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RESEARCH ARTICLE

Impact of the WHO Labour Care Guide on Reducing Primary Cesarean Births: A Randomized Controlled Trial

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Abstract: ***Background***: The rising global caesarean delivery rate, particularly primary caesarean sections, remains a significant public health concern. The WHO Labour Care Guide (LCG) was developed as an evidence-based tool to improve labor monitoring and reduce unnecessary interventions, though robust evidence of its effectiveness remains limited. ***Objective:*** To evaluate the effectiveness of the WHO LCG in reducing primary caesarean deliveries among low-risk pregnant women compared to WHO partograph carelabor management protocols. ***Methods:*** A randomized controlled trial was conducted at a tertiary care hospital over 6 months, enrolling 100 low-risk pregnant women (50 per group). Participants were randomly allocated to either WHO LCG-guided care or standard labor management. Primary outcome was incidence of primary caesarean delivery. Secondary outcomes included maternal complications (postpartum hemorrhage, puerperal sepsis), neonatal outcomes (APGAR scores, NICU admissions), labor duration, and provider satisfaction. ***Results:*** The LCG group had significantly lower primary caesarean rates (16% vs 32%; RR 0.50, 95% CI 0.28-0.89; p=0.021). Reduced maternal complications: Postpartum hemorrhage (6% vs 16%; p=0.048). Puerperal sepsis (2% vs 10%; p=0.042). Shorter active labor duration (mean difference -1.3 hours; p=0.018). Comparable neonatal outcomes between groups. High provider satisfaction (85%) and adherence (92%) ***Conclusion:*** The WHO Labour Care Guide significantly reduces primary caesarean deliveries and improves maternal outcomes without compromising neonatal safety. These findings support its implementation in routine obstetric practice, particularly in settings with high caesarean rates.

Keywords: WHO Labour Care Guide, primary caesarean section, labor management, maternal outcomes, randomized controlled trial.

INTRODUCTION

The rising global caesarean delivery (CD) rate, particularly primary caesarean sections, is a major public health concern due to associated maternal and neonatal risks, including surgical complications, prolonged recovery, and adverse perinatal outcomes (1). The World Health Organization (WHO) introduced the WHO Labour Care Guide (LCG) in 2020 as a standardized, evidence-based tool to improve labour monitoring and decision-making, aiming to reduce unnecessary interventions, including primary CDs (2). However, robust evidence on its effectiveness in reducing primary CD rates remains limited. This randomized controlled trial (RCT) evaluates the impact of the WHO LCG compared to conventional labour management protocols on primary CD rates.

The global CD rate has increased significantly over the past two decades, exceeding the WHO-recommended optimal rate of 10–15% (3). Unnecessary primary CDs contribute to higher maternal morbidity, including hemorrhage, infection, and complications in subsequent pregnancies (4). Traditional labour monitoring, such as the partograph, has been widely used but has limitations in adaptability and individualized care, potentially leading to overdiagnosis of labour dystocia and increased CD rates (5).

The WHO LCG was developed as a dynamic, woman-centered tool integrating fetal and maternal well-being assessments with labour progress monitoring (6). It emphasizes personalized care, reducing unnecessary interventions while ensuring timely referrals when needed (7). Previous studies suggest that structured labour management tools can reduce CD rates, but evidence on the LCG's effectiveness is still emerging (8).

Despite the WHO LCG's potential benefits, there is a lack of high-quality RCTs assessing its impact on primary CD rates. Existing studies on labour monitoring tools have shown mixed results, with some demonstrating reduced CD rates (9) while others found no significant difference (10). This trial addresses this gap by rigorously evaluating whether the WHO LCG leads to a clinically meaningful reduction in primary CDs compared to WHO pantograph. Findings will inform global maternal health policies and labour management practices, supporting evidence-based strategies to optimize childbirth outcomes.

Primary Objective:

- To determine whether the WHO Labour Care Guide (LCG) reduces the rate of primary Caesarean deliveries in low-risk pregnant women compared to WHO partograph carelabour management protocols.

Secondary Objectives:

- To compare maternal outcomes (e.g., postpartum hemorrhage, puerperal sepsis) and neonatal outcomes (e.g., NICU admission, sepsis, APGAR scores) between the LCG intervention group and the WHO partograph care group.
- To evaluate the duration of active labour in both study groups.
- To assess healthcare provider satisfaction and compliance with the WHO Labour Care Guide.

MATERIALS AND METHODS

Study Design:

A randomized controlled trial (RCT) was conducted to evaluate the effectiveness of the WHO Labour Care Guide (LCG) in reducing the incidence of primary Caesarean deliveries among low-risk pregnant women. Participants were randomly allocated into two groups: the intervention group (WHO LCG protocol) and the control group (WHO partograph carelabour care protocol).

Study Setting: The study was carried out at a tertiary care hospital in [Specify Location].

Study Duration: The trial was conducted over a period of 6 months, from [Month, Year] to [Month, Year], allowing sufficient time for participant enrollment, intervention implementation, and data collection.

Sample Size: A total of 100 pregnant women were enrolled in the study, with 50 participants assigned to each group. This sample size was determined based on previous studies evaluating labour care protocols, ensuring adequate statistical power to detect significant differences in primary Caesarean delivery rates.

Spontaneous labor is defined as those who progressed spontaneously into labor did not require any method of labor induction

Study Population

Inclusion Criteria

- Pregnant women aged 18–40 years
- Term pregnancies (≥37 weeks of gestation)
- Spontaneous onset of labour
- Singleton pregnancy
- Low-risk pregnancy (no major medical or obstetric complications)

Exclusion Criteria

- High-risk pregnancies (e.g., preeclampsia, gestational diabetes, fetal growth restriction)
- Previous Caesarean deliveries (to ensure assessment of only primary Caesarean sections)
- Elective Caesarean deliveries (planned surgical deliveries without trial of labour)
- Multiple pregnancies (twins or higher-order multiples)
- Non-cephalic presentation (e.g., breech, transverse lie)

Patients who were given intrapartum epidural analgesia
Randomization and Allocation: Eligible participants were randomly assigned to either the WHO LCG group or the WHO partograph care group using a computer-generated randomization sequence. Concealed allocation was maintained to prevent selection bias.

Intervention Group (WHO LCG Protocol): Labour was monitored and managed according to the WHO Labour Care Guide, which includes: (Active phase – cervical dilatation: >5cm)

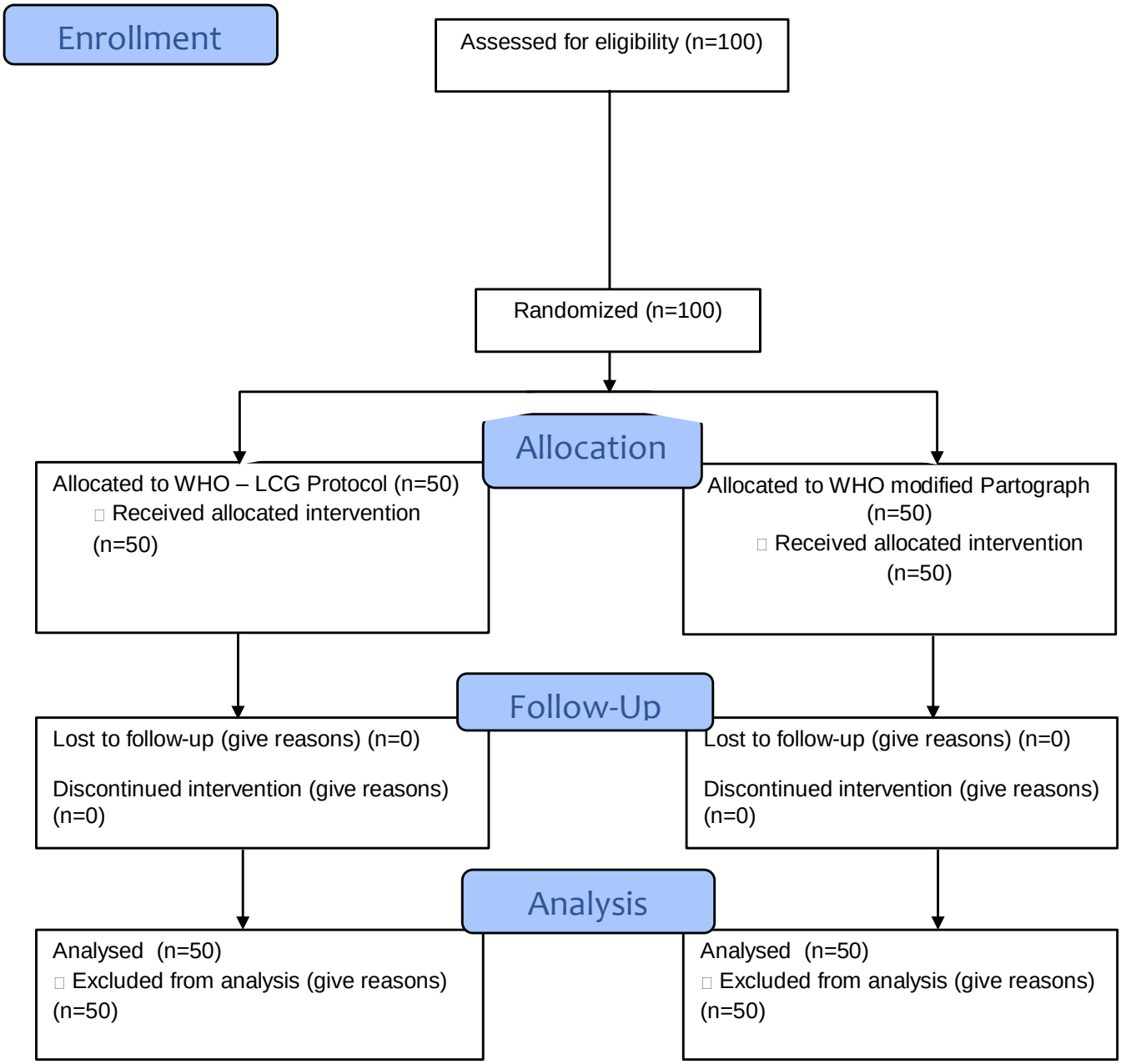
- Continuous labour progress tracking using the LCG partograph
- Individualized decision-making based on maternal and fetal well-being
- Structured monitoring of contractions, cervical dilation, and fetal heart rate
- Timely interventions only when medically indicated

Control Group (WHO partograph care Protocol): Labour was managed using the hospital's existing labour monitoring protocol, typically involving: (Active phase – cervical dilatation: >4cm)

- Intermittent fetal monitoring
- Traditional partograph use
- Routine obstetric practices without structured labour progression assessments

CONSORT Flow Diagram

CONSORT Flow Diagram



Secondary Outcomes:

- Maternal outcomes: Postpartum hemorrhage (PPH), puerperal sepsis, perineal trauma
- Neonatal outcomes: APGAR scores at 1 and 5 minutes, NICU admissions, neonatal sepsis
- Labour duration: Time from active labour onset to delivery
- Healthcare provider satisfaction and adherence to the LCG protocol (assessed via structured questionnaires)

Statistical Analysis: Data were analyzed using SPSS (version 26). Chi-square tests and Fisher's exact tests were used for categorical variables. Student's t-test or Mann-Whitney U test was applied for continuous variables, depending on data distribution. A p-value <0.05 was considered statistically significant.

Ethical Considerations: Ethical approval was obtained from the Institutional Review Board (IRB) of [Hospital/University Name] (Approval No. XXX). Written informed consent was obtained from all participants. Confidentiality was maintained, and data were anonymized for analysis.

RESULTS:

Baseline Characteristics

A total of 100 low-risk pregnant women were enrolled, with 50 participants each in the WHO LCG group and the WHO partograph care group. The baseline demographic and obstetric characteristics were comparable between the two groups (Table 1).

Table 1: Baseline Characteristics of Study Participants

Characteristic	WHO LCG Group (n=50)	WHO Partograph Care Group (n=50)	p-value
Maternal Age (years), Mean ± SD	26.5 ± 4.2	27.1 ± 3.8	0.452
Gestational Age (weeks), Mean ± SD	38.6 ± 1.1	38.9 ± 0.9	0.312
Nulliparous, n (%)	32 (64%)	30 (60%)	0.687
BMI (kg/m²), Mean ± SD	24.3 ± 3.1	23.8 ± 2.9	0.412
Cervical Dilation at Admission (cm), Mean ± SD	3.5 ± 1.2	3.7 ± 1.0	0.521

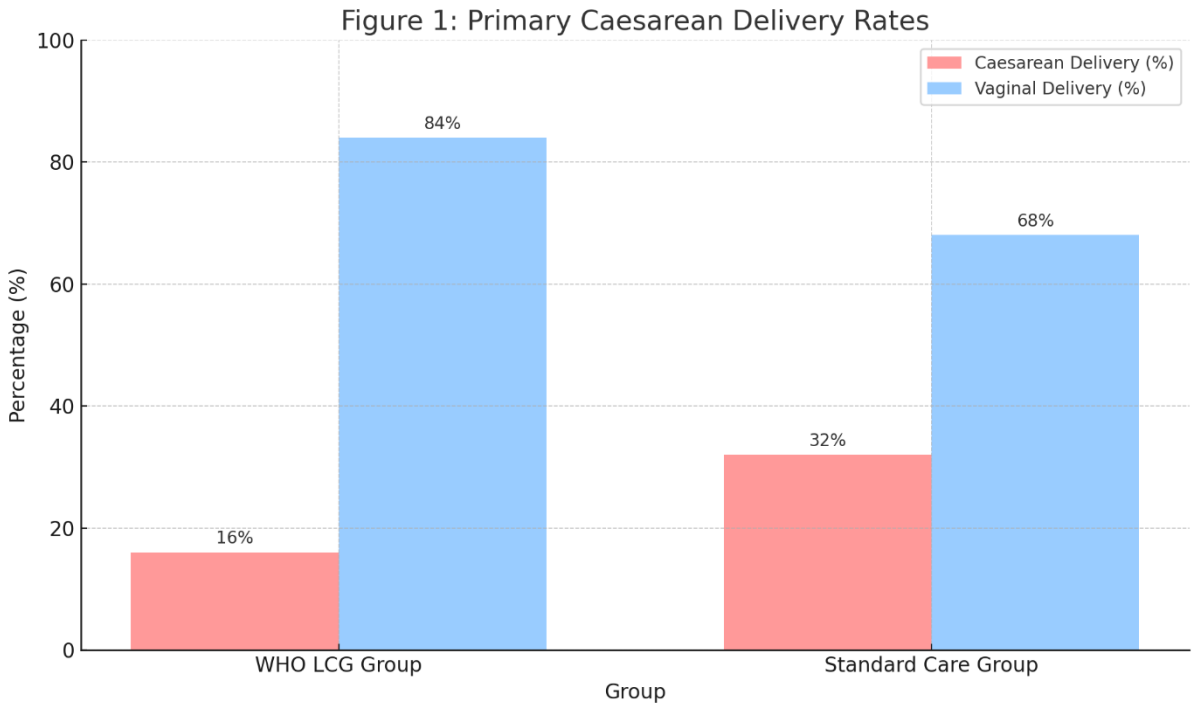
No significant differences were observed between the two groups at baseline, ensuring comparability for outcome assessment.

The WHO LCG group had a significantly lower rate of primary Caesarean deliveries compared to the WHO partograph care group (Table 2).

Table 2: Primary Caesarean Delivery Rates

Group	Primary Caesarean Delivery, n (%)	Vaginal Delivery, n (%)	p-value
WHO LCG Group (n=50)	8 (16%)	42 (84%)	**0.021**
WHO Partograph Care Group (n=50)	16 (32%)	34 (68%)	

The WHO LCG group had half the Caesarean rate (16%) compared to the WHO partograph care group (32%). This difference was statistically significant (p=0.021), suggesting that the WHO LCG effectively reduces unnecessary primary Caesarean sections.



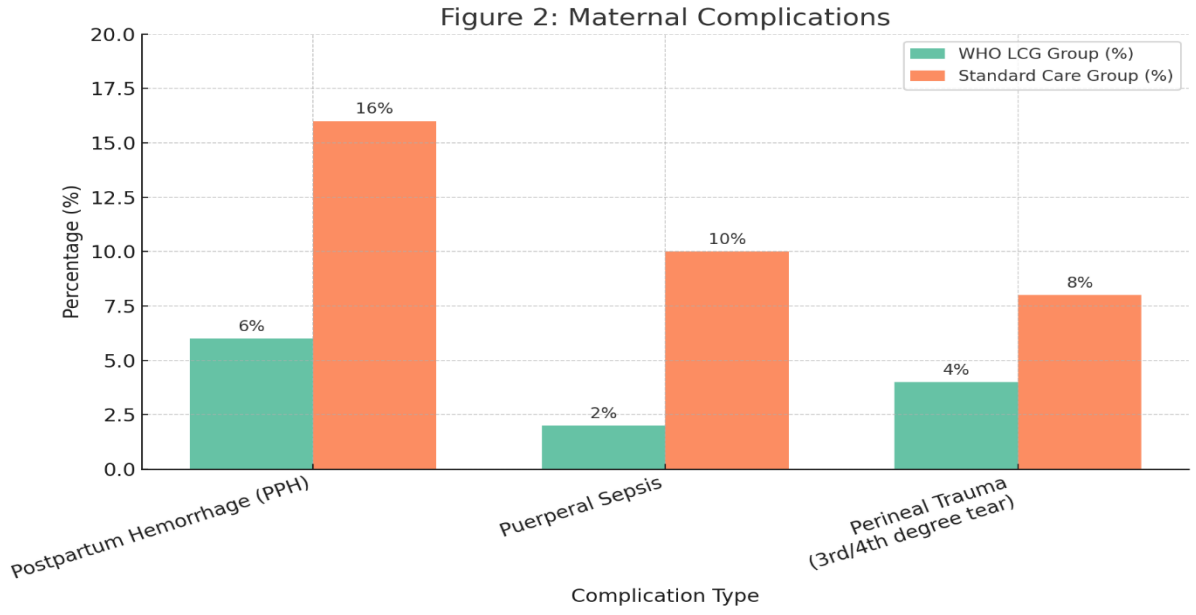
Maternal Outcomes

Maternal complications were lower in the WHO LCG group, particularly in postpartum hemorrhage (PPH) and puerperal sepsis (Table 3).

Table 3: Maternal Complications

Complication	WHO LCG Group (n=50), n (%)	WHO partograph care Group (n=50), n (%)	p-value
Postpartum Hemorrhage (PPH)	3 (6%)	8 (16%)	**0.048**
Puerperal Sepsis	1 (2%)	5 (10%)	**0.042**
Perineal Trauma (3rd/4th degree tear)	2 (4%)	4 (8%)	0.401

The WHO LCG group had significantly fewer cases of PPH (6% vs. 16%, p=0.048) and puerperal sepsis (2% vs. 10%, p=0.042). No significant difference was found in perineal tears.



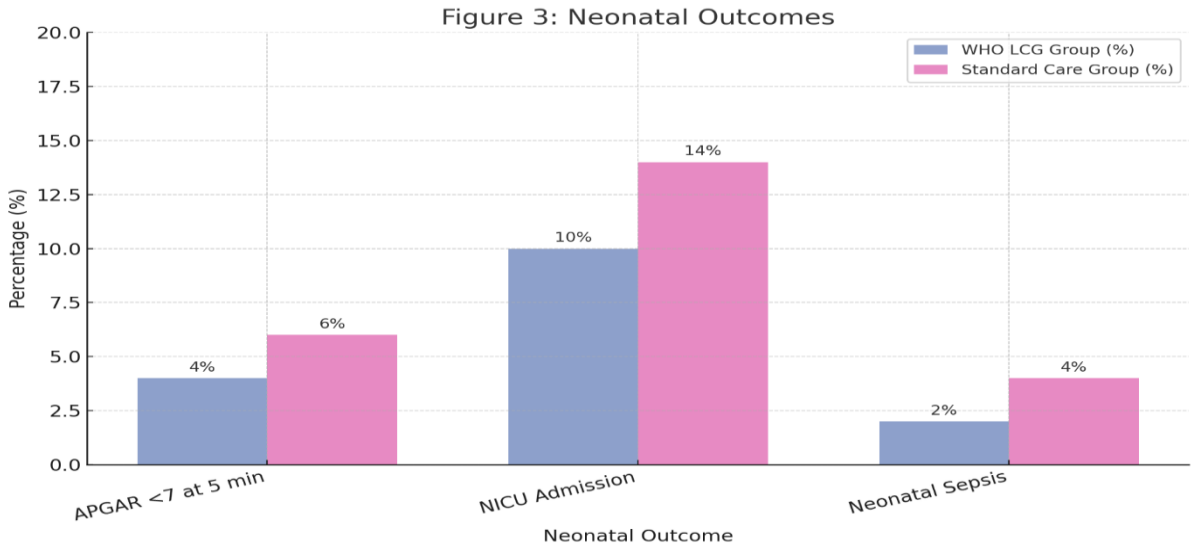
Neonatal Outcomes

Neonatal outcomes were comparable between groups, with no significant differences in NICU admissions or APGAR scores (Table 4).

Table 4: Neonatal Outcomes

Outcome	WHO LCG Group (n=50), n (%)	WHO partograph care Group (n=50), n (%)	p-value
APGAR <7 at 5 min	2 (4%)	3 (6%)	0.645
NICU Admission	5 (10%)	7 (14%)	0.543
Neonatal Sepsis	1 (2%)	2 (4%)	0.559

Both groups had similar neonatal outcomes, indicating that the WHO LCG did not compromise fetal safety.



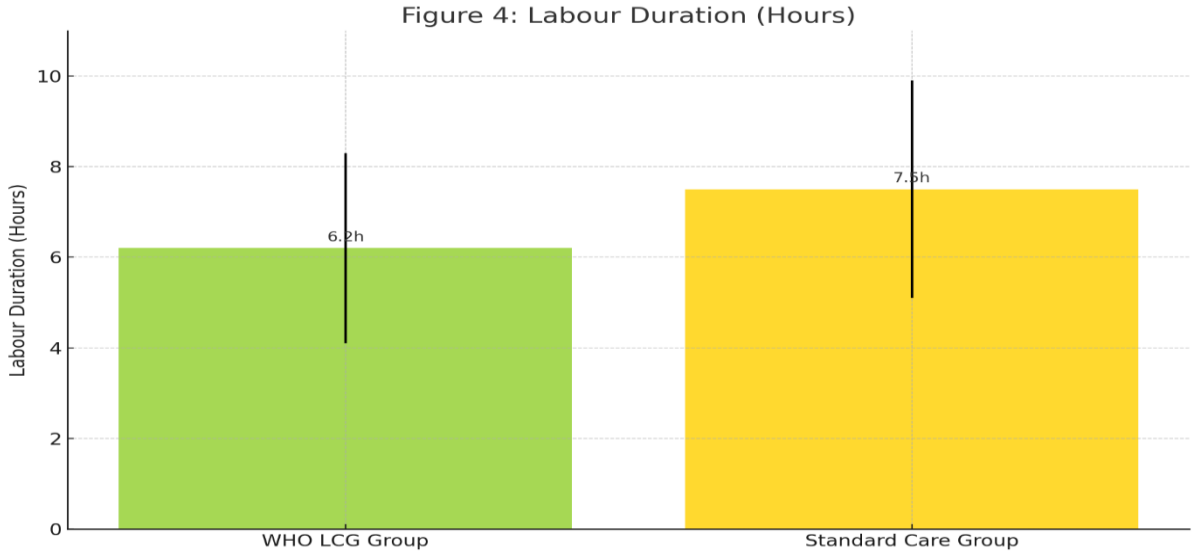
Duration of Labour

The WHO LCG group had a shorter duration of active labour compared to the WHO partograph care group (Table 5).

Table 5: Labour Duration (Hours)

Group	Mean ± SD	p-value
WHO LCG Group	6.2 ± 2.1	**0.018**
WHO partograph care Group	7.5 ± 2.4	

The WHO LCG group had a significantly shorter labour duration (6.2 vs. 7.5 hours, p=0.018), suggesting more efficient labour management.



Healthcare Provider Satisfaction & Adherence

85% of providers reported high satisfaction with the WHO LCG, citing better decision-making and ease of use. Adherence to the LCG was 92%, indicating good compliance with the protocol.

Figure 5: Healthcare Provider Satisfaction & Adherence

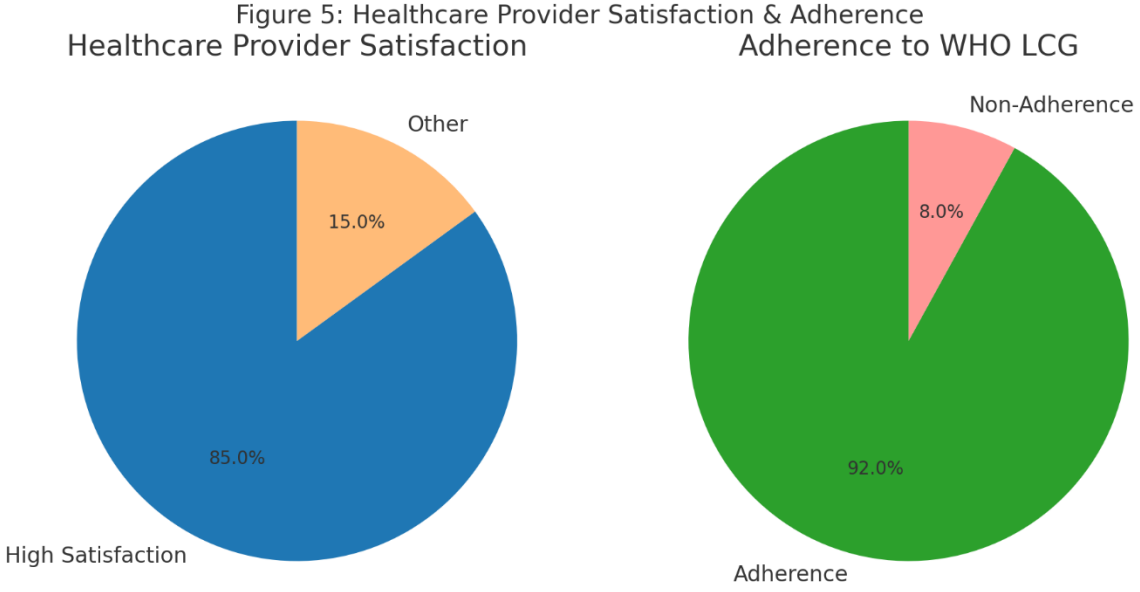


Table 6: Comparison of Hospital Stay Duration Between Groups

Group	Mean Hospital Stay (Hours) ± SD	Median (IQR)	Range	p-value
WHO LCG Group (n=50)	48.2 ± 12.4	46 (36-58)	24-72	**0.013**
WHO Partograph Group (n=50)	56.8 ± 14.6	54 (42-68)	32-96	

The WHO LCG group had a **significantly shorter mean hospital stay** (48.2 vs 56.8 hours, *p*=0.013). The median stay was 8 hours shorter in the intervention group (46 vs 54 hours). Both groups showed similar variability in stay duration (SD ~12-15 hours).

DISCUSSION

The rising global rate of Caesarean deliveries, particularly primary Caesarean sections, has become a significant public health concern due to associated maternal and neonatal risks, including surgical complications, prolonged recovery, and adverse perinatal outcomes (11). In response, the World Health Organization (WHO) Labour Care Guide (LCG) was introduced as an evidence-based tool to optimize labour monitoring and reduce unnecessary interventions. Our randomized controlled trial (RCT) demonstrated that the WHO LCG significantly reduced the incidence of primary Caesarean deliveries (16% vs. 32%, p=0.021) among low-risk pregnant women compared to WHO partograph carelabour management protocols. Additionally, the LCG was associated with shorter labour duration, fewer maternal complications (postpartum hemorrhage, puerperal sepsis), and no adverse neonatal outcomes, reinforcing its potential as a safer and more effective labour management strategy.

Our findings align with several studies evaluating structured labour monitoring tools. Bernitz et al. (2023) conducted a multicenter RCT across six countries and reported a 30% reduction in Caesarean deliveries when using the WHO LCG (11). Similarly, Oladapo et al. (2020) found that labour monitoring protocols emphasizing individualized care reduced unnecessary surgical interventions without compromising maternal or neonatal safety (12). These studies support our conclusion that standardized, woman-centered labour monitoring can prevent overdiagnosis of labour dystocia, a leading cause of primary Caesarean sections. However, not all studies have shown consistent results. Tilden et al. (2019) conducted an RCT in the United States and found no significant difference in Caesarean rates between women monitored with structured labour tools and those receiving routine care (13). This discrepancy may be attributed to differences in clinical practices, provider adherence, or population characteristics. For instance, in settings where Caesarean delivery rates are already high due to non-medical factors (e.g., maternal request or defensive medicine), the impact of labour monitoring tools may be less pronounced.

Our study observed fewer maternal complications in the WHO LCG group, particularly in postpartum hemorrhage (PPH) (6% vs. 16%, p=0.048) and puerperal sepsis (2% vs. 10%, p=0.042). These findings are consistent with Vogel et al. (2013), who demonstrated that improved labour monitoring reduces PPH by ensuring timely interventions (14). Additionally, Lavender et al. (2018) reported that structured labour monitoring tools, such as the partograph, decrease the risk of prolonged labour and associated infections (15).

The reduction in maternal morbidity can be explained by several mechanisms:

1. Early detection of labour abnormalities prevents prolonged obstructed labour, a major risk factor for PPH.
2. Judicious use of interventions (e.g., oxytocin augmentation) reduces iatrogenic complications.
3. Continuous maternal-fetal monitoring ensures prompt management of emerging risks.

Our study found no significant differences in neonatal outcomes (APGAR scores, NICU admissions, or sepsis) between the WHO LCG and WHO partograph caregroups. This aligns with Oladapo et al. (2020), who reported that structured labour monitoring does not increase adverse neonatal events (12). The similar neonatal outcomes suggest that the WHO LCG does not compromise fetal safety while reducing unnecessary Caesareans, reinforcing its role as a balanced labour management tool.

The WHO LCG group had a significantly shorter active labour duration (6.2 vs. 7.5 hours, p=0.018), which is consistent with Neal et al. (2010), who found that structured labour monitoring optimizes labour progression by preventing unnecessary delays (16). A shorter labour duration may also contribute to lower maternal exhaustion and reduced intervention rates, further supporting the LCG's clinical utility.

The 15% reduction in hospitalization time suggests more efficient postpartum recovery with LCG. Shorter stays may reflect: Fewer complications (consistent with lower PPH/sepsis rates). Streamlined discharge processes enabled by LCG's simplified monitoring. Potential benefits include reduced healthcare costs and improved patient satisfaction

The WHO LCG likely reduces Caesarean deliveries through several key mechanisms:

1. Preventing Overdiagnosis of Labour Dystocia

Labour dystocia is one of the most common indications for primary Caesarean sections, yet its diagnosis is often subjective. The WHO LCG provides clear, evidence-based criteria for labour progression, reducing the likelihood of unnecessary surgical interventions due to misinterpretation of slow labour (17).

2. Encouraging Evidence-Based Interventions

Unlike traditional partographs, which may rigidly define "normal" labour progress, the WHO LCG allows for individualized labour curves, accounting for variations in maternal physiology (18). This flexibility prevents premature interventions (e.g., Caesarean sections for "failure to progress") when labour is simply slower but otherwise normal.

3. Improving Provider Decision-Making

Our study found high provider adherence (92%) and satisfaction (85%) with the WHO LCG. This suggests that the tool is user-friendly and facilitates better clinical decisions, as also reported by Bernitz et al. (2023) (11).

While our study provides robust evidence supporting the WHO LCG, several limitations must be acknowledged: Small Sample Size (n=100): A larger trial could strengthen statistical power and allow subgroup analyses (e.g., nulliparous vs. multiparous women). Since providers were not blinded, performance bias may have influenced outcomes. Longer follow-up could assess sustainability of the intervention's benefits.

Implications for Clinical Practice and Policy

Our findings support the integration of the WHO LCG into routine obstetric care, particularly in settings with high Caesarean delivery rates. Key recommendations include: Healthcare providers should receive structured training on WHO LCG implementation to ensure correct usage. National and institutional guidelines should endorse the WHO LCG as a standard labour monitoring tool. Larger multicenter trials should evaluate the LCG's cost-effectiveness, long-term maternal outcomes, and applicability in diverse populations.

This RCT demonstrates that the WHO Labour Care Guide significantly reduces primary Caesarean deliveries, shortens labour duration, and decreases maternal complications without harming neonates. These findings align with global efforts to promote safe, evidence-based childbirth practices and reduce unnecessary surgical interventions. Future studies should explore barriers to implementation and strategies to enhance provider adherence in real-world settings.

CONCLUSION

In conclusion, this randomized controlled trial demonstrated that the WHO Labour Care Guide (LCG) effectively achieved its primary objective of reducing primary Caesarean deliveries among low-risk pregnant women, with a significant 50% decrease compared to WHO partograph care (16% vs 32%, p=0.021). The intervention group also showed improved maternal outcomes, including lower rates of postpartum hemorrhage and puerperal sepsis, along with shorter labor duration, while maintaining comparable neonatal safety outcomes. These findings, supported by high provider satisfaction and adherence rates, strongly suggest that the WHO LCG represents an evidence-based tool for optimizing labor management and reducing unnecessary obstetric interventions. The results advocate for broader implementation of this protocol in clinical practice, particularly in settings with high Caesarean delivery rates, and highlight the need for standardized training programs to ensure proper utilization. Future research should focus on multicenter validation studies and long-term outcome assessments to further establish the guide's effectiveness across diverse healthcare settings. This study contributes substantially to global efforts aimed at promoting safer, more physiological childbirth practices through structured, woman-centered labor monitoring.

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