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Original Research Article

Comparative analysis of WHO labour care guide versus WHO modified partogram on labour outcomes

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ABSTRACT

Background: Effective intrapartum monitoring is essential for improving maternal and neonatal outcomes while minimizing unnecessary obstetric interventions. The World Health Organization (WHO) labour care guide (LCG) is an updated labour monitoring tool that emphasizes individualized assessment and respectful maternity care compared with the WHO modified partogram. This study compared labour outcomes between these two approaches.

Methods: A prospective randomized controlled trial was conducted among 300 women with term singleton pregnancies in spontaneous active labour with cephalic presentation at a tertiary care centre. Participants were randomized to labour monitoring using the WHO labour care guide (n=150) or the WHO modified partogram (n=150). The primary outcome was mode of delivery. Secondary outcomes included labour characteristics, maternal complications, neonatal outcomes, and maternal satisfaction assessed using the birth satisfaction scale-revised.

Results: The WHO LCG group had a significantly higher normal vaginal delivery rate than the modified partogram group (85.33% versus 68.67%; p=0.001) and a lower caesarean section rate (14.67% versus 31.33%). The active phase of labour was significantly shorter (4.56±0.99 versus 4.95±1.13 hours; p=0.002). Non-progress of labour as an indication for caesarean section was less frequent (9.09% versus 42.55%; p=0.028). Maternal complications and neonatal outcomes were comparable, whereas maternal satisfaction was significantly higher with the WHO LCG (96.00% versus 88.67%; p=0.014).

Conclusions: The WHO labour care guide improved labour outcomes by increasing vaginal deliveries, reducing caesarean sections, shortening labour duration, and enhancing maternal satisfaction without compromising neonatal outcomes.

Keywords: Caesarean section, Intrapartum care, Labour care guide, Maternal satisfaction, Neonatal outcomes

INTRODUCTION

Labour is a complex physiological process, and its safe management requires effective real-time monitoring of cervical progress, fetal well-being, and maternal condition. Preventable intrapartum complications remain a leading contributor to maternal and perinatal mortality globally, particularly in low- and middle-income countries, where approximately 95% of maternal deaths occur. Timely

identification of abnormal labour patterns and rational use of obstetric interventions are central to improving outcomes.^{1,2}

The graphical monitoring of labour, conceptualized by Friedman in the 1950s, established the sigmoid-shaped cervical dilatation curve and introduced the widely accepted benchmark of 1 cm per hour during the active phase.³ Building upon this, Philpott and Castle developed

the partogram with alert and action lines to standardize intervention thresholds.⁴ The WHO endorsed the partogram under its Safe Motherhood Initiative, and a landmark multicenter trial published in 1994 demonstrated reductions in prolonged labour, oxytocin augmentation, and emergency caesarean section with its routine use.⁵ The WHO modified partogram, introduced in 2000, simplified this tool by excluding the latent phase and defining active labour onset at 4 cm cervical dilatation.⁶

However, contemporary cohort analyses challenged the universality of the 1 cm per hour rule, demonstrating wide inter-individual variability in labour progression and suggesting that active labour may not reliably begin before 5 to 6 cm dilatation.^{7,8} Rigid adherence to alert and action lines has been associated with rising rates of oxytocin augmentation and caesarean delivery without proportional improvement in neonatal outcomes.⁹ Furthermore, incomplete documentation and inconsistent utilization have limited the practical effectiveness of the partogram in busy clinical settings.¹⁰

In response to evolving evidence, WHO released updated intrapartum care recommendations in 2018, redefining active labour onset at 5 cm dilatation and emphasizing a positive childbirth experience alongside clinical safety.¹¹ To operationalize these recommendations, the WHO introduced the labour care guide (LCG) in 2020. The LCG replaces fixed action lines with evidence-based time thresholds per centimetre of cervical dilatation, integrates supportive care elements, and promotes shared decision-making and respectful maternity care within a single intrapartum monitoring tool.^{12,13}

While early implementation studies have reported improved documentation and provider acceptability, head-to-head comparative evidence between the LCG and the modified partogram in routine tertiary care practice, particularly regarding mode of delivery and maternal satisfaction, remains limited. The present study aimed to compare the WHO labour care guide with the WHO modified partogram with respect to labour outcomes, maternal complications, neonatal outcomes, and maternal satisfaction in a tertiary care centre in northern India.

METHODS

Study design and setting

This was a prospective, single-blind, randomized controlled trial conducted in the department of obstetrics and gynecology at Ganesh Shankar Vidyarthi Memorial Medical College (GSVM MC), Kanpur, Uttar Pradesh, India, over a period of two years. Ethics committee approval was obtained prior to study initiation (Ref. No. EC/483/Dec/2024). The trial was conducted in accordance with the Declaration of Helsinki and ICMR-GCP guidelines. Written informed consent was obtained from all participants prior to enrolment.

Participants

Women with term singleton pregnancies (37 to 40 weeks of gestation) in spontaneous active labour with cephalic presentation were screened for eligibility. Exclusion criteria included complicated obstetric or medical conditions (hypertension, diabetes mellitus, cardiac or renal disease, antepartum hemorrhage, multiple gestation, previous uterine surgery, malpresentation, postdated pregnancy, or adverse obstetric history), planned elective caesarean section, and use of intrapartum epidural analgesia. Women unwilling to provide written informed consent were also excluded.

Sample size

Sample size was calculated based on a caesarean delivery rate of 7.1% in the LCG group and an assumed intergroup difference of 15%, at 95% power and 5% significance, yielding a minimum of 150 participants per group.¹⁴

Randomization and allocation

Eligible participants were randomized using balanced block randomization (block size 4) with a computer-generated allocation sequence. Participants were assigned to one of two groups: group I (LCG, n=150), where labour was monitored with the WHO labour care guide, and group II (modified partogram, n=150), where labour was monitored with the WHO Modified Partogram. The study was single-blind; participants were not informed of the tool used, but clinicians were aware of group allocation.

Monitoring protocols

Group I: the WHO LCG defined active labour onset at 5 cm cervical dilatation. Labour progress was evaluated against evidence-based time limits per centimetre of dilatation, with no fixed alert or action lines. Supportive care elements including pain relief, birth companionship, oral hydration, and maternal positioning were integrated into the monitoring process, alongside assessment of fetal heart rate, uterine contractions, and maternal vital signs. Shared decision-making and reassessment were documented at each monitoring interval.

Group II: the WHO modified partogram initiated monitoring at 4 cm cervical dilatation, with cervical dilatation plotted against time. Progress was evaluated against the standard 1 cm per hour rule, with clinical intervention triggered when the dilatation curve crossed the action line, set 4 hours to the right of the alert line. Fetal heart rate, uterine contractions, and maternal vital signs were monitored and documented at standard intervals.

Obstetric interventions including labour augmentation, instrumental delivery, or caesarean section were performed when clinically indicated according to institutional protocols in both groups.

Outcome measures

The primary outcome was mode of delivery (normal vaginal delivery, operative vaginal delivery, or caesarean section). Secondary outcomes included duration of the active phase of labour, rate of cervical dilatation, duration of the second stage of labour, indications for caesarean section, maternal complications (postpartum haemorrhage, puerperal sepsis), neonatal outcomes (APGAR score at 5 minutes, NICU admission and indications, neonatal mortality), and maternal satisfaction assessed using the birth satisfaction scale-revised (BSS-R), a validated 10-item questionnaire measured on a 5-point Likert scale, developed and validated by Hollins and Martin. The total BSS-R score ranges from 10 to 50, with higher scores indicating greater satisfaction.¹⁵ A BSS-R score of 39 to 50 was classified as high birth satisfaction.

Statistical analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS version 26. Continuous variables are presented

as mean±standard deviation and compared using the independent samples t-test. Categorical variables are presented as frequencies and percentages and compared using the chi-square test. A p value below 0.05 was considered statistically significant.

RESULTS

Baseline characteristics

A total of 300 women were enrolled and equally allocated (n=150 per group). Baseline demographic and obstetric characteristics are presented in Table 1. The two groups were comparable with respect to baseline variables. Mean age was 26.79±5.03 years in the LCG group and 26.40±4.49 years in the modified partogram group (p=0.483). Mean BMI was 23.90±3.44 kg/m² and 23.66±3.07 kg/m², respectively (p=0.519). Mean gestational age at delivery was 38.58±0.95 weeks in the LCG group and 38.57±1.01 weeks in the modified partogram group (p=0.953).

Table 1: Comparison of baseline maternal and obstetric characteristics between the study groups.

Variables	WHO LCG (n=150) mean±SD	Modified partogram (n=150) Mean±SD	t-value	P value
Age (years)	26.79±5.03	26.40±4.49	0.70	0.483
BMI (kg/m ²)	23.90±3.44	23.66±3.07	0.65	0.519
Period of gestation (weeks)	38.58±0.95	38.57±1.01	0.06	0.953

WHO LCG, World Health Organization Labour Care Guide; BMI, body mass index; SD, standard deviation.

Table 2: Comparison of labour characteristics and outcome measures between the study groups.

Variables	WHO LCG (n=150) Mean±SD	Modified partogram (n=150) Mean±SD	t-value	P value
Duration of active phase (hours)	4.56±0.99	4.95±1.13	-3.189	0.002*
Rate of cervical dilatation (cm/hour)	0.98±0.21	0.95±0.25	1.324	0.187
Duration of second stage (minutes)	55.21±16.80	52.48±16.96	1.264	0.207

WHO LCG, World Health Organization Labour Care Guide; SD, standard deviation.

Table 3: Mode of delivery between the study groups.

Variable	Category	WHO LCG		Modified Partogram		P value
		N	%	N	%	
Mode of delivery	NVD	128	85.33	103	68.67	0.001
	LSCS	22	14.67	47	31.33	
	Total	150	100.00	150	100.00	

WHO LCG, World Health Organization labour care guide; NVD, normal vaginal delivery; LSCS, lower segment cesarean section.

Labour characteristics

The duration of the active phase of labour was significantly shorter in the LCG group (4.56±0.99 hours) compared with the Modified Partogram group (4.95±1.13 hours; p=0.002), as shown in Table 2. This finding may be attributed to the higher threshold for initiation of active

labour monitoring in the LCG (5 cm cervical dilatation) compared to the modified partogram (4 cm), along with its individualized approach to labour assessment that reduces unnecessary early interventions. However, the rate of cervical dilatation (0.98±0.21 cm/hour versus 0.95±0.25 cm/hour; p=0.187) and duration of the second stage of labour (55.21±16.80 minutes versus 52.48±16.96 minutes; p=0.207) were comparable between the two groups.

Table 4: Indications Of LSCS between the study groups.

Variable	Category	WHO LCG		Modified partogram		P value
		N	%	N	%	
Indications of LSCS	FD	9	40.91	9	19.15	0.028
	MSL	7	31.82	8	17.02	
	Arrest of descent	3	13.64	4	8.51	
	NPL	2	9.09	20	42.55	
	DTA	1	4.55	6	12.76	
	Total LSCS	22	100.00	47	100.00	

WHO LCG, World Health Organization Labour Care Guide; LSCS, lower segment caesarean section; FD, fetal distress; MSL, meconium-stained liquor; NPL, non-progress of labour; DTA, deep transverse arrest.

Table 5: Maternal complications between the study groups.

Variable	Category	WHO LCG		Modified partogram		Chi-square	P value
		N	%	N	%		
Maternal complications	PPH (atonic)	6	4.00	12	8.00	0.99	0.320
	PPH (traumatic)	4	2.67	3	2.00		
	Puerperal sepsis	1	0.67	1	0.67		

WHO LCG, World Health Organization Labour Care Guide; PPH, postpartum hemorrhage; χ^2 , chi-square.

Table 6: Maternal satisfaction between the study groups.

Variable	Category	WHO LCG		Modified partogram		Chi-square	P value
		N	%	N	%		
Maternal satisfaction	High	144	96.00	133	88.67	6.02	0.014
	Low	6	4.00	17	11.33		
	Total	150	100.00	150	100.00		

Table 7: Comparison of neonatal outcomes between the study groups.

Variable	Category	WHO LCG		Modified partogram		Chi-square	P value
		N	%	N	%		
NICU admission	Yes	18	12.00	26	17.33	1.31	0.253
	No	132	88.00	124	82.67		
	Total	150	100.00	150	100.00		
Indications for NICU admission	TTN	8	5.33	12	8.00	0.53	0.998
	MAS	3	2.00	5	3.33		
	LBW	3	2.00	3	2.00		
	Birth asphyxia	1	0.67	2	1.33		
	Neonatal sepsis	1	0.67	2	1.33		
	Jaundice	1	0.67	1	0.67		
	Neonatal pneumonia	1	0.67	1	0.67		
Neonatal mortality	Yes	0	0.00	2	1.33	-	0.498
	No	150	100.00	148	98.67		
	Total	150	100.00	150	100.00		

WHO LCG, World Health Organization labour care guide; NICU, neonatal intensive care unit; TTN, transient tachypnoea of the newborn; MAS, meconium aspiration syndrome; LBW, low birth weight; χ^2 , chi-square.

Mode of delivery

The normal vaginal delivery (NVD) rate was significantly higher in the LCG group (85.33%) compared with the modified partogram group (68.67%; $p=0.001$), as

presented in Table 3. Accordingly, the caesarean section rate was lower in the LCG group (14.67%) than in the modified partogram group (31.33%). No operative vaginal deliveries were recorded in either group.

Indications for caesarean section

The distribution of indications for caesarean section differed significantly between groups ($p=0.028$), as shown in Table 4. Non-progress of labour (NPL) was the predominant indication in the modified partogram group (42.55%), compared with only 9.09% in the LCG group. Conversely, fetal distress accounted for 40.91% of caesarean sections in the LCG group versus 19.15% in the modified partogram group. Meconium-stained liquor (LCG 31.82% versus MP 17.02%), arrest of descent (13.64% versus 8.51%), and deep transverse arrest (4.55% versus 12.76%) were also observed.

Maternal complications

Maternal complications were comparable between the groups and are shown in Table 5. Atonic postpartum haemorrhage occurred in 4.00% of women in the LCG group versus 8.00% in the modified partogram group (chi-square =0.99; $p=0.320$). Traumatic PPH was recorded in 2.67% versus 2.00%, and puerperal sepsis in 0.67% in both groups. No cases of uterine rupture were recorded in either group.

Maternal satisfaction

Maternal satisfaction was significantly higher in the LCG group, as presented in Table 6. High birth satisfaction (BSS-R score 39 to 50) was reported by 96.00% of women monitored using the LCG compared with 88.67% of those monitored using the modified partogram (chi-square =6.02; $p=0.014$). Low satisfaction (BSS-R score 10 to 29) was reported by only 4.00% in the LCG group compared with 11.33% in the modified partogram group.

Neonatal outcomes

Neonatal outcomes were comparable between the groups, as shown in Table 7. NICU admission rates were 12.00% in the LCG group versus 17.33% in the modified partogram group (chi-square =1.31; $p=0.253$). The most common indication for NICU admission in both groups was transient tachypnoea of the newborn (TTN; 5.33% versus 8.00%), followed by meconium aspiration syndrome (2.00% versus 3.33%) and low birth weight (2.00% in both groups). Birth asphyxia occurred in 0.67% versus 1.33% and neonatal sepsis in 0.67% versus 1.33%, both non-significant. There were no neonatal deaths in the LCG group compared with 2 (1.33%) in the modified partogram group, a difference that was not statistically significant ($p=0.498$).

DISCUSSION

The present trial demonstrates that monitoring labour with the WHO labour care guide is associated with a significantly higher normal vaginal delivery rate, shorter active phase duration, reduced caesarean delivery for non-progress of labour, and superior maternal satisfaction,

while maintaining comparable maternal and neonatal safety profiles relative to the WHO modified partogram.

The NVD rate of 85.33% in the LCG group and 68.67% in the modified partogram group in the present study closely parallels findings from Singh et al, who conducted a prospective observational study of 200 women and reported NVD rates of 86% and 78% in the LCG and modified partogram groups respectively, with a caesarean rate of 14% versus 22% ($p=0.21$ in their cohort).¹⁶ In a comparative observational study by Priya et al among 146 primigravidae, vaginal delivery was achieved by 95.9% of LCG-monitored women versus 72.6% of those monitored with the modified partogram ($p<0.001$), with caesarean section rates of 4.1% and 27.4% respectively.¹⁷ The lower caesarean rate in that study compared with ours likely reflects the restriction to primigravidae and the single-institution protocol. Pandey et al in an open-label RCT reported a more dramatic reduction in primary caesarean delivery, from 17.8% to 1.5% with the LCG ($p<0.001$), largely because latent-phase caesarean sections were excluded.¹⁸ The direction and clinical magnitude of the effect across all these studies are consistent with the present findings.

In contrast, Jogi et al found no statistically significant difference in caesarean rates between LCG and partogram groups in their respective trials.¹⁹ These discrepancies may reflect differences in baseline population risk, provider training levels, institutional oxytocin augmentation thresholds, or parity composition of the study samples. The current study included both nulliparous and multiparous women in equal proportions across both groups, which may explain the intermediate caesarean rate relative to primigravida-only studies.

The significantly shorter active phase in the LCG group in the present study (4.56 ± 0.99 hours versus 4.95 ± 1.13 hours; $p=0.002$) is consistent with findings from both referenced studies. Singh et al found that 59% of LCG-group women completed the first stage in under 4 hours compared with 39% of modified partogram-group women ($p=0.013$).¹⁶ Priya et al reported a mean active phase of 3.60 ± 0.50 hours in the LCG group versus 4.13 ± 0.096 hours in controls ($p<0.001$).¹⁷ Pandey et al documented a nearly two-hour reduction in active labour duration with LCG use, and Jogi et al similarly reported significantly shorter active and second stage durations.^{18,19} The consistently shorter active phase across studies likely reflects the LCG's definition of active labour onset at 5 cm rather than 4 cm, effectively excluding the earlier, slower portion of cervical dilatation from the measured active phase, and its more flexible time thresholds that reduce premature oxytocin use and unnecessary interventions that can prolong labour.

A particularly important finding in the present study is the marked redistribution of indications for caesarean section between groups. Non-progress of labour was the predominant caesarean indication in the modified

partogram group (42.55%) but accounted for only 9.09% of caesarean deliveries in the LCG group. Conversely, fetal distress was the commonest caesarean indication in the LCG group (40.91%) versus 19.15% in the modified partogram group. This pattern closely mirrors results from Priya et al, who reported that prolonged first stage predominated as a caesarean indication in the modified partogram group (65%) versus 33.3% in the LCG group

($p=0.01$), while fetal distress was the commonest cause in the LCG group (66.7% versus 15%).¹⁷ This redistribution is mechanistically coherent: the LCG allows more physiological time for labour to progress spontaneously, thereby avoiding premature operative delivery for apparent non-progress; however, when fetal compromise occurs, it is appropriately identified and acted upon.

Table 8: Comparison of labour outcomes among the present study and previous similar studies.

Study	Study design/sample	Intervention compared	Labour outcomes
Present Study	Prospective randomized controlled trial; n=300 (LCG=150, Modified Partogram=150)	WHO labour care guide versus WHO modified partogram	Normal vaginal delivery was significantly higher in the LCG group (85.33% versus 68.67%). Caesarean section rate was lower (14.67% versus 31.33%). Active phase duration was significantly shorter (4.56 ± 0.99 hours versus 4.95 ± 1.13 hours). Maternal satisfaction was significantly higher (96.0% versus 88.67%)
Vogel et al¹⁴	Mixed-methods multicountry evaluation; n=1226	WHO labour care guide	Majority of women had spontaneous vaginal birth (91.6%). Practitioner satisfaction and usability were high, and LCG promoted woman-centred labour monitoring
Pandey et al¹⁸	Open-label randomized controlled trial; n=280	WHO labour care guide versus WHO modified partograph	Caesarean delivery rate was significantly lower in the LCG group (1.5% versus 17.8%). Duration of active labour was significantly shorter with comparable maternal and neonatal outcomes
Srividya et al²¹	Observational comparative study; n=80	WHO labour care guide versus WHO modified partograph	No significant difference was observed in caesarean section rates and instrumental deliveries. Maternal and perinatal outcomes were comparable between groups
Fayaz et al²²	Prospective observational comparative study; n=200	WHO labour care guide versus standard partograph	No significant difference in mode of delivery (80% versus 85%), labour duration, maternal complications, or neonatal outcomes. Patient satisfaction was significantly higher in the LCG group (95% versus 82%)
Mugenyi et al²⁰	Ambispective cohort study; n=2011	Modified WHO labour care guide versus traditional partograph	LCG diagnosed more prolonged/obstructed labour cases and demonstrated increased caesarean section and labour augmentation rates with no major maternal outcome differences
Jogi et al¹⁹	Open-label randomized controlled trial; n=100	WHO labour care guide versus WHO modified partograph	Active phase (2.52 versus 3.85 hours) and second stage (48.1 versus 65.5 min) were significantly shorter in the LCG group, while other outcomes remained comparable
Singh et al¹⁶	Prospective observational study; n=200	WHO labour care guide versus WHO modified partograph	Higher normal vaginal delivery (86% versus 78%), lower maternal complications, and shorter labour duration were observed in the LCG group
Priya et al¹⁷	Comparative observational study; n=146	WHO labour care guide versus WHO modified partograph	Active and second stages of labour were significantly shorter and cesarean section rate was lower in the LCG group, while neonatal outcomes remained comparable

The comparable neonatal outcomes in both groups are pivotal to the interpretation of these findings. The reduction in caesarean delivery for non-progress in the LCG group was not accompanied by any increase in birth asphyxia, NICU admission for adverse neonatal reasons, or neonatal mortality. NICU admission rates of 12.00% and 17.33% ($p=0.253$) in the present study align with Singh et al (11% versus 18%, $p=0.228$) and Priya et al (mean NICU stay 2.1 versus 2.4 days, $p=0.488$).^{16,17} A multicountry implementation study by Vogel et al and an

ambispective cohort study by Mugenyi et al also confirmed that LCG implementation does not increase adverse neonatal outcomes despite its broader intervention thresholds.^{14,20} Together, these consistent findings across diverse settings demonstrate that the LCG's permissive approach to labour duration is safe for the neonate.

Maternal complications were not significantly different between groups in the present study. The trend toward lower atonic PPH in the LCG group (4.00% versus 8.00%;

$p=0.320$) was non-significant, similar to Singh et al who reported 1% versus 6% ($p=0.05$) and Priya et al who found atonic PPH in 4.1% versus 2.7% ($p=0.64$), the latter favouring neither group.^{16,17} Srividya and Lakshmi similarly found no significant difference in maternal complications with LCG use.²¹

Maternal satisfaction, assessed with the validated BSS-R instrument, was significantly higher in the LCG group in the present study (96.00% versus 88.67%; $p=0.014$). This finding is consistent with Fayaz et al, who reported 95% satisfaction in the LCG group versus 82% in the partogram group ($p=0.004$), and demonstrated significantly higher satisfaction with LCG in a randomized controlled trial.²² The improvement in satisfaction in the LCG group is attributed to the tool's explicit integration of pain relief, birth companionship, posture, oral hydration, and shared decision-making, features systematically absent from the modified partogram.

The present study has several strengths. It was a prospective randomized controlled trial with balanced block randomization, a relatively large single-centre sample ($n=300$) including both nulliparous and multiparous women, and the use of a validated tool (BSS-R) to assess maternal satisfaction. Limitations include the single-centre design, which restricts generalizability, the single-blind nature of the study, and the absence of long-term neonatal follow-up.

CONCLUSION

The WHO labour care guide is a more effective intrapartum monitoring tool than the WHO modified partogram. Its use was associated with a significantly higher normal vaginal delivery rate, shorter active phase duration, substantial reduction in caesarean section for non-progress of labour, and significantly higher maternal satisfaction, while maternal and neonatal complication rates remained comparable. These findings support the integration of the WHO labour care guide into routine intrapartum monitoring protocols in tertiary care settings. Larger multicentric randomized trials are warranted to validate these benefits and assess implementation feasibility across diverse healthcare contexts.

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