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Research Protocol

Obstetrics and Gynaecology Section

WHO-modified Partogram versus Paperless Partogram for Effective Management of Labour: A Research Protocol

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ABSTRACT

Introduction: The partograph is a simple, inexpensive tool that provides a continuous pictorial overview of labour. It helps to identify obstructed or prolonged labour and determines when appropriate actions should be taken to prevent complications. The partograph is a valuable tool for making early decisions, including transferring patients to higher-level centres when labour is not progressing.

Need for the study: This research aims to contribute to the development of a standardised approach for healthcare personnel to ensure accuracy and reliability in observations and data collection.

Aim: This study will compare the efficacy of the World Health Organisation (WHO)-modified partograph versus the paperless partograph.

Materials and Methods: This will be a prospective interventional study conducted at the Department of Obstetrics and Gynaecology, JNMC, Wardha, Maharashtra, India over a two-year duration from January 2024 to January 2026. The study will include 200 pregnant women who will be divided into two groups. One group will use the WHO-modified partograph, while the other group will use the paperless partograph. The comparison will be based on the effective management of labour using the action and alert line Estimated Time of Delivery (ETD) between the two partographs. The overall usefulness will be evaluated using the Chi-square test/Fisher's-exact test, with a statistical value of <0.05 considered significant.

Keywords: Estimated time of delivery, Foetus, Gestation, Labour, Pregnancy, World health organisation

INTRODUCTION

Prolonged labour is a common cause of maternal mortality in developing countries, often associated with issues related to the size and shape of the pelvis, as well as difficulties in cervical dilation. Early identification of abnormal labour progression can help prevent prolonged labour, reduce the risk of postpartum bleeding, decrease instances of obstructed labour, and minimise the need for intensive care for newborns. Continuous monitoring of labour and prompt intervention are essential to mitigate adverse outcomes associated with childbirth [1].

Friedman first presented the concept of a partogram in 1954 to visually track dilation during labour. Philpott and Castle later expanded on this idea by incorporating "action" and "alert" lines on the graph. The partogram is a tool that includes parameters like foetal heart rate, cervical dilation, contractions, and the mother's pulse rate. These details are recorded on specially designed paper for monitoring purposes. The World Health Organisation (WHO) strongly recommends the use of a partogram for labour management [2].

In 1987, the World Health Organisation (WHO) launched the Safe Motherhood initiative. Since then, WHO has published three different types of partographs [3]. The earliest WHO partograph was the composite partograph, which was further modified in 2000 by eliminating the latent phase, resulting in the WHO-modified partograph [4]. The comprehensive parameters for patient monitoring and evaluation in the WHO program (1994) were further adjusted in 2000 with the removal of the latent phase. However, despite these modifications, the WHO partogram is still not widely popular among busy Indian obstetricians, who often face challenges in meeting the WHO-recommended doctor-to-patient ratio. The current issue lies in the infamously low rate of complete documentation of the WHO partogram, which can be attributed to various factors, including poor awareness and training, a shortage of medical professionals, high patient loads, lack of supervision, unfavourable perceptions, and the complexity of plotting the WHO partogram. In response to these challenges, Dr. AK Debdas from India has presented a new low-skill method called the paperless partogram, aiming to adapt to local conditions to evolve a simple, user-friendly system for centers with high delivery rates and a dearth of skilled personnel. The paperless partogram is a two-step computation that only requires basic addition and reading of a watch/clock. It does not involve graphing and can be completed quickly. The birth attendant enters the Estimated Time of Delivery (ETD) twice on the paperless partograph: once for the "action" and once for the "alert" [5].

Rationale: Despite minimal variation in labour management and monitoring between the two favoured partogram approaches, the present study aims to establish the efficacy of a specific partograph in a different setting or population. It will help identify potential advantages or differences and encourage further research and improvement in labour management practices. Additionally, it will enable healthcare workers to validate existing literature and be of significance to obstetricians, nurses, and other healthcare providers involved in labour management. Furthermore, policymakers and hospital administrators responsible for developing and implementing policies and guidelines related to obstetric care will benefit from this research.

Aim

To study the WHO-modified partogram in comparison to the paperless partogram for the effective management of labour.

Objectives

Measuring labour progression in both divided groups, assessing maternal and foetal outcomes within a specified timeframe, to compare the efficacy of the paperless partogram and the WHO-modified partogram in labour management among a particular population of pregnant women.

REVIEW OF LITERATURE

In a study conducted by Ghulaxe Y et al., it was discovered that the partograph has been widely accepted as a tool for evaluating labour progress. In the past, it was also commonly used as a method for monitoring labour. However, despite its widespread use, there have been reports of inaccurate implementation [6].

A study by Vlachos G et al., revealed that a new type of partogram shows promise in reducing instances of prolonged labour and lowering caesarean section rates [7].

Reshma S et al., conducted a study which revealed that among all women who surpassed the ETD, 16 women had vaginal deliveries and two underwent caesarean sections before reaching the action ETD. Additionally, five women went beyond the action ETD. Among those who surpassed the action ETD, three had deliveries while two required Caesarean sections. The majority of women who exceeded both the alert and action ETD were primigravida. In conclusion, their study supports the effectiveness of the partogram in managing labour and preventing prolonged labour [8].

Tandu-Umba NFB and Muamba GK found that relying on the Alert and Action ETD proved to be convenient in determining measures for labour outcomes. The utilisation of a partogram is an effective method for managing the labour phase, aiming to prevent delays in labour progression within our specific context [9].

According to research by Agarwal K et al., the digital partogram has proven to be convenient and efficient in managing labour. Their study showed that the average time from ETD to delivery was 4.3 hours, which aligns with the WHO recommendation for partograms suggesting intervention after four hours of prolonged labour. Out of the 91 participants in the research, 55 (60%) were primigravida, while 36 (40%) were multipara. The study also noted no differences in delivery duration after an alert ETD between primigravida and multipara, with averages of approximately 4.7±1.9 hours and 3.7±1.8 hours, respectively [10].

In another study by Mohammed AA et al., it was found that the use of a paperless partogram proved to be more effective compared to the WHO-modified partogram in managing labour [11].

In a study conducted by Giri DK et al., it was discovered that the paperless partogram functions effectively and efficiently as the WHO method for managing labour. One of its advantages is its user-friendly nature, making it particularly suitable for situations where resources are limited [12].

Another study conducted by Faswila M and Rao SB, found that the paperless partogram beat the WHO partogram in terms of documentation, usability, learning, efficiency, productivity, cost viability, and labour management and monitoring. It was also better at identifying labour patterns. Consequently, the paperless partogram was deemed preferable for labour monitoring [13].

Research carried out by Deka G et al., concluded that Dr. Debdass's Paperless partograph showed effectiveness compared to the WHO-modified partogram in monitoring both multiparous labours. They highlighted its potential to prevent prolonged labour due to its simplicity and time-saving attributes, without requiring any graphs [14].

In a study by Tarannum N and Akhtar N, study uncovered that the paperless methodology proved to be equally efficient as the WHO-adjusted partograph in managing labour. The typical time taken for delivery was approximately 3.57 hours, which aligns with the distinction, between the alert and action lines on the WHO partograph. This suggests that in resource-limited settings like India, where there is a high population burden, using a partogram could be considered as an alternative to the more intricate and time-consuming WHO-modified partograph [15].

MATERIALS AND METHODS

This will be a prospective interventional study conducted in the Department of Obstetrics and Gynaecology of JNMC, AVBRH, DMIHER, Wardha, India, from January 2024 to January 2026. The Clinical Trial Registry India (CTRI) Registration number: REF/2023/05/067952. Indian Ethical Committee (IEC) number: DMIHER(DU)/IEC/2023/797. Term patients visiting Acharya Vinoba Bhave Rural Hospital for vaginal delivery, as per our inclusion criteria, will be encouraged to participate in the study.

Inclusion criteria:

- Age: 19-40 years
- Primigravida
- Gestational age: 36 to 42 weeks
- Singleton pregnancy
- Cephalic presentation
- No history of medical or surgical illness
- In established labour (3 contractions in 10 minutes, lasting 45 to 60 seconds)
- Cervical dilation of 4 cm on vaginal examination
- Onset of labour must be spontaneous (not induced)
- Adequate pelvis

Exclusion criteria:

- Non cephalic presentation
- Induced labour
- Cephalopelvic disproportion
- Previous caesarean section
- Multiple pregnancy
- Pregnancy-induced hypertension
- Antepartum haemorrhage
- Known major foetal structural anomaly
- Previous uterine surgery
- Sample size: 90

Sample size calculation: The simple random sampling will be used.

Power of the test: 80%

- Formula used: Cochran formula for sample size:

$=\{(Z_{\alpha/2}).p.(1-p)\}/E^2$

η=sample size

$Z_{\alpha/2}$ is the level of significance at 5%, i.e., 95% confidence interval=1.96

p=proportion of labour induction=13%=0.13 [16].

E=error margin=7%=0.07

$\eta=\{(1.96)^2.(0.13).(1-0.13)\}/(0.07)^2$

=88.67

η=90 patients in each group

Recruitment:

Assignment of interventions:

The allocation process will involve the use of numbers generated by a computer. As for the allocation concealment mechanism, it is not applicable in this case. The principal investigator will be responsible for carrying out the allocations with guidance from the study supervisor. Additionally, measures will be taken to ensure that trial participants remain unaware of their assigned groups through single blinding. The statistician and outcome assessors will not be blinded.

Data collection, management, and analysis:

A total of 200 mothers with pregnancies that meet specific criteria will voluntarily be recruited after providing informed consent. These participants will be divided into two groups: Group A consisting of 100 women whose normal labour will be monitored by the WHO Partograph, and Group B consisting of 100 women whose normal labour will be monitored by the Paperless Partogram Method.

Both groups will be carefully matched in terms of age, gestational age, Body Mass Index (BMI), and haemoglobin levels (Hb status). Thorough assessments and routine tests will be conducted, along with monitoring. The treatment approach will be determined by the attending healthcare professional.

Expected outcomes/results:

Primary outcomes:

- Labour crossing the alert line/action line in the WHO Modified Partogram.
- Labour crossing the alert line/action line in the Paperless Partogram.

  The Alert Line computation is based on Friedman's widely recognised formula, which states that once a woman enters active labour, the rate of cervical dilation happens at a rate of 1 cm per hour. To determine the "Alert Line," or the point at which the cervix is fully dilated, the doctor must count backwards six hours from the moment the woman starts to exhibit 4 cm of cervical dilation. The authors will then count on another four hours from this point to get the "Action Line" [17].

Secondary outcomes:

- Mode of delivery-spontaneous, forceps, caesarean section.
- Rate of caesarean section.
- Perinatal outcomes-Appearance, Pulse, Grimace, Activity and Respiration (APGAR) score, birth weight, Neonatal Intensive Care Unit (NICU) admission.

STATISTICAL ANALYSIS

The authors will input the data into an Excel sheet and utilise Statistical Package for Social Sciences (SPSS) software version 18.0 for the analysis. The results will be presented as mean±standard deviation. To compare variables, we will employ the sample t-test and Mann-Whitney U test. The normality of the data will be assessed using the Kolmogorov-Smirnov test. For continuous variables, a t-test will be used, while categorical variables will be compared using the Chi-square or Fisher's-exact test. A p-value of <0.05 will be considered statistically significant.

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