

Effectiveness of a Novel Partograph (WHO Labour Care Guide) on Maternal and Perinatal Outcome among Intranatal Mothers Admitted at Selected Tertiary Care Hospitals: A Quantitative Evaluative Study

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ABSTRACT

Background

Obstructed and prolonged labour remain leading contributors to preventable maternal and perinatal morbidity and mortality. The World Health Organization introduced the Labour Care Guide (LCG) — referred to in this study as the "novel partograph" — as a next-generation, woman-centred tool for intrapartum monitoring intended to support timely clinical decision-making.

Objectives

To determine maternal outcome among mothers monitored with the novel partograph, to determine Perinatal outcome among newborns of mothers monitored with the novel partograph & find out the association between maternal and perinatal outcome with the socio-demographical variables of maternal and perinatal outcome.

Methods

A quantitative evaluative approach with a pre-experimental, post-test only design was used. Sixty intranatal mothers admitted to the labour room at Parul Sevashram Hospital and Nirmeet Women's Hospital, Vadodara, were enrolled by non-probability purposive sampling. Labour was monitored using the novel partograph, and maternal and perinatal outcomes were recorded on a validated, self-structured tool (Cronbach's $\alpha = 0.723$). Data were summarised using frequency and percentage and analysed for association using Fisher's exact test.

Results

Most mothers (83.3%) had a spontaneous vaginal delivery, 10% underwent emergency caesarean section, and 83.3% had no maternal complications; 93.3% were discharged in normal condition. Among newborns, 86.7% were alive and healthy with an Apgar score of 7–10 at five minutes, and 86.7% did not require NICU admission; one fresh stillbirth (1.6%) was recorded. Statistically significant associations ($p < 0.05$) were found between maternal and perinatal outcome and age, education, occupation, gravida, gestational age on admission, booking status, number of antenatal visits, high-risk pregnancy status, and previous caesarean section; residence and socio-economic status were not significantly associated with most outcome variables.

Conclusion

Use of the novel partograph was associated with a favourable pattern of maternal and perinatal outcome in this low-risk, well-booked cohort. Outcome remained significantly shaped by the mother's socio-demographic and antenatal profile, suggesting the tool is best implemented as one component of a broader system of antenatal risk screening and obstetric care rather than as a stand-alone determinant of outcome.

Keywords: Novel partograph; WHO Labour Care Guide; maternal outcome; perinatal outcome; intranatal mothers; intrapartum monitoring; tertiary care.

1. INTRODUCTION

Maternal and perinatal health indicators remain among the most sensitive measures of a health system's performance, and prolonged or obstructed labour continues to be a major preventable contributor to maternal and perinatal morbidity and mortality worldwide. For over four decades the partograph has served as an inexpensive, single-sheet graphic record for monitoring the progress of labour and for prompting timely referral or intervention when labour deviates from the normal pattern. Despite its long-standing use, inconsistent completion and interpretation of the traditional partograph have limited its clinical impact in many settings.

To address these limitations, the World Health Organization introduced the Labour Care Guide (LCG), described in this study as the "novel partograph" — a next-generation, woman-centred intrapartum monitoring tool that extends beyond graphic charting of cervical dilatation to include structured, time-bound assessment of maternal well-being,

fetal condition, and labour progress, together with supportive elements of care such as companionship, hydration, mobility, and pain relief. The tool is intended to help birth attendants recognise deviations from normal labour earlier and to support timely clinical decision-making, thereby reducing avoidable operative intervention and adverse outcome.

In the Indian context, national programmes such as Janani Suraksha Yojana and the Pradhan Mantri Surakshit Matritva Abhiyan have improved antenatal service uptake, yet intrapartum monitoring practices remain variable across facilities, and evidence on the real-world performance of the Labour Care Guide in Indian tertiary care settings is still accumulating. Nursing personnel, who are principally responsible for continuous intrapartum observation and charting, are central to the effective use of any such tool. Against this background, the present study was undertaken to generate facility-level evidence on the effectiveness of the novel partograph on maternal and perinatal outcome among intranatal mothers at selected tertiary care hospitals, and to examine how far socio-demographic and obstetric characteristics shape that outcome independent of the monitoring tool used.

Objectives of the Study

1. To determine maternal outcome among mothers monitored with the novel partograph.
2. To determine Perinatal outcome among newborns of mothers monitored with the novel partograph.
3. To find out the association between maternal and perinatal outcome with the socio-demographical variables of maternal and perinatal outcome.

Hypotheses

- H1: There will be a significant difference in maternal and perinatal outcomes among intranatal mothers monitored with the novel partograph.
- H2: There is a significant association between maternal and perinatal outcome and selected socio-demographic variables.

2. MATERIALS AND METHODS

Study Design and Setting

A quantitative evaluative research approach with a pre-experimental, post-test only design was adopted. The study was conducted in the labour rooms of Parul Sevashram Hospital, Waghodia, and Nirmeet Women's Hospital, Vadodara, Gujarat, following approval from the Parul University Institutional Ethical Committee for Human Research (PUIECHR/PIMSR/00/081734/9117) and permission from the participating hospitals.

Participants and Sampling

Sixty intranatal mothers admitted to the labour room were enrolled using non-probability purposive sampling. Inclusion criteria were: admission in active labour, singleton term pregnancy, cephalic presentation, and willingness to participate. Mothers with high-risk pregnancies requiring caesarean section from the onset, those with known obstetric complications prior to admission, or those who declined consent were excluded. Written informed consent was obtained from all participants.

Independent, Dependent, and Demographic Variables

The independent variable was use of the novel partograph (WHO Labour Care Guide) for intrapartum monitoring. The dependent variables were maternal outcome (mode of delivery, maternal complications, length of hospital stay, and condition of the mother) and perinatal outcome (perinatal status, birth weight, Apgar score at 5 minutes, and NICU admission). Demographic and obstetric variables examined for association included age, residence, education, occupation, socio-economic status, gravida, gestational age on admission, booking status, number of antenatal visits, high-risk pregnancy status, and previous caesarean section.

Instrument

A self-structured tool comprising four sections was developed after literature review and expert consultation: Section A — demographic, obstetric, and antenatal history; Section B — intrapartum details recorded through the novel partograph (cervical dilatation, fetal heart rate, uterine contractions, fetal station, moulding, membrane

status, maternal blood pressure, and duration of labour phases); Section C — maternal outcome; and Section D — perinatal outcome. Content validity was established by five experts in obstetric and gynaecological nursing, and reliability of the socio-demographic and obstetric-history section was established using Cronbach's alpha ($\alpha = 0.723$) in a sample of 30 intranatal mothers, indicating acceptable internal consistency.

Data Collection

After explaining the purpose of the study and obtaining written informed consent, socio-demographic and antenatal data were collected by interview. Labour was then monitored using the novel partograph, with cervical dilatation, fetal heart rate, uterine contractions, fetal station, moulding, and maternal vital signs recorded at regular intervals from admission through delivery. Maternal outcomes were assessed and documented following delivery, and perinatal outcomes were recorded from direct observation and hospital records. Data were checked for completeness and coded prior to analysis.

Statistical Analysis

Descriptive statistics (frequency and percentage) were used to summarise socio-demographic characteristics and maternal and perinatal outcome. Fisher's exact test was used to test the association between socio-demographic/obstetric variables and maternal and perinatal outcome, with $p < 0.05$ taken as statistically significant.

3. RESULTS

Socio-Demographic and Obstetric Characteristics

Half of the mothers (50%) were aged 23–27 years and 30% were aged 28–32 years. A majority (78.3%) resided in rural areas, 36.7% had completed secondary education, 73.3% were homemakers, and 53.3% belonged to the middle socio-economic group. Nearly half (48.3%) were second gravida (G2) and 38.3% were primigravida (G1); 63.3% were admitted at 39+1–40 weeks of gestation. Almost all mothers (96.7%) were booked, 50% had attended more than six antenatal visits, 20% had a high-risk pregnancy, and 10% had a previous caesarean section (Table 1).

Table 1. Frequency and percentage distribution of selected socio-demographic and obstetric variables (N = 60)

Variable	Category	f	%
Age (years)	18–22	8	13.3
	23–27	30	50.0
	28–32	18	30.0
	33–37	4	6.7
Residence	Urban	13	21.7
	Rural	47	78.3
Education	Primary school	8	13.3
	Secondary school	22	36.7
	Higher secondary	18	30.0
	Graduate & above	12	20.0
Occupation	Homemaker	44	73.3
	Skilled worker	4	6.7
	Professional	12	20.0

Variable	Category	f	%
Socio-economic status	Low	16	26.7
	Middle	32	53.3
	High	12	20.0
Gravida	G1	23	38.3
	G2	29	48.3
	G3	6	10.0
	≥ G4	2	3.3
Gestational age on admission	38+1–39 weeks	20	33.3
	39+1–40 weeks	38	63.3
	>40 weeks	2	3.3
Booking status	Booked	58	96.7
	Unbooked	2	3.3
ANC visits	1–3	2	3.3
	4–6	28	46.7
	>6	30	50.0
High-risk pregnancy	No	48	80.0
	Yes	12	20.0
Previous caesarean section	Yes	6	10.0
	No	54	90.0

Maternal Outcome

A majority of mothers (83.3%) had a spontaneous vaginal delivery, 6.7% had an instrumental (vacuum/forceps) delivery, and 10% underwent emergency caesarean section; no mother required elective caesarean section. Most mothers (83.3%) had no maternal complications, while 10% had a perineal tear and 6.7% had postpartum haemorrhage. Length of hospital stay was under 3 days for 80% of mothers, and 93.3% were discharged in normal condition (Table 2).

Table 2. Frequency and percentage distribution of maternal outcome (N = 60)

Maternal outcome	Category	f	%
Mode of delivery	Spontaneous vaginal delivery	50	83.3
	Instrumental (vacuum/forceps)	4	6.7
	Emergency caesarean section	6	10.0

Maternal outcome	Category	f	%
Maternal complications	None	50	83.3
	Postpartum haemorrhage	4	6.7
	Perineal tear	6	10.0
Length of hospital stay	<3 days	48	80.0
	3–5 days	8	13.3
	>5 days	4	6.7
Condition of the mother	Normal	56	93.3
	Abnormal	4	6.7

Perinatal Outcome

Among newborns, 86.7% were alive and healthy, 11.7% were alive with complications, and one newborn (1.6%) had a fresh stillbirth; no macerated stillbirth or early neonatal death was recorded. Most newborns (60%) had a birth weight of 3.1–3.5 kg, 86.7% had an Apgar score of 7–10 at 5 minutes, and 86.7% did not require NICU admission (Table 3).

Table 3. Frequency and percentage distribution of perinatal outcome (N = 60)

Perinatal outcome	Category	f	%
Perinatal status	Alive & healthy	52	86.7
	Alive with complications	7	11.7
	Stillbirth – fresh	1	1.6
Birth weight	2.5–3.0 kg	20	33.3
	3.1–3.5 kg	36	60.0
	>3.5 kg	4	6.7
Apgar score at 5 minutes	4–6	8	13.3
	7–10	52	86.7
NICU admission required	Yes	8	13.3
	No	52	86.7

Association Between Socio-Demographic Variables and Maternal and Perinatal Outcome

Fisher's exact test showed statistically significant associations ($p < 0.05$) between mode of delivery and age, education, occupation, gravida, gestational age on admission, booking status, number of antenatal visits, high-risk pregnancy, and previous caesarean section; residence and socio-economic status were not significantly associated with mode of delivery. A similar pattern was observed for maternal complications, length of hospital stay, and condition of the mother at discharge, and for perinatal status, Apgar score, and NICU admission — with residence and socio-economic status generally not reaching significance, except that birth weight was significantly associated with nearly all socio-demographic variables examined, including residence, education, and socio-economic status (Table 4).

Table 4. Association between selected socio-demographic variables and mode of delivery (Fisher's exact test, N = 60)

Socio-demographic variable	df	p-value	Result
Age (years)	6	<0.001	Significant
Residence	2	0.094	Not significant
Education level	6	0.0116	Significant
Occupation	4	<0.001	Significant
Socio-economic status	4	0.5356	Not significant
Gravida	6	0.0035	Significant
Gestational age on admission	4	<0.001	Significant
Booking status	2	0.0120	Significant
Number of ANC visits	4	<0.001	Significant
High-risk pregnancy	2	<0.001	Significant
Previous caesarean section	2	<0.001	Significant

Significant at $p < 0.05$. Comparable associations for maternal complications, length of hospital stay, condition of the mother, and the perinatal outcome variables are summarised in the text above; full tables are available from the corresponding author.

4. DISCUSSION

The socio-demographic profile of the sample — predominantly women in the mid-twenties, largely rural in residence, well-booked, and with more than six antenatal visits in half the cohort — is consistent with the general obstetric population attending tertiary care institutions in India, and reflects the reach of national maternal health programmes into rural catchment areas even where formal antenatal engagement might otherwise be expected to be delayed.

The high proportion of spontaneous vaginal delivery (83.3%), low caesarean section rate (10%), and low burden of maternal complications (83.3% with none) observed in this study are consistent with previous reports that structured, Labour Care Guide-based intrapartum monitoring is associated with a favourable pattern of vaginal delivery and reduced operative intervention. Comparable findings have been reported in non-randomised controlled and comparative studies from Indian tertiary care settings, which similarly found reduced duration of labour, fewer vaginal examinations, and higher rates of spontaneous vaginal delivery among mothers monitored with a Labour Care Guide-type tool. However, other comparative work has found the Labour Care Guide broadly equivalent to the modified WHO partograph, and a large pragmatic stepped-wedge trial in India did not demonstrate a statistically significant reduction in caesarean section rate with Labour Care Guide use. Because the present study used a pre-experimental, post-test only design without a comparison group, the favourable outcome observed cannot be attributed to the novel partograph alone and may partly reflect the low baseline obstetric risk of the sample.

Perinatal outcome was similarly favourable, with 86.7% of newborns alive and healthy, a normal Apgar score in 86.7%, and NICU admission required in only 13.3%. These findings parallel other studies reporting improved neonatal parameters with partograph or Labour Care Guide monitoring and no compromise of neonatal safety despite improved maternal labour parameters. The single fresh stillbirth recorded is consistent with the broader literature indicating that a small proportion of adverse perinatal events persist even under structured monitoring, often related to factors outside the scope of intrapartum observation, such as late presentation or antenatal complications not captured by the tool itself.

The significant associations found between maternal and perinatal outcome and age, education, occupation, gravida, gestational age on admission, booking status, number of antenatal visits, high-risk pregnancy, and previous caesarean section reaffirm that outcome of labour and delivery, even under structured monitoring, continues to be substantially shaped by the antenatal and socio-demographic context of the mother, a pattern well corroborated in the wider literature on maternal health service utilisation in India. The particularly strong and consistent association of birth weight with almost every socio-demographic variable studied reflects the well-documented multifactorial influence of maternal nutrition, antenatal care, and socio-economic status on fetal growth, independent of the specific labour-monitoring tool used.

Hypothesis H1 was descriptively, though not statistically, supported by the favourable pattern of maternal and perinatal outcome observed; because the design lacked a comparison group, this finding should be read as hypothesis-generating rather than confirmatory of causal superiority over standard care. Hypothesis H2 was statistically supported, with the majority of socio-demographic variables tested showing significant association with one or more maternal or perinatal outcome variables.

5. CONCLUSION

Use of the novel partograph, based on the WHO Labour Care Guide, among intranatal mothers at selected tertiary care hospitals was associated with a high proportion of spontaneous vaginal delivery, low maternal complication rates, short hospital stay, and favourable perinatal outcome. At the same time, outcome remained significantly shaped by the mother's socio-demographic and antenatal profile, indicating that the tool functions most effectively as one component within a broader system of antenatal preparation, risk screening, and obstetric care rather than as a stand-alone determinant of outcome. The novel partograph appears to be a feasible, clinically useful, and woman-centred tool for intrapartum monitoring in the tertiary care setting studied, and its wider, consistent use by nursing and obstetric personnel is likely to support continued reduction of preventable maternal and perinatal morbidity when implemented alongside sustained antenatal outreach and risk-based referral systems.

Clinical and Nursing Implications

- Labour room nurses and midwives should adopt the novel partograph (Labour Care Guide) as a routine tool for continuous monitoring, using it as an active decision-support aid rather than only a documentation record.
- Nursing curricula and in-service education should incorporate structured, simulation-based training on the novel partograph to build competency before and during clinical practice.
- Nursing administrators should ensure adequate chart availability, periodic completion audits, and sufficient nurse-to-patient ratios to support consistent real-time use of the tool.
- Given the association between antenatal visit frequency and outcome, antenatal and labour room nurses should continue to reinforce health education on regular antenatal check-ups.

Limitations and Recommendations for Future Research

This study used a pre-experimental, post-test only design without a control or comparison group, a single-institution catchment across two hospitals, and a modest purposive sample of 60 mothers; these features limit causal inference and generalisability. Future research should include a comparative study with a control group receiving standard partograph or routine care, replication with larger multi-centric samples, assessment of nurses' and midwives' knowledge and practice regarding the tool, evaluation of structured teaching programmes on the novel partograph, and qualitative exploration of mothers' experience of care under Labour Care Guide-based monitoring.

Ethical Considerations

The study was approved by the Parul University Institutional Ethical Committee for Human Research (PUIECHR/PIMSR/00/081734/9117), with permission obtained from the participating hospitals. Written informed consent was obtained from all participants, and confidentiality of data was maintained throughout.

Conflict of Interest

The authors declare no conflict of interest.

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