UTILITY OF PAPERLESS PARTOGRAM IN LABOR MANAGEMENT

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ABSTRACT

Objective: To compare WHO-modified partograph and paperless partogram in the effective management of labor.

Methods: A prospective analytical study was carried out in the Department of Obstetrics and Gynecology, Pannadhay Zanana Hospital at RNT Medical College, Udaipur. A sample of 400 pregnant women was recruited by random sampling from the labor room, for 1 year (June 01, 2021, to May 31, 2022). Women fulfilling inclusion criteria were randomly assigned for monitoring of labor in an active phase of labor ≥ 4 cm of cervical dilatation.

Results: The mean age was 26.46 ± 3.90 years with an age range of 18–37 years, 65% were rural. 11% crossed alert line and 1.5% crossed action line. 94.75% had a normal vaginal delivery and 21 (5.25%) cases had lower segment cesarean section (LSCS). As indication for LSCS 16 (76.19%) had fetal distress and 5 (23.81%) had secondary arrest of dilatation and descent head. 17 (4.25%) had APGAR <7 at 5 min and no stillbirth was reported.

Conclusion: We concluded that the paperless partogram was effective and user-friendly in the management of labor and prevention of abnormal or prolonged labor when compared to the WHO partogram in low-risk cases.

Keywords: Paperless partograph, WHO partograph, Labor management.

INTRODUCTION

Maternal mortality continues to be a major public health problem worldwide. India is among those countries which has a very high maternal mortality rate (MMR) [1]. From 2000 to 2017, the global maternal mortality ratio declined by 38% – from 342 deaths to 211 deaths/100,000 live births, according to UN inter-agency estimates. India has improved its maternal mortality ratio (MMR) to 97 deaths/100,000 in 2018–2020 from 103 deaths/100,000 in 2017–2019, as per data retrieved by the Registrar of India [2].

One of the major causes of maternal death include prolonged and obstructed labor (10%), leading to perinatal and maternal morbidity and mortality. Continuous monitoring of labor and timely intervention thus plays an important role in improving the obstetrical and perinatal outcome.

The partograph is a graphical representation of the various events of labor plotted against time. Relevant measurements include statistics such as cervical dilation, fetal heart rate, duration of labor, and vital signs. It serves to be a very cost-effective and affordable health intervention for monitoring labor and appropriate decision-making. WHO recommends the universal use of WHO-modified partograph, which in clinical setup is less often used, and when used it is incompletely interpreted. Dr. Debdas argued that the WHO partograph has not been adapted to local needs, accepted by those who use it and cannot be used given available resources. There are many factors that seem to be responsible for non-compliance with partograph use, which include – lack of awareness, lack of availability, negative perceptions of partograph, high patient load, fewer clinicians, extra time to plot data, and complex face of the graph. These drawbacks highlighted the need for the development of a new tool for labor monitoring, which is suitable for poor resource settings such as India and can also be used at the community level.

Debdas and Singh [3] propose a new, low-skill method for preventing prolonged labor by the use of a paperless partogram. It takes 20 s and requires only basic addition and the reading of a clock or watch. It holds the potential for more effectively mobilizing clinicians to prevent prolonged labor and is appropriate on all counts [4].

In the paperless partogram 4 model, clinicians calculate 2 times, an alert estimated time of delivery (ETD) and an action ETD. The alert calculation uses Friedman's [5] widely accepted rule that the cervix dilates 1 cm/h while a woman is in active labor. The clinician simply adds 6 h to the time at which the woman becomes dilated to 4 cm to find the alert ETD (when cervical dilation is at 10 cm). The clinician adds 4 h to the alert ETD [6-8] to get the action ETD. At the time of the alert ETD, clinicians should be sensitized to the fact that the woman has not yet been delivered and, if the current facility lacks C-section availabilities, make arrangements for transportation to a facility with available emergency obstetric care. At the time of the action ETD, if the woman has not yet delivered, she is at risk for prolonged labor and the clinician must deliver her now by suitable medical treatment or surgical intervention. Throughout the process of active labor, the paperless partogram also helps prevent prolonged labor by prompting clinicians to work toward a roughly "on-time" delivery [9]. For example, if uterine contractions are poor close to the alert ETD, clinicians can give the woman oxytocin or an equivalent to strengthen contractions. If a woman faces obstetric complications before any ETD, clinicians should pursue medical interventions to keep the mother and fetus healthy regardless of ETD.

Aim
To compare WHO-modified partograph and paperless partogram in the effective management of labor.

METHODS

The study was a prospective analytical study carried out in the Department of Obstetrics and Gynecology, Pannadhay Zanana Hospital at RNT Medical College, Udaipur, included 400 pregnant women recruited from the outdoor patient department and labor room. Pregnant women

irrespective of age and parity, singleton pregnancy, gestational age from 36 to 42 weeks gestation, cephalic presentation, and women should be 4 cm or more dilated at the point were included in the study. Women who had a non-cephalic presentation, known fetal structural anomaly, previous Caesarian section or uterine surgery, premature or post-dated pregnancy, and maternal co-morbidities/high-risk pregnancy were excluded from the study. Admitted pregnant women were examined after taking detailed obstetrics and gynecological history. Women fulfilling inclusion criteria were randomly assigned for monitoring of labor in the active phase of labor ≥4 cm of cervical dilatation.

Paperless partogram

In the paperless model of study alert ETD and action ETD were calculated. Both ETDs written in big letters on the front of the case sheet and action ETD is circled in RED. The whole procedure was paperless/graphless and done in split second mental calculation.

Alert ETD

According to Friedman's rule, the cervix dilates at 1 cm/h: 6 h were simply added to the time at which women was 4 cm dilated to get alert ETD. At the time of alert ETD, if a woman had not delivered yet, clinician was alerted and sensitized. Careful monitoring and intervention are done, for example, if contractions were poor, labor was augmented by oxytocin or ARM. A mandatory PV examination was done at this point of time.

Action ETD

Four hours are added to alert ETD to get action ETD. If she had not yet delivered spontaneously by this extra 4 h, then she was at risk of prolonged labor and needed delivery by suitable medical or surgical technique.

The difference between alert ETD and action ETD, that is, 4 h denotes the timing for intervention of prolonged labor. It was in accordance with WHO-modified partograph recommendation where the difference between alert line and action line is 4 h. In the WHO partograph in the active phase of labor, cervical dilatation remained normal on/left of alert line. When dilatation crosses to the right of alert line it is a warning that labor might be prolonged, but it does not signify obstructed labor and does not compromise feto-maternal outcome. However, when action line was crossed, it signifies that action must be taken immediately (WHO) [7-9].

FHR, liquor, contraction in 10 min (every 1/2 h), BP, temperature (1 hourly), PV examination 4 hourly to see dilation of the cervix and descent and molding of head.

The investigation was started after receiving ethical approval from the institute. Written informed consent was obtained from all the study subjects.

RESULTS

The majority of cases 46.75% (187 patients) belonged to 26–30 years. The least common age group was >35 years, that is, 1.00% (4 cases) and the mean age was 26.46 ± 3.90 years with an age range of 18–37 years. The majority of cases 65% (260 patients) belonged to rural areas (Table 1).

The majority 59% were booked and 234 (58.5%) were multigravida and all patients were antenatal. The majority of cases 40.75% were between 37 and 38 weeks of period of gestation. Only 0.75% of cases were between >40 weeks (Table 2).

The majority of cases 356 (89%) had no need for augmentation and 44 (11%) cases needed augmentation. The majority of cases 379 (94.75%) had normal vaginal delivery and 21 (5.25%) cases had lower segment cesarean section (LSCS) (Figs. 1 and 2).

44 (11%) had crossed alert line and 6 (1.5%) had crossed action line (Table 3).

The majority of cases 16 (76.19%) had fetal distress and 5 (23.81%) had secondary arrest of dilatation and descent head. In 99.25% of cases had eventful maternal outcome whereas a minimum of 0.75% had uneventful outcome. Maximum 383 (95.75) cases had APGAR >7 at 5 min whereas 17 (4.25%) had APGAR <7 at 5 min.

DISCUSSION

Monitoring labor can be done by various methods. One method commonly used in developing countries is the partograph (or partogram). The partogram is a tool that enables midwives and obstetricians to record maternal and fetal observations. WHO has recommended the universal use of a partogram during labor to aid in clinical decision-making [10].

Table 1: Sociodemographic status of study subjects

Sociodemography	Frequency (%)
Age (years)	
<20	13 (3.25)
20–25	144 (36)
26–30	187 (46.75)
31–35	52 (13)
>35	4 (1)
Residence	
Urban	140 (35)
Rural	260 (65)

Table 2: Obstetric status of study subjects

obs history	Frequency (%)
Obstetric status	
Booked	236 (59)
Unbooked	164 (41)
Gravida	
Primigravida	166 (41.5)
Multigravida	234 (58.5)
Gestational age (weeks)	
37–38	163 (40.75)
38.1–39	124 (31)
39.1–40	110 (27.5)
>40	3 (0.75)

Table 3: Alert and action line among study subjects

Crossed	Frequency (%)
Alert line ETD	44 (11)
Action line ETD	6 (1.5)

ETD: Estimated time of delivery
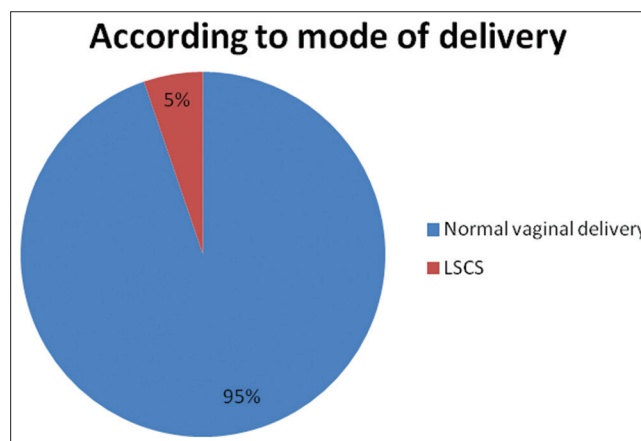
Fig. 1: Mode of delivery among study subjects
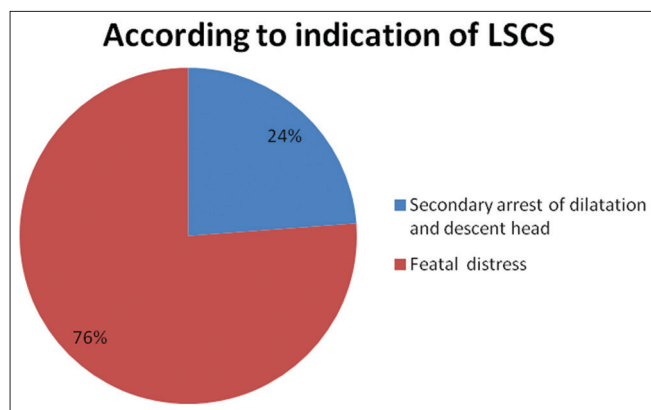
Fig. 2: Indication of lower segment cesarean section as observed in this study

In 1972, two landmark papers in this journal described the partograph [11,12] a chart designed to provide finite referral criteria for midwives working in peripheral clinics. The partograph was globally adopted and has been used as part of the assessment of labor progress for nearly half a century. It was recommended by the WHO in the early 1990s as a routine tool for displaying the progress of labor. Despite its global acceptance, utilization and correct completion rates as low as 31 and 3%, respectively, have been reported [13]. Following the update of its global recommendations on intrapartum care in 2018 [14] the WHO initiated a process to revise the partograph in light of recent evidence, including a new understanding of the individual variability of the progress of laborers resulting in good perinatal outcomes, and the fact that many women do not experience a labor that conforms to the average rate on which the partograph design was based [15].

The new WHO recommendations based on the emerging evidence on normal labor progression, as well as recommendations informed by the global shift toward improving the experience of childbirth, necessitated the design of a new labor monitoring tool called the WHO Labour Care Guide [14].

The WHO recommendation has not changed despite a 2009 Cochrane review of five randomized controlled trials (including both high- and low-resource countries. The paperless partograph is a low-skill method for preventing abnormal labor [16].

It is designed to monitor not only the progress of labor but also the condition of the mother and the fetus during labor. A paperless partogram needs no graph paper, no extra time to do it, and uses the routine that the nurses are already used to it gives the two basic data on which the partogram works namely (the alert line and the action line).

This method involves only calculating alert and action times by adding 6 h to the time when a woman reaches 4 cm of dilatation (alert line) and adding 4 h to the alert time (action line); based on the rational that the cervix should dilate 1 cm per hour between 4 cm and 10 cm. If there is no birth at alert time, refer to care, and if no birth by action line, immediate delivery. Very little research was done to test the effectiveness of paperless and its acceptance by health-care providers (nurses midwives and obstetricians); hence, it is important to conduct the present study that aims to evaluate the effect of using the paperless partogram on the outcome of labor.

In our study, the majority of cases 46.75% (187 patients) belonged to 26–30 years. The least common age group was >35 years, that is, 1.00% (4 cases) and the mean age was 26.46 ± 3.90 years with an age range of 18–37 years. Similarly, Agarwal *et al.* (2013) [16] found that the mean age of the participants was 25.36 years. Furthermore, Fatouh *et al.* (2015) [10] and Khalil *et al.* (2022) [11] found that the mean age of the participants was 25.6 years.

In our study, the majority of cases 65% (260 patients) belonged to rural areas and rest of 35% cases (140 cases) belonged to urban areas, 59% were booked and 41% cases were unbooked. This is because we are at tertiary care and referral center; the major drainage of cases was from rural areas which are referred from primary care centers.

The majority of cases 234 (58.5%) were multigravida and 41.5% of cases were primigravida. Our study was consistent with the findings of Agarwal *et al.* (2013) [16] found that 60% were primigravida and 40% were multipara in their study. Furthermore, Debdas *et al.* (2020) [9] found that out of the 110 women included in the study, 73 (66.4%) were nulliparous. Furthermore, Fatouh *et al.* (2015) [10] and Khalil *et al.* (2022) [11] found 87% were multipara.

In our study, all patients were antenatal. The majority of cases 40.75% were between 37 and 38 weeks of period of gestation. Only 0.75% of cases were between >40 weeks. Similarly, Agarwal *et al.* (2013) in their study, women were invited to participate if they were at 36–42 weeks of gestation, the mean duration of gestation was 281.9 days. Furthermore, Fatouh *et al.* (2015) and Khalil *et al.* (2022) [11] found that the gestational age from 37 to 42 weeks, and the mean gestational age was 39.1 weeks. Furthermore, Debdas *et al.* (2020) [9] found that the mean (SD) gestational age of subjects was 38.47 (1.4) weeks.

The majority of cases 356 (89%) had no need for augmentation and 44 (11%) cases needed augmentation.

The majority of cases 379 (94.75%) had normal vaginal delivery and 21 (5.25%) cases had LSCS. Similarly, Abdullahi *et al.* (2022) [17] in their study found that 91% had normal vaginal delivery.

The majority of cases 356 (89%) did not cross the alert line and 44 (11%) had crossed the alert line. Similarly, Tarannum (2020) [8] found that there were 87.5% of women who delivered before alert ETD. Furthermore, Abdullahi *et al.* (2022) [17] 91% of laborers were within normal time and Debdas *et al.* (2020) [9] found that 75 (68.2%) women delivered on or before the time of the calculated ETD.

The majority of cases 394 (98.5%) did not cross the action line and 6 (1.5%) had crossed the action line. Similarly, Reshma and Ambarkar [18] found that five women crossed the action ETD.

In our study, 99.25% had eventful outcomes whereas a minimum of 0.75% had uneventful outcomes. Indication of surgery, the majority of cases 16 (76.19%) had fetal distress and 5 (23.81%) had secondary arrest of dilatation and descent head.

In our study, a maximum of 383 (95.75) cases had APGAR >7 at 5 min whereas 17 (4.25%) had APGAR <7 at 5 min. Similarly, Abdullahi *et al.* (2022) [17] found that 72% of babies were born with good APGAR scores at 1 min of delivery. Furthermore, Khalil *et al.* (2022) [11] found that the mean APGAR score of the newborn after 5 min was 9.4.

CONCLUSION

We concluded that the paperless partogram was effective and user-friendly in management of labor and prevention of abnormal or prolonged labor when compared to WHO partogram in low-risk cases. WHO partograph was rarely used in overburdened and busy labor rooms and at the peripheral health-care centers due to a lack of knowledge and awareness.

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AUTHORS' CONTRIBUTIONS

All the authors have contributed equally.

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