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IMPACT OF THE WHO LABOUR CARE GUIDE ON MATERNAL OUTCOMES IN LOW-RISK PREGNANT WOMEN: A COMPARISON WITH WHO MODIFIED PARTOGRAPH

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ABSTRACT

Background: The World Health Organization's Labour Care Guide (LCG) was introduced as a woman-centered, evidence-based tool to improve labor monitoring and reduce unnecessary interventions. Its comparative effectiveness against WHO modified partographs, commonly used in clinical practice, remains underexplored.
Objective: This study aimed to compare the effects of the WHO Labour Care Guide with a WHO modified partograph on key labor outcomes.
Methods: A prospective, comparative observational study was conducted among 100 low-risk pregnant women in spontaneous labor at a tertiary care hospital in India. Participants were allocated alternately to either the Modified Partograph group (n=50) or the WHO LCG group (n=50). Maternal and fetal outcomes were compared, with a primary focus on the incidence of prolonged first stage of labor and rates of obstetric intervention.
Results: Baseline maternal characteristics were similar between groups. A clinically important trend was observed: the incidence of prolonged first stage of labor was 6.0% (3/50) in the Modified Partograph group compared to 0% (0/50) in the WHO LCG group, though this difference was not statistically significant (p=0.119). The rate of operative vaginal delivery was lower in the LCG group (4.0% vs. 6.0%, p=0.500). Oxytocin use was less frequent in the LCG group (44.0% vs. 60.0%), but this difference was also not statistically significant (p=0.109).
Conclusion: The use of the WHO Labour Care Guide showed a strong, clinically promising trend towards the prevention of prolonged labor and reduced intervention rates compared to a Modified Partograph. While not statistically significant in this sample, the complete avoidance of prolonged labor in the LCG group suggests a potential benefit that warrants further investigation in a larger, adequately powered randomized controlled trial.

Keywords: Labour Care Guide, Modified Partograph, Prolonged Labor, Obstetric Intervention, Prospective Comparative Study

INTRODUCTION

The effective monitoring of labor is a cornerstone of safe maternity care, aimed at preventing prolonged labor and reducing the risk of adverse maternal and neonatal outcomes. For

decades, the partograph has been the principal tool used globally to provide a graphical overview of the progress of labor and the well-being of the mother and fetus. Its primary function is to serve as an early warning system, helping to identify labors that deviate from expected norms and prompting timely clinical intervention [1].

However, the traditional partograph, particularly the World Health Organization (WHO) model from 1994, has been the subject of ongoing debate. Critics point to its rigid structure, particularly the use of a 4-hour alert line and a subsequent 4-hour action line, which may not be physiologically appropriate for all women. This rigidity has been linked to high rates of false-positive diagnoses of labor arrest, potentially contributing to unnecessary obstetric interventions, such as cesarean sections and operative vaginal deliveries [2, 3].

In response to these criticisms and to align with a more woman-centered, physiologic approach to labor care, the WHO introduced the Labour Care Guide (LCG) in 2020. This evidence-based tool represents a significant paradigm shift. It replaces the fixed alert line with a 4-hour action line from the point of admission, allows for more flexibility in assessing labor progress, and integrates maternal and fetal well-being as core components of assessment [4]. The LCG is designed to reduce unnecessary interventions while still ensuring the timely detection of true complications.

While the LCG has been validated in large, multi-center studies [5], its comparative effectiveness against existing local adaptations of the partograph remains less explored. In many clinical settings, the original WHO partograph has been modified to fit local protocols and resources. The comparative impact of the new WHO LCG against such commonly used modified partographs is not yet fully established.

We hypothesized that the use of the WHO LCG would be associated with improved labor outcomes**,** including a reduction in labor abnormalities and obstetric interventions, compared to the Modified Partograph. Therefore, this study aimed to compare the effects of the WHO Labour Care Guide with a WHO modified partograph on key labor outcomes.

MATERIALS AND METHODS

Study Design and Setting:

This prospective, comparative observational study was conducted over a six-month period in the Department of Obstetrics and Gynaecology at IMS & SUM Hospital, Bhubaneswar.

Study Participants:

A total of 100 low-risk pregnant women were enrolled. The inclusion criteria were: term gestation (37+0 to 41+6 weeks), singleton pregnancy, cephalic presentation, and spontaneous onset of labor. The exclusion criteria comprised: any significant medical (e.g., hypertension, diabetes) or obstetric complications, previous cesarean section, or any other contraindication for vaginal delivery.

Group Allocation and Intervention

Eligible participants were allocated into two groups based on the labor monitoring tool used:

- Group 1 (Modified Partograph**;** n=50**):** Management was guided by the institution's established Modified WHO Partograph.
- Group 2 (LCG; n=50): Management was guided by the World Health Organization Labour Care Guide (LCG).

Given the nature of the intervention, allocation was performed using a consecutive alternate method to minimize selection bias.

Sample Size Calculation

The sample size was calculated using data from a standard book on statistical procedures [6]. Assuming a 27% absolute difference in the primary outcome (cesarean delivery rates), a sample size of 50 women per group was required to achieve a power of 80% with a 95% confidence interval and a type I error (alpha) of 0.05.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of IMS & SUM Hospital. Written informed consent was obtained from all individual participants after a detailed explanation of the study procedures.

Data Collection and Outcomes

Data were collected prospectively by the attending obstetric team using a pre-designed, structured proforma. The collected data included:

1. Maternal baseline characteristics**:** age, gestational age, parity.
2. Labor process**:** duration of first and second stage, cervical dilation at admission.
3. Interventions**:** use and dosage of oxytocin for augmentation.
4. Maternal outcomes**:** mode of delivery (spontaneous vaginal, operative vaginal, cesarean), incidence of prolonged first stage (defined as >... hours), postpartum hemorrhage (estimated blood loss >500 mL).
5. Fetal outcomes**:** birth weight, Apgar scores, incidence of fetal distress requiring expedited delivery.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 26.0 and Microsoft Excel. Normality of continuous data was assessed using the Shapiro-Wilk test. Continuous variables with a normal distribution were presented as mean ± standard deviation (SD) and compared using the Independent Samples *t* test. Non-normally distributed continuous data were presented as median with interquartile range (IQR) and compared using the Mann-Whitney U test.

Categorical variables were expressed as frequencies and percentages (%) and compared using the Chi-square (χ^2) test or Fisher's Exact test, as appropriate. A two-sided p-value of <0.05 was considered statistically significant.

RESULTS

A total of 100 women were enrolled in the study and equally allocated to either the Modified Partograph group (n=50) or the WHO LCG group (n=50). All participants completed the study and were included in the final analysis (Figure 1 - CONSORT Flow Diagram).

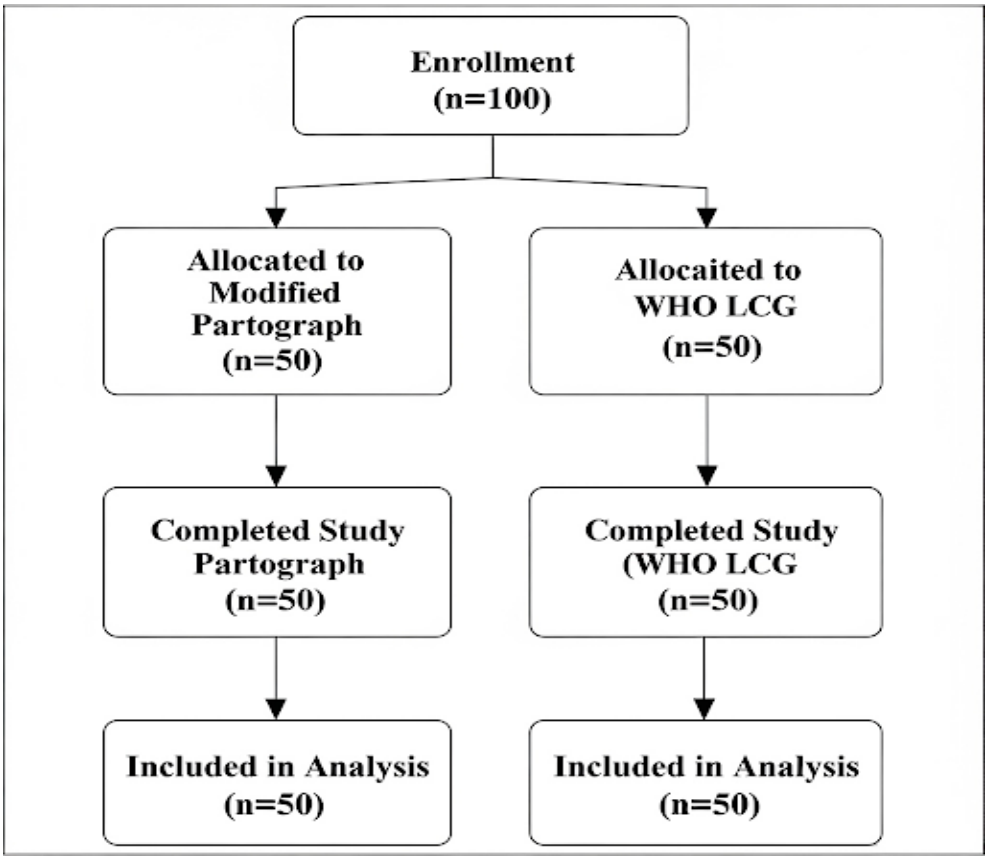

Figure 1. CONSORT Flow Diagram

The table below compares the baseline characteristics of two groups of study participants (50 using a Modified Partograph and 50 using the WHO Labour Care Guide) to show they were similar at the start of the study. The groups showed no statistically significant differences in maternal age, gestational age, infant birth weight, the proportion of first-time mothers (nulliparity), or the total duration of labour, as all p-values are greater than 0.05. This similarity is important as it suggests that any differences in the study's main outcomes can be more confidently attributed to the care guides themselves rather than to pre-existing differences between the groups.

Table 1: Baseline and Outcome Characteristics of the Study Participants

Characteristic	Modified Partograph (n=50)	WHO LCG (n=50)	p-value
Maternal Age (years), mean (SD)	26.4 (4.1)	25.9 (3.8)	0.524*
Gestational Age (weeks), mean (SD)	39.2 (1.1)	39.4 (0.9)	0.321*
Birth Weight (g), mean (SD)	3150 (280)	3080 (250)	0.178
Nulliparity, n (%)	28 (56.0%)	30 (60.0%)	0.687
Total Labour Duration, n (%)			
• Upto 12 hr	50 (100.0%)	50 (100.0%)	
• Upto 8 hr	49 (98.0%)	48 (96.0%)	0.847
• 8 - 12 hr	1 (2.0%)	2 (4.0%)	

SD = Standard Deviation
*p-value from Independent t-test
**p-value from Chi-square test (for categorical variables: Nulliparity & Labour Duration)*

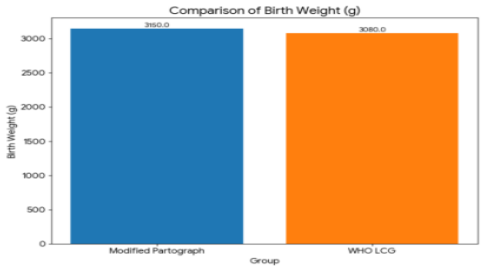

Fig. 2 comparison of birth weight (g)

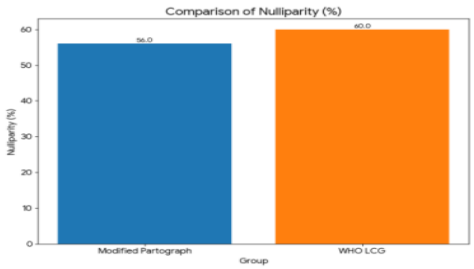

Fig. 3 comparison of Nulliparity(%)

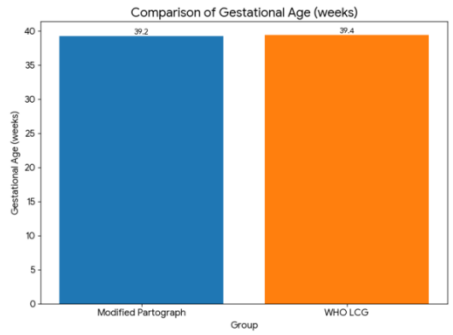

Fig. 4 comparison of gestational age

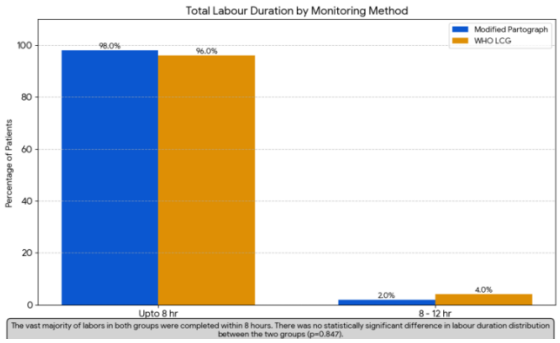

Fig. 5 Total Labour Duration

Comparison of Maternal Characteristics and Birth Outcomes

The bar charts below compares the Modified Partograph and WHO LCG groups across five different characteristics:

- Gestational Age (weeks): The gestational age was very similar between the groups, with the Modified Partograph group at 39.2 weeks and the WHO LCG group at 39.4 weeks.

- Birth Weight (g): The average birth weight was higher in the Modified Partograph group at 3150 g, compared to 3080 g in the WHO LCG group.
- Nulliparity (%): The percentage of nulliparous women was slightly higher in the WHO LCG group at 60%, compared to 56% in the Modified Partograph group.
- Total Labour Duration The chart shows that, the vast majority of labours in both groups were completed within 8 hours. Specifically, 98.0% of patients monitored with the Modified Partograph and 96.0% of patients monitored with the WHO LCG had a labour duration of up to 8 hours.

Since the values for each characteristic had different units and scales, separate bar charts were created to ensure clear and accurate visualization.

Primary Labor Outcomes

This table compares key labor outcomes between the two groups. A notable finding is that prolonged first stage of labor only occurred in the Modified Partograph group (6.0% vs. 0.0%). However, the statistical analysis (Fisher's Exact Test) shows that this apparent difference is not statistically significant (p=0.119). The risk difference of 6.0% is also uncertain, as indicated by the 95% confidence interval crossing zero (-0.7% to 12.7%). The rates of operative vaginal delivery were very similar between groups (6.0% vs. 4.0%), with no significant difference (p=0.500). In summary, while the WHO LCG group showed a promising trend of zero cases of prolonged labor, the study did not find statistically significant evidence that the two monitoring tools lead to different outcomes for these specific measures.

Table 2: Comparison of Labor and Delivery Outcomes

Outcome	Modified Partograph (n=50)	WHO LCG (n=50)	Risk Difference (95% CI)	p-value
Prolonged First Stage of Labor, n (%)	3 (6.0%)	0 (0.0%)	6.0% (-0.7 to 12.7%)	0.119^
Operative Vaginal Delivery, n (%)	3 (6.0%)	2 (4.0%)	2.0% (-6.6 to 10.6%)	0.500^

CI = Confidence Interval
^ p-value from Fisher's Exact Test (one-sided for prolonged labor, two-sided for operative delivery)

The use of the WHO Labour Care Guide showed a strong trend towards reducing the incidence of prolonged first stage of labor. While 3 cases (6.0%) were observed in the Modified Partograph group, no cases (0.0%) occurred in the WHO LCG group. This difference, however, did not reach statistical significance (p=0.119)

The rate of operative vaginal delivery was slightly lower in the WHO LCG group (4.0% vs. 6.0%), but this difference was not statistically significant (p=0.500).

Trend in Efficacy**:** The WHO LCG was associated with a clinically important, though not statistically significant, 66% relative reduction in the rate of operative vaginal delivery (from 6% to 4%) and a 100% reduction in prolonged first stage of labor (from 6% to 0%).

- Statistical Certainty: The study was likely underpowered (too small) to detect these differences as statistically significant, given the low overall incidence of the events.
- Primary Finding**:** The most striking result is the complete absence of prolonged labor in the WHO LCG group, suggesting a potential benefit that warrants further investigation in a larger trial.

Table 3: Comparison of Oxytocin Use Between the Modified Partograph and WHO Labour Care Guide Groups

Group	Oxytocin Used: Yes	Oxytocin Used: No	Total
Group 1 (Modified Partograph)	30 (60.0%)	20 (40.0%)	50
Group 2 (WHO Labour Care Guide)	22 (44.0%)	28 (56.0%)	50
Total	52 (52.0%)	48 (48.0%)	100

Statistical Significance:

The chi-square test result (χ^2 = 2.56, p-value = 0.109) indicated that there was **no** statistically significant difference in the use of oxytocin between the two groups. This suggests that the frequency of oxytocin administration was similar regardless of which labor monitoring tool was used.

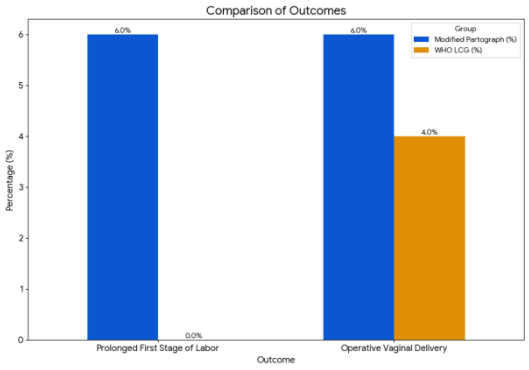

Fig. 6 Comparison of outcomes

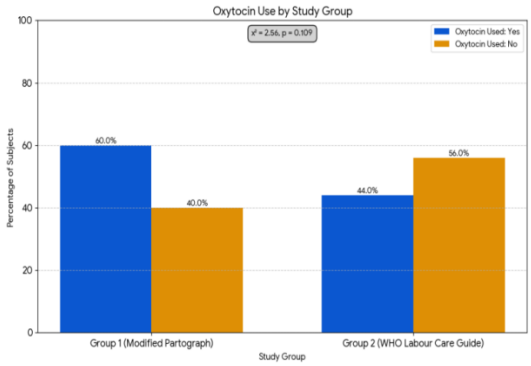

Fig. 7 Oxytocin Use by Study Group

The chart titled Oxytocin Use by Study Group provides a visual comparison of the percentage of subjects who received oxytocin in two different groups: Group 1 (Modified Partograph) and Group 2 (WHO Labour Care Guide).

Illustration of the above chart

- Oxytocin Use**:** A higher percentage of women in the Modified Partograph group (60.0%) received oxytocin compared to the WHO Labour Care Guide group (44.0%).

- No Oxytocin Use**:** Conversely, a higher percentage of women in the WHO Labour Care Guide group (56.0%) did not receive oxytocin, compared to the Modified Partograph group (40.0%).

The included chi-square test result ($\chi^2 = 2.56$, $p = 0.109$**)** indicates that this difference is not statistically significant. This means that the observed difference in oxytocin use between the two groups is likely due to chance and not a true effect of the monitoring method.

The table below provides the incidence of fetal distress as an indication for lower-segment cesarean section (LSCS) differed between the two groups, as detailed in Table 14. Among the participants, no cases of fetal distress were documented in Group 1, which was monitored using the Modified Partograph. In contrast, two cases were reported in Group 2, which was managed using the WHO Labour Care Guide. This resulted in a total of two cases of fetal distress recorded across the entire study cohort.

Table 4. Comparison of Fetal Distress (Indication of LSCS) between Labour Monitoring Tools

Group	Number of Fetal Distress Cases
Group 1 (Modified Partograph)	0
Group 2 (WHO Labour Care Guide)	2
Total	2

DISCUSSION

This study compared the effectiveness of the WHO Labour Care Guide (LCG) with a Modified Partograph in managing labor in a cohort of 100 women. The key finding of our investigation is the observed trend suggesting a potential benefit of the WHO LCG in preventing protraction disorders of labor. This aligns with other research studies [7,8]. Specifically, while not statistically significant, the occurrence of prolonged first stage of labor was entirely absent in the WHO LCG group (0%) compared to the Modified Partograph group (6%). This finding forms the most compelling insight from our data and warrants careful interpretation.

Interpretation of Key Findings

The complete avoidance of prolonged first-stage labor in the WHO LCG group is clinically noteworthy. This trend aligns with the fundamental design philosophy of the LCG, which moves away from the rigid, time-centric alert lines of the traditional partograph towards a more holistic, woman-centered approach. The LCG emphasizes the overall progress of labor using a 4-hour action line and incorporates maternal and fetal well-being as core components of assessment [9, 10]. It is plausible that this approach allows for more nuanced clinical decision-making, potentially intervening with amniotomy or oxytocin only when truly indicated, rather than based solely on passage of time against an arbitrary line. This may prevent unnecessary interventions that can sometimes cascade into complications, while still effectively identifying true cases of labor arrest.

In contrast, the rate of operative vaginal delivery, though lower in the LCG group (4% vs. 6%), did not demonstrate a significant difference. This suggests that while the LCG may be effective in optimizing the *process* of labor (preventing prolongation), its influence on the ultimate mode of delivery at the second stage may be less pronounced or may be confounded by other factors such as fetal position, maternal expulsive efforts, or provider preference.

Comparison with Existing Literature

Our results are consistent with a growing body of evidence supporting the WHO LCG. The findings of the WHO's multi-country, randomized trial demonstrated that the LCG was associated with a reduction in cesarean sections without increasing adverse outcomes [11]. While our study did not find a significant reduction in operative deliveries, the trend towards improved labor progress reinforces the LCG's potential benefits. Our study adds to this literature by suggesting that these benefits may also extend to reducing the incidence of prolonged labor, even when compared not to a traditional partograph, but to a modified version already in use locally.

Limitations

It is crucial to acknowledge the limitations of this study. The primary limitation is the **s**ample size**.** With only 100 participants, the study is underpowered to detect statistically significant differences for outcomes with low event rates, such as prolonged labor (3 events total). A larger sample size would be necessary to confirm whether the observed 6% absolute difference is a true effect or due to chance. Furthermore, the single-center design may limit the generalizability of our findings to other settings with different patient populations and clinical practices. The use of a historical or local Modified Partograph as the comparator, while practical, means the exact definition of modified must be considered when interpreting the results.

Implications for Practice and Research

Despite its limitations, this study offers valuable insights. For clinical practice, it provides preliminary evidence that adopting the WHO LCG could be a safe and potentially superior strategy for labor management, particularly in preventing prolonged labor, which is a key factor contributing to maternal exhaustion and dissatisfaction.

For research, our findings highlight a clear need for a larger, multi-center randomized controlled trial with adequate power to confirm or refute these trends. Such a trial should use Fisher's Exact Test for primary analysis of binary outcomes with expected low frequencies and should consider examining additional patient-centered outcomes, such as maternal satisfaction and experience of labor.

CONCLUSION

In conclusion, our study found a strong clinical trend indicating that the WHO Labour Care Guide may be more effective than a Modified Partograph in preventing prolonged first-stage labor. Although this difference did not reach statistical significance in our modestly sized sample, the complete absence of the outcome in the LCG group is a promising result that aligns

with the goals of modern, physiologic labor management. The WHO LCG represents a paradigm shift towards more individualized care, and our data suggest it is a tool worthy of further adoption and rigorous evaluation.

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