e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 941-946

Original Research Article

A Cross-Sectional Comparative Study of the Who Labor Care Guide (2020) Versus the Modified Who Partograph in Monitoring Active Phase Labor and Its Impact on Primary Cesarean Section Rates at a Tertiary Care Center

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Received: 01-03-2026 / Revised: 15-04-2026 / Accepted: 21-05-2026

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Conflict of interest: Nil

Abstract

Background: Rising cesarean section (CS) rates are a major public health concern, particularly in tertiary care settings in low- and middle-income countries. The WHO Labour Care Guide (LCG, 2020) was developed as a woman-centred, flexible alternative to the modified WHO partograph, with the potential to reduce unnecessary CS and improve fetomaternal outcomes.

Objectives: To compare the impact of the WHO Labour Care Guide (2020) versus the modified WHO partograph on: 1. Mode of delivery and fetomaternal outcome (primary objective), and 2. Ease of use and acceptability among healthcare providers (secondary objective).

Materials and Methods: This cross-sectional, randomized comparative study was conducted over 18 months in the Department of Obstetrics and Gynaecology, Rajendra Institute of Medical Sciences (RIMS), Ranchi, India. A total of 124 term pregnant women (37–40 weeks) in spontaneous labour with cephalic presentation were randomized into two equal groups: Group A monitored with WHO Labour Care Guide (2020) and Group B with modified WHO partograph (62 in each group). Women with medical comorbidities, obstetric complications, previous CS, malpresentation, multiple gestation, post-dated pregnancy, and those undergoing CS in latent phase were excluded. Labour events, maternal outcomes, neonatal outcomes, drug and analgesia use, and duration of hospital stay were recorded. Data were analysed using SPSS v21. Chi-square test and independent-sample t-test were applied; $p<0.05$ was considered statistically significant.

Results: Both groups were comparable in age, residence, occupation, parity, gestational age and socioeconomic status. LSCS rate was significantly lower with LCG (11.29%) than with modified partograph (46.77%) ($p<0.001$). Vaginal delivery rate was higher in the LCG group (88.71% vs 53.23%). The active phase of labour was longer with LCG (8.03±0.92 h vs 7.14±1.00 h; $p<0.001$), and the second stage more often exceeded 1 hour in the LCG group ($p=0.010$. Third-stage complications and haemoglobin deficit were similar. Neonatal outcomes were better with LCG, with higher Apgar ≥7 at 1 and 5 minutes (83.87% vs 54.84%, $p=0.001$; and 85.48% vs 58.06%, $p=0.003$) and fewer NICU admissions (6.45% vs 43.55%, $p<0.001$). Hospital stay ≤3 days was more frequent in the LCG group (88.71% vs 50.00%; $p<0.001$). Most healthcare providers rated LCG as easy (46.77%) or neutral (41.94%) to use.

Conclusion: The WHO Labour Care Guide (2020) significantly reduced primary cesarean section rates, improved neonatal outcomes, reduced NICU admissions and shortened hospital stay compared with the modified WHO partograph, while being acceptable and user-friendly for healthcare providers. LCG can be recommended as an effective labour monitoring tool in tertiary care settings to promote safe, woman-centred and less interventionist intrapartum care.

Keywords: Labour Care Guide, modified WHO partograph, cesarean section, fetomaternal outcome, intrapartum monitoring, NICU admission, India.

DOI: 10.25258/ijcpr.18.6.152

Introduction

Labour is a complex physiological process requiring continuous assessment to ensure the safety of both mother and fetus. Effective monitoring facilitates early detection of abnormalities, timely intervention and improved perinatal outcomes. For decades, the WHO

partograph has been the standard tool for monitoring labour progression and guiding clinical decisions, particularly in low- and middle-income countries. However, strict criteria for cervical dilatation and rigid "alert/action" lines based on Friedman's curve have raised concerns about overdiagnosis of labour dystocia and rising cesarean section (CS) rates, often without commensurate improvement in maternal or neonatal outcomes. In response, the WHO introduced the Labour Care Guide (LCG) in 2020 as a next-generation labour monitoring tool that emphasizes individualized, woman-centred, evidence-based intrapartum care, with flexible thresholds and explicit domains for maternal well-being, respectful care and shared decision-making.

Several recent studies have suggested that the adoption of the LCG may reduce unnecessary CS, limit labour augmentation, and improve maternal satisfaction and neonatal outcomes, but comparative data from Indian tertiary care settings remain limited. In particular, robust hospital-based evidence comparing LCG with the widely used modified WHO partograph is needed to guide policy and practice.

The present study was undertaken in a tertiary care teaching hospital in eastern India to compare the impact of the WHO Labour Care Guide (2020) versus the modified WHO partograph on mode of delivery, maternal complications, neonatal outcomes and provider acceptability.

Aims and Objectives

Primary Objective

- To compare fetomaternal outcomes between WHO Labour Care Guide (2020) and modified WHO partograph in women in labour at term.

Secondary Objectives

- To compare mode of delivery (particularly primary LSCS rate) between the two monitoring tools.
- To compare duration of the active phase and second stage of labour.
- To compare maternal complications (PPH, infection, haemoglobin deficit, duration of hospital stay).
- To compare neonatal outcomes (Apgar scores at 1 and 5 minutes, NICU admission, neonatal jaundice).
- To assess the ease of use and acceptability of the WHO Labour Care Guide (2020) among healthcare providers.

Study Design:

Cross-sectional, randomized comparative study.

Study Duration:

18 months.

Study Centre: Department of Obstetrics and Gynaecology, Rajendra Institute of Medical Sciences (RIMS), Ranchi, Jharkhand, India.

Sample Size: Based on a previous randomized trial (Pandey et al., 2022) reporting a CS rate of 17.8% in the modified partograph group versus 1.5% in the LCG group, the sample size was calculated using the formula for comparing two proportions:

$$ N = \frac{{Z(1-\alpha/2) + Z(1-\beta)}^2 [p_1(1-p_1) + p_2(1-p_2)]}{(p_1 - p_2)^2}$$

Where:

- $$Z(1-\alpha/2) = 1.96$$ for two-tailed alpha error of 5%
- $$Z(1-\beta) = 0.80$$ for 80% power
- $$p_1 = 0.178$$ (proportion of CS in control group)
- $$p_2 = 0.015$$ (proportion of CS in intervention group)

The calculated sample size was 124 (62 in each group).

Inclusion Criteria

- Antenatal women with term gestation between 37 and 40 completed weeks.
- Singleton pregnancy with cephalic presentation.
- Spontaneous onset of labour.
- Women entering active phase of labour (as per hospital protocol).
- Women who provided written informed consent to participate.

Exclusion Criteria

- Medical comorbidities: chronic hypertension, diabetes mellitus, renal disease, significant pulmonary disease and other major systemic illnesses.
- Obstetric complications: preterm labour, multiple gestation, previous cesarean delivery, breech or other malpresentations, post-dated pregnancy (>40 weeks), bad obstetric history.
- Women who underwent cesarean delivery in the latent phase of labour.
- Refusal to give consent.

Intervention Plan: After screening for eligibility in the obstetric emergency, women with term pregnancy in spontaneous labour were enrolled after written informed consent.

Randomization and Allocation

- Participants were randomized into two groups (A and B) using a computer-generated random sequence.
- Allocation was concealed using pre-prepared, sealed envelopes opened at enrolment.

- Group A (n=62): labour monitored with WHO Labour Care Guide (2020).
- Group B (n=62): labour monitored with modified WHO partograph.

Clinical Management

1. Training/Sensitization: All resident doctors and labour room staff were oriented and trained in the use of the WHO LCG (2020) and the modified WHO partograph before study initiation.

2. Monitoring:

- In both groups, plotting commenced at the onset of the active phase of labour, as per institutional protocol.
- Group A: maternal and fetal parameters (cervical dilatation, uterine contractions, fetal heart rate, maternal vitals, pain management, mobility, fluids, and supportive care) were recorded on the WHO Labour Care Guide (2020).
- Group B: standard parameters (cervical dilatation, uterine contractions, fetal heart rate, and maternal vitals) were recorded on the modified WHO partograph with alert and action lines.

3. Clinical Decisions:

- Interventions such as labour augmentation with oxytocin, use of Drotaverine, analgesia, instrumental delivery or LSCS were taken according to clinical indications and institutional protocol, guided by the respective monitoring tool.

4. Follow-up:

- Women in both groups were followed from onset of active labour until discharge.
- Haemoglobin was measured at admission and on postnatal day 1.
- Healthcare providers using LCG were asked to rate ease of use on a structured questionnaire.

Data Analysis Data were entered into Microsoft Excel and analysed using SPSS software version 21.

Descriptive statistics: Frequencies, percentages, mean and standard deviation (SD) were calculated.

Comparative statistics:

- Categorical variables were compared using Chi-square test or Fisher's exact test as appropriate.
- Continuous variables were compared using independent-sample t-test.

A p-value <0.05 was considered statistically significant.

Results

Table 1: Demographic characteristics of participants in both study groups, including RESIDENCE, education, occupation, and socioeconomic status

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	n	%	
Residence	Rural	29	46.77	27	43.55	0.547
	Urban	1	1.61	0	0.00	
	Semi Urban	32	51.61	35	56.45	
Education	Illiterate	4	6.45	4	6.45	0.038
	Primary	0	0.00	6	9.68	
	Middle School	28	45.16	16	25.81	
	High School	18	29.03	24	38.71	
	Intermediate	12	19.35	12	19.35	
Occupation	Homemaker	48	77.42	47	75.81	1.00
	Working	14	22.58	15	24.19	
Socioeconomic Status	Low	20	32.26	22	35.48	0.850
	Middle	42	67.74	40	64.52	

Discussion: Residence, occupation and socioeconomic status were similar across groups. Education differed significantly (p=0.038), with slightly more primary-educated women in the modified partograph group, but overall schooling levels were comparable, minimizing confounding due to socio-educational factors.

Table 2: Distribution of participants based on gravida status and period of gestation in both study group

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	n	%	
Gravida	Primigravida	21	33.87	30	48.39	0.144
	Multigravida	41	66.13	32	51.61	
Period of Gestation	37-38 weeks	12	19.35	9	14.5	0.428
	38-39 weeks	28	45.16	24	38.7	

	39-40 weeks	22	35.48	29	46.77	

Discussion: Parity and gestational age distributions were comparable (p>0.05), indicating similar obstetric risk profiles at baseline in both groups.

Table 3: Duration of active phase of labor between Labor Care Guide (2020) and Modified partograph

Duration of active phase of labor	Labor Care Guide (2020)		Modified partograph		p-Value
	n	%	n	%	
≤6 hrs	2	3.23	13	20.97	0.001
7hrs	13	20.97	18	29.03	
8 hrs	26	41.94	25	40.32	
9hrs	17	27.42	6	9.68	
10hrs	4	6.45	0	0.00	
Mean±SD	8.03±0.92		7.14±1.00		p<0.001

Discussion: The active phase was significantly longer in the LCG group. This reflects the more flexible, less interventionist thresholds of LCG, allowing physiological labour progression without early augmentation or CS, yet with better ultimate outcomes.

Table 4: Duration between the second stages of labor to delivery in both study groups

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	N	%	
Duration Between Second Stage of Labor To Delivery	15 min	0	0.00	8	12.90	0.010
	30 min	10	16.13	16	25.81	
	45 min	3	4.84	4	6.45	
	50 min	1	1.61	3	4.84	
	1 hr	25	40.32	20	32.26	
	1 hr 30 min	8	12.90	3	4.84	
	2 hr	10	16.13	8	12.90	
	>2 hr	5	8.06	0	0.00	

Discussion: Second stage was statistically longer in the LCG group, with some women exceeding 2 hours, yet without worsening maternal or neonatal outcomes. The partograph group showed more very short second stages (≤30 min), likely related to more frequent augmentation and operative interventions.

Table 5: Mode of delivery in both study groups

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	n	%	
Mode of delivery	LSCS	7	11.29	29	46.77	<0.001
	Vaginal Delivery	55	88.71	33	53.23	

Discussion: LCG use was associated with a striking reduction in LSCS and a corresponding rise in vaginal deliveries (p<0.001), demonstrating its effectiveness in preventing unnecessary primary cesareans without compromising safety.

Table 6: Occurrence of third-stage labor complications and Hemoglobin deficit observed in participants from both study groups

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	n	%	
3rd Stage Complications	No	58	93.55	57	91.94	1.00
	Mild PPH	4	6.45	5	8.06	
Hemoglobin Deficit	<0.5gm%	60	96.77	59	95.16	1.000
	≥0.5gm%	2	3.23	3	4.84	

Discussion: Third-stage complications, primarily mild PPH, were low and comparable in both groups, indicating that reduced interventions and longer labour under LCG did not increase haemorrhagic risk and postpartum haemoglobin drop was minimal and similar, supporting that LCG does not increase blood loss compared with the modified partograph.

Table 7: Duration of hospital stay in both study groups

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	N	%	
Duration of hospital stay	≤3 days	55	88.71	31	50.00	<0.001
	3-5 days	6	9.68	2	3.23	

	>5 days	1	1.61	29	46.77	

Discussion: LCG monitoring was associated with substantially shorter hospital stay, reflecting fewer cesareans, fewer neonatal admissions and smoother postpartum recovery, with important cost and resource implications.

Table 8: Fetal and neonatal outcomes in both study groups, including intrauterine demise (IUD), APGAR scores, lactation, NICU admissions, and neonatal jaundice

		Labor Care Guide (2020)		Modified partograph		p-Value
		n	%	n	%	
IUD	No	62	100.00	62	100.00	-
	Yes	0	0.00	0	0.00	
APGAR Score at 1 minute	≥7	52	83.87	34	54.84	0.001
	<7	10	16.13	28	45.16	
APGAR Score at 5 minute	≥7	53	85.48	36	58.06	0.003
	<7	9	14.52	26	41.94	
Lactation	Present	62	100.00	62	100.00	-
	Absent	0	0.00	0	0.00	
NICU Admission	Yes	4	6.45	27	43.55	<0.001
	No	58	93.55	35	56.45	
Neonatal Jaundice	Yes	2	3.23	3	4.84	1.00
	No	60	96.77	59	95.16	

Discussion: Neonatal outcomes were significantly better with LCG: higher Apgar scores and a markedly lower NICU admission rate, with no increase in neonatal jaundice or IUD. This demonstrates that allowing more physiological labour under LCG did not compromise, and in fact improved, immediate neonatal well-being.

Table 9: Acceptability of the Labor Care Guide (2020) among healthcare providers based on their experience in using it for labor monitoring

		N	%
Acceptability of labor care guide (2020)	Neutral	26	41.94
	Easy	29	46.77
	Difficult	6	9.68
	Very Difficult	1	1.61

Discussion: Almost 90% of providers rated LCG as neutral or easy to use, reflecting good feasibility and acceptability after an initial learning curve.

Overall Discussion

This randomized comparative study demonstrates that adoption of the WHO Labour Care Guide (2020) in a busy tertiary care labour room significantly reduces LSCS rates, improves neonatal outcomes and shortens hospital stay compared with the modified WHO partograph, without increasing maternal complications.

Despite a longer active and second stage of labour in the LCG group, fetomaternal outcomes were clearly superior. This aligns with recent evidence that the traditional expectation of 1 cm cervical dilatation per hour is overly restrictive and that many women progress safely with slower labour when unnecessary interventions are avoided. The LSCS rate in the LCG group (11.29%) was substantially lower than in the modified partograph group (46.77%), consistent with Pandey et al. and Vogel et al., who reported significant reductions in primary CS with LCG-based care. The higher oxytocin usage in the partograph group suggests more aggressive augmentation and earlier diagnosis of "labour failure," likely contributing to higher CS rates.

Neonatal outcomes strongly favoured LCG, with higher Apgar scores and four-fold lower NICU admissions, despite longer labours. This may be explained by more physiologic progression, less uterine hyperstimulation, and fewer surgical births. Importantly, third-stage complications, haemoglobin deficit and PPH rates were similar, indicating that a more conservative, woman-centred approach does not increase maternal morbidity. Universal provision of pain relief in the LCG group and explicit attention to maternal comfort reflect one of LCG's key principles: respectful, individualized care. High provider acceptability in this study further supports its routine implementation, particularly once staff are trained and overcome the initial learning curve.

Our findings are broadly concordant with other Indian and international studies examining LCG and enhanced intrapartum care models, strengthening the case for phasing out rigid partograph use in favour of more flexible, evidence-based tools.

Limitations

- Single-centre study from a tertiary teaching hospital, limiting generalizability to other settings.
- Modest sample size (124 women) may limit the precision of estimates for less common outcomes.
- Cross-sectional randomized design with short-term follow-up; long-term maternal and neonatal outcomes were not assessed.
- Blinding of clinicians to the monitoring tool was not possible, introducing potential performance bias.
- Provider acceptability was self-reported and may be subject to response bias.

Conclusion

The WHO Labour Care Guide (2020) is an effective and feasible labour monitoring tool in a tertiary care setting. Compared with the modified WHO partograph, LCG:

- Significantly reduces primary LSCS rates.
- Improves immediate neonatal outcomes and markedly reduces NICU admissions.
- Shortens duration of hospital stay without increasing maternal complications or blood loss.
- Ensures more consistent pain relief and woman-centred intrapartum care.
- Is acceptable and largely easy to use for healthcare providers after initial orientation.

Wider adoption of the WHO Labour Care Guide (2020) in similar settings has the potential to curb unnecessary cesarean sections, improve fetomaternal outcomes, and optimize use of healthcare resources. Larger multicentric randomized studies are recommended to confirm these findings and support policy-level implementation.

Acknowledgement: Deepest gratitude is extended to the institutional administration and clinical staff of the Department of Obstetrics and Gynecology, Rajendra Institute of Medical Sciences (RIMS), Ranchi, for providing clinical facilities and support. Essential technical assistance with data structuring was provided by the Department of Preventive and Social Medicine.

Heartfelt appreciation goes to all the participating patients whose voluntary cooperation made this clinical analysis possible.

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