cm in WHO labour care guide. The modified partograph paper or WHO labour care guide paper was placed in the patient file at randomization. Pregnant women in group 1 (modified partograph) were followed up using the modified partograph, and in group 2 with WHO labour care guide including assessment of the fetus and woman, labour progress, administration of medications according to WHO recommendations. Any deviations from normal parameters of modified partograph or labour care guide necessities early response and interventions. Modified partograph had an alert line drawn at section of cervical dilatation with rate of dilation 1cm/h and an action line drawn parallel to alert line after 4 hours. In labour care guide, Specific time delays were considered for each centimeter of cervical dilatation (e.g. 5cm [= 6.0 hours], 6cm [= 5.0 hours], 7cm [= 3.0 hours], 8cm [= 2.5 hours] and 9cm [= 2.0 hours). An alarm was triggered when the lag time for a specific dilatation was exceeded without any progress. Babies were properly resuscitated following delivery by a pediatrician.

Study Outcome:

The maternal and neonatal outcomes using the WHO Labour Care Guide at Mansoura University Hospital were assessed.

Sample Size calculation and power analysis:

The calculated sample size of the study will be 48 participants for both groups at 5% level of significance and 80% power of the study, using G*Power 3 sample size calculator. Proportion of CS among WHO labour care guide group (1.5%). Proportion of CS among modified partograph (17.8%) based on Pandey *et al*.,[9].The sample size was increased to be 60 participants for each group to compensate for incomplete data and to increase the study power.

Statistical Analysis:

The collected data were coded, processed, and analyzed using the SPSS program (Version 26) for Windows. Appropriate statistical tests were applied when needed. A *p*-value of less than 0.05(5%) was considered statistically significant.

RESULTS

As shown in the study flow chart Figure (1), 76 pregnant women were assessed for study eligibility criteria. 16 pregnant women were excluded as they refused to patriciate in the study or not met inclusion criteria, 60 pregnant women were randomly assigned into 2 equal groups: group 1(Modified partograph) and group 2 (labour care guide). In groups 1, 28 had normal vaginal deliveries and 2 had cesarean sections (CS). In group 2, 27 had normal vaginal deliveries and 3 had CS. Post-partum hemorrhage occurred in 3 cases in Group1 and 2 in Group 2. There were no maternal deaths in either group.

As shown in Table (1), both groups were similar in age (p= 0.97) and BMI (p= 0.67) and did not show any statistically significant difference. The duration of marriage was slightly longer in Group 2 but not significantly different (p= 0.30). Medical and surgical history were comparable, with minor differences in conditions such as DM, pyelonephritis and prior surgery, none of which were statistically significant (p= 0.15-0.54). These results indicate a homogenous baseline population with no demographic confounders affecting the study outcomes.

As shown in Table (2), maternal pulse, systolic and diastolic blood pressure, temperature, and hemoglobin levels were similar between groups ($p\geq0.41$), suggesting

no significant difference in maternal physiological status during labour. These results reinforce the reliability of subsequent comparisons of labour progression and outcomes, as no systemic maternal conditions were biased in one group to the other.

As shown in Table (3), Cervical dilation at admission was marginally greater in labour care guide group 2 (5.7±1.8 vs. 5.23±1.63cm, p= 0.24), while uterine contractions per 10min were slightly fewer (2.8 Vs. 3.3), but not statistically significant (p= 0.09). Membrane status and amniotic fluid conditions showed no significant difference (53.3 percent of patients with ROM in Group 1 versus 40 percent in Group 2). Oxytocin use was higher in Group 2 (36.7% vs. 16.7%), but statistical significance was not achieved (p= 0.08). These data suggest a comparable intrapartum course between groups without significant intervention bias.

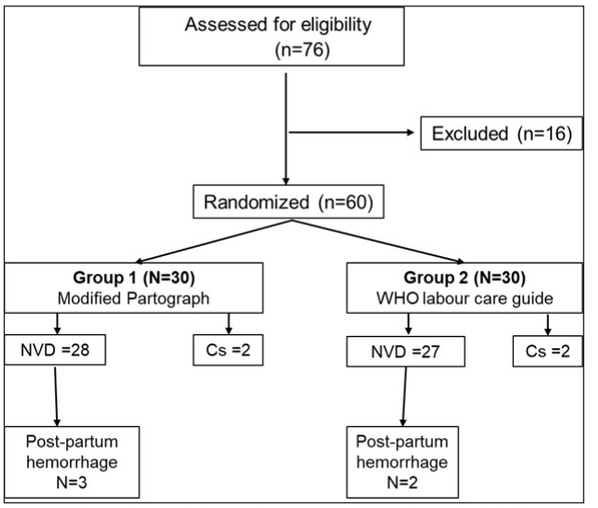

Fig. 1: Flow chart of the study; NVD: Normal vaginal delivery.

Table 1: Demographic and clinical data of the studied groups:

	Group 1 Modified partograph (n= 30)	**Group 2 Labour care guide (n= 30)**	***P* value**
Maternal Age (years)			
Mean ±SD	21.2±4.3	21.2±3.06	0.97
Range	15-33	18-27	
BMI			
Mean ±SD	24.1±2.5	24.4±3.2	0.67
Range	18-30	20-31	
Duration of marriage (years)			
Mean ± SD	1.15±0.41	1.31±0.77	
Range	1-3	1-5	0.30
Gestational age (weeks)			
Mean ±SD	38.4±1.1	38.2±1.2	0.65
Range	36-40	35-40	
Medical history			
Free	27(90%)	23(76.7%)	
DM	0(0%)	2(6.7%)	
Seizure	0(0%)	1(3.3%)	
Pyelonephritis	0(0%)	2(6.7%)	0.15
Bronchial asthma	1(3.3%)	1(3.3%)	
Idiopathic thrombocytopenic purpura	2(6.7%)	0(0%)	
Hypothyroidism	0(0%)	1(3.3%)	
Surgical history			
Free	25(83.3%)	25(83.3%)	
Tonsillectomy	3(10%)	4(13.3%)	0.54
Bilateral ureteric stent	0(0%)	1(3.3%)	
ovarian cystectomy	2(6.7%)	0(0%)	

P value>0.05: Not significant; *P* value<0.05 is statistically significant; p<0.001 is highly significant.

As shown in Table (4), most pregnant women in both groups remained within the expected time of delivery (ETD) or Alert ETD (83.3 vs. 66.7 in groups 1 and 2), although the proportion of those crossing the Alert ETD was higher in Group 2 (26.7 vs. 13.3) and more cases exceeded the action ETD (6.7% vs. 3.3%). However, these differences were not statistically significant (p= 0.39).

As shown in Table (5), normal vaginal delivery was slightly higher in Group 1 (93.3% vs. 90%), while cesarean

deliveries were slightly more frequent in Group 2 (10% vs. 6.7%), although differences were not statistically significant (p= 0.64). Postpartum hemorrhage (PPH) was slightly lower in Group 2 (6.7% vs. 10%), Although statistically insignificant (p= 0.99). APGAR scores were comparable, although slightly lower at 1min in Group 2 (7.2±1.06 vs. 7.7±1.4, p= 0.15). NICU admissions were similar 10% in both groups. birth weight was slightly higher in Group 2 (2988±443g vs. 2831.6±431g), although statistically insignificant (p= 0.17). Gender distribution varied (73.3% males in Group A vs. 53.3% in Group B, p= 0.18), but this is likely incidental.

Table 2: Vital signs and hemoglobin level of the studied groups:

	Group 1 Modified partograph (*n*= 30)	**Group 2 Labour care guide (*n*= 30)**	***P* value**
Maternal pulse			
Mean±SD	84.8±15.3	84.4±15	0.93
Range	60-109	63-109	
SBP			
Mean±SD	17.03±12.4	114.1±16	0.44
Range	91-136	90-138	
DBP			
Mean±SD	76.7±8	74.9±8.7	0.41
Range	60-89	54-89	
Temperature			
Mean±SD	37.4±0.49	37.5±0.52	0.92
Range	36.5-38.5	36.5-38.4	
Hb (gm/dl)			
Mean±SD	11.45±0.86	11.47±0.79	0.93
Range	10.1-12.7	10.3-12.6	

P value>0.05: Not significant; *P* value<0.05 is statistically significant; p<0.001 is highly significant.

Table 3: Comparison of clinical data during delivery between studied groups:

	Group 1 Modified partograph (*n*= 30)	**Group 2 Labour care guide (*n*= 30)**	***P* value**
Fetal heart rate (FHR)			
Mean±SD	141.3±16.3	145.6±23.4	0.41
Range	115-178	113-179	
Cervical dilatation at admission (cm)			
Mean±SD	5.23±1.63	5.7±1.8	0.24
Range	3-9	2-9	
Uterine contraction per 10 min			
Mean±SD	3.3±1.08	2.8±1.18	0.09
Range	2-5	1-5	
Membrane status			
Intact	14(46.7%)	18(60%)	0.30
ROM	16(53.3%)	12(40%)	
Amniotic fluid condition			
Absent	14(46.7%)	18(60%)	0.40
Clear	15(50%)	10(33.3%)	
Meconium stained	1(3.3%)	2(6.7%)	
Oxytocin use	5(16.7%)	11(36.7%)	0.08

P value>0.05: Not significant; *P* value<0.05 is statistically significant; p<0.001 is highly significant.

Table 4: Comparison of alert and action ETD between studied groups:

Alert and action ETD	Group 1 Modified partograph (*n*= 30)	Group 2 Labour care guide (*n*= 30)	*P* value
within ETD/Alert ETD	25(83.3%)	20(66.7%)	
Alert Raised/Crossed Alert ETD	4(13.3%)	8(26.7%)	0.39
Beyond ETD/Action ETD	1(3.3%)	2(6.7%)	

P value>0.05: Not significant; *P* value<0.05 is statistically significant; *p*<0.001 is highly significant.

Table 5: Maternal and neonatal outcomes of the studied groups:

	Group 1 Modified partograph (*n*= 30)	Group 2 Labour care guide (*n*= 30)	*P* value
Mode of delivery			
Normal vaginal delivery	28(93.3%)	27(90%)	0.64
CS	2(6.7%)	3(10%)	
Indication of CS			
Fetal distress	0(0%)	1(3.3%)	0.99
Prolonged second stage	2(6.7%)	2(6.7%)	
Post-partum hemorrhage	3(10%)	2(6.7%)	0.99
APGAR 1min			
Mean±SD	7.7±1.4	7.2±1.06	0.08
Range	6-10	5-10	
APGAR 5min			
Mean±SD	9.8±0.46	9.5±0.89	0.15
Range	8-10	6-10	
NICU admission	3(10%)	3(10%)	1
Cause of NICU admission			
Neonatal jaundice	2(6.7%)	3(10%)	
Respiratory distress	1(3.3%)	0(0%)	0.99
Gender			
Males	22(73.3%)	16(53.3%)	0.18
Females	8(26.7%)	14(46.7%)	
Birth weight			
Mean±SD	2831.6±431	2988±443	0.17
Range	200-3500	2100-3600	

P value>0.05: Not significant; *P* value<0.05 is statistically significant; *p*<0.001 is highly significant.

DISCUSSION

Monitoring of the labour is essential to reduce maternal and perinatal morbidity and mortality. The partograph is a bedside form that allows midwives and obstetricians to easily record maternal and fetal observations and visually represent the progress of labor including cervical dilatation and fetal head descent. It serves as a system of early warning, assisting in prompt decisions about labor augmentation and termination. The definition of active phase of first stage of labour was changed from 3cm cervical dilatation in original partograph to 4cm in modified partograph and finally 5cm in WHO labour care guide.

National implementation of modified WHO partograph or WHO labour care guide in general hospitals of the Ministry of Health and universities hospital will help to reduce the CS rate particularly in pregnant primigravida women. Once primigravida is delivered by CS without clear indication the subsequent pregnancies become again CS with unavoidable future complications like placenta accreta. Our study tries to compare the already used modified partograph in our hospital with the new WHO labour care guide regarding maternal and neonatal outcomes.

Regarding comparison of demographic data of our studied groups. We reported no statistically significant difference between the two groups in maternal age (21.2±4.3 in group 1 vs 21.2±3.06 in group 2, p= 0.97). In agreement with our study Mugyenyi *et al*.,[10] who evaluated WHO labour care guide against partograph in detecting prolonged or obstructed labour. They reported that there was no statistically significant difference between the two groups in maternal age (25.9±5.5 in partograph vs 25.9±5.8 in labour care, p value=0.92). The age of our patients is younger that Mugyenyi *et al*., study because all pregnant women in our study were primigravida and not primigravida and multipara as in Mugyenyi *et al*., study.

Our study reported no statistically significant difference in gestational age between the two groups (38.4±1.1 in group 1 vs 38.2±1.2 in group 2, p= 0.65). This finding is in consistent with Ranjan *et al.*,[11] study who reported no statistically significant difference in gestational age (38.6±0.89 in partograph vs 38.8±0.8 in labour care guide, p= 0.413).

We reported that maternal vital data (pulse, systolic and diastolic blood pressure, temperature), and hemoglobin levels were similar between groups, suggesting no significant difference in maternal physiological status during labour that would affect labour progress and maternal outcomes.

We demonstrated that Fetal heart rate (FHR) in the two groups was within normal range, slightly higher in Group 2 (145.6±23.4 vs. 141.3±16.3bpm), but not significantly different (p= 0.41). Cervical dilation at admission was slightly higher in Group 2 (5.7±1.8 vs. 5.23±1.63cm, p= 0.24), whereas uterine contractions per 10 min were slightly fewer (2.8 Vs. 3.3), however, non-significant (p= 0.09). There was no statistically significant difference between two groups regarding membrane status and amniotic fluid conditions (53.3% in group 1 had ROM vs. 40% in group 2). Oxytocin use was higher in Group 2 (36.7% vs. 16.7%), but statistical significance was not reached (p= 0.08). These data indicate a comparable intrapartum course between groups without significant intervention bias.

In our study, we found that most pregnant women in both groups remained within the Expected Time of Delivery (ETD) or Alert ETD (83.3% in group 1 vs. 66.7% in group 2), with a higher percentage of labour care guide crossed alert ETD (26.7% vs. 13.3%) and exceeded action ETD (6.7% vs. 3.3%). However, these differences were not statistically significant (p= 0.39). In agreement with our study, Ranjan *et al.*,[11] found that 82.5% in partograph group versus 76.25% in labour care guide group delivered before crossing ETD or reaching alert ETD and 17.5% in labour care guide group and 13.75% in partograph group delivered after the alert was raised or crossed alert ETD respectively. Only 6.25% in the labour care guide group and 3.75% in the partograph group delivered after crossing ETD and action ETD.

Regarding the mode of delivery between studied groups. We found that normal vaginal delivery was slightly higher in Group 1 (93.3% vs. 90%), while Cesarean deliveries were slightly more frequent in Group 2 (10% vs. 6.7%), though differences were not significant (p= 0.64). Cesarean section indications (fetal distress, oligohydramnios and prolonged second stage) showed minimal variation (p= 0.99). These findings suggested that both groups had similar labour management and delivery outcomes. In agreement with our study N., S., and Lakshmi M., S., J., study[12] found that, there was no statistically significant difference in normal vaginal deliveries, CS, and instrumental delivery (80%, 15% and 5% in modified partograph versus 80%, 12.5% and 7.5% in labour care guide).

In our study, we found that there was no statistically significant difference in postpartum hemorrhage (p= 0.99). 2 women in labour care guide had atonic postpartum whereas 3 women had atonic postpartum hemorrhage (PPH) in modified partograph. No maternal deaths occurred in both groups. These findings suggest comparable maternal safety profiles for both monitoring methods. Our findings were matched with N., S., and Lakshmi M., S., J., study[12] who reported 2 women in modified partograph and 4 women in labour care guide had postpartum hemorrhage with no statistically significant difference between two groups with (p= 0.791).

Regarding the perinatal outcomes in our study, we found that APGAR scores were comparable, though slightly lower at 1min in labour care guide group 2 (7.2±1.06 vs. 7.7±1.4, p= 0.15). NICU admissions were similar (10% in both groups), with jaundice and respiratory distress being the main causes. These results suggest no significant difference in neonatal health outcomes between the two monitoring methods. No neonatal mortality occurred in both groups. These results suggest no significant difference in neonatal health outcomes between the two monitoring methods. Birth weight was slightly higher in group 2 (2988±443g vs. 2831.6±431g, however, non-significant, p= 0.17). In agreement with our study Mugyenyi *et al*.,[10] found that there was no statistically significant difference between LCG group and partograph group regard Apgar Score >7 at 1 minute with p= 0.370 respectively, while there was statistically significant difference regard Apgar Score>7 at 5 minutes with p value=0.025.

The main strength of our study were; 1) it was a prospective study not retrospective, 2) our pregnant women in both groups were similar in terms of age, gestational age and all primigravida that were not found in other studies, 3) primary outcomes were maternal and neonatal outcomes not obstetric outcomes rather than obstructed and prolonged labour as many other studies have shown.

The main limitations of our study are, 1) the small size of both groups of study so we need more studies in the future to compare between, 2 methods of monitoring of labour process in more large scale of patients, 2) we do not assess patient satisfaction as we used the policy of WHO supportive care described in labour care guide to promote positive childbirth experience in modified partograph as a part of project of WHO in our hospital prior to the launch WHO labour care guide .

Finally, we recommend using WHO labour care guide to monitor labour progress during first and second stage labour. This will help midwives and junior obstetricians to identify early complications and to make the right decisions to ensure that every pregnant woman has a positive childbirth experience and to lower the rate of CS, particularly in settings with limited resources.

CONCLUSION

The present study demonstrated that PE was accompanied by a significant increase in neutrophils, monocytes, and basophils values compared to healthy subjects. We concluded that monitoring of hematological parameters can be used as clinical indicators in the assessment of severity of PE and may be taken as a useful parameter to prevent complications of PE. However, further multicenter prospective cohort studies with large sample size are required to verify the role these parameters in the diagnosis of PE and assessment of disease severity.

CONFLICT OF INTERESTS

There is no conflict of interests.

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