



## Evaluation of Labour Progress and Delivery Outcome Using Modified WHO Partograph

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### Introduction

- Despite the fact that the maternal mortality ratio (MMR) has decreased by roughly 45 % in the previous two decades, over 300,000 women die each year in the world as a result of preventable pregnancy-related problems<sup>[1]</sup> Labor obstruction is a significant cause of maternal and newborn death worldwide, but it is particularly prevalent in poor countries. <sup>[2]</sup>
- The first graphic assessment of progress of labour was designed by Friedman and further improved by Philpott and Castle.<sup>[3]</sup> Much work has been done to improve the partograph as a tool which graphically represents key events during labour and adapts it for use globally.
- The use of partograph (or labour chart) to monitor the progress of labour is one of the globally recognized tools for reducing maternal mortality.<sup>[4]</sup>
- The partograph is a low-cost instrument that is meant to offer a continuous visual picture of labor. When used to monitor and manage labor, it has been demonstrated to enhance outcomes.
- To determine the extent to which health care providers are making use of the partograph in monitoring the progress of labour through checking the documentation of the parameters

of the partograph. We hoped to identify the extent to which partographs are used to make clinical decisions.

### Methods

- **Study Design:** Hospital based prospective descriptive study.
- **Place of Study:** M.G.M Medical College, Kishanganj, Bihar.
- **Duration of study:** January 2020 to June 2021
- **Sample Size Calculation**

Cochran formula for sample size for descriptive analysis,

$$\text{EQUATION: Sample size } n = z^2 pq / e^2$$

Depending upon previous studies conducted by WHO,

p = result of effectiveness of partograph use

q = 1-p

z = 1.96 at 95% confidence level

e (error allowed) = 0.05

Taking p = 11% (based on previous study on partograph)

$$q = 1 - 0.11 = 0.89$$

$$n = 150 \text{ (minimum sample size)}$$

So, I had taken sample size of 200 cases with partograph.

**Inclusion Criteria**

Woman with term pregnancy in labour. The delivery was conducted in our hospital irrespective of gravidity, parity and age group.

**Exclusion Criteria**

- Any uterine scar
- Any further contraindication for vaginal delivery, such as
  - Cephalo-pelvic disproportion
  - Transverse lie
  - Placenta previa
  - Brow presentation
  - Cord prolapsed etc

After obtaining clearance and approval from the Institutional Ethics Committee, 200 obstetrics patients fulfilling the inclusion and exclusion criteria who gave informed consent were randomly allocated into study group. All the patients were admitted to the hospital and a detailed history taking and clinical examination was done. The labour patients in the study group was monitored using a partograph. Important details such as Maternal conditions, Fetal condition and Progress of labour as outlined below was noted.

**Table 1:** Age Distribution

Age Group	Frequency	Percentage
18-30 years	90	45.0
31-40 years	98	49.0
41-45 years	12	6.0
Total	200	100.0
Mean Age	30.23 ±6.20	

Table 1 presents the distribution of the study participants according to age. Majority of the subjects in the present study were aged between 31 to 40 years (49%) followed by 18 to 30 years (45%) and (41 to 45 years (6%). The mean age was 30.23 ±6.20 years.

**Table 2:** Gravidity

Gravidity	Frequency	Percentage
Primigravida	88	44.0
Multigravida	112	56.0
Total	200	100.0

Table 2 presents majority of the study participants were multigravida (56%) and 44% were primigravida.

**Table 3 & Figure 1:** Evaluation of Progress in Labour using Modified WHO Partograph

Evaluation of Progress	Frequency	Percentage
Normal Active Phase	139	69.5
Moved between alert and action line	53	26.5
Reached or crosses action line	8	4.0
Total	200	100.0

Table 3 presents the Distribution of the study participants according to evaluation of progress in labour. The above table shows that the partograph indicates majority of the study subjects (69.5%) had normal active phase while 26.5% moved between alert and action line and 4% reached or crossed action line.

**Table 4 & Figure 3:** Evaluation of Progress of Labour using Modified WHO Partograph according to pattern of Labour

Evaluation of Progress	Normal Labour (n=170)		Abnormal Labour (n=30)		p value
	Percentage	Frequency	Percentage	Frequency	
Normal Active Phase	139	81.8	0	0.0	<0.0001
Moved between alert and action line	31	18.2	22	73.0	<0.0001
Reached or crosses action line	0	0.0	8	26.7	<0.0001
Total	170	100.0	30	100.0	

Table 4 presents the data regarding the progress of labour according to WHO partograph among patients with normal and abnormal labour. The observation of the present study reveals there was a significant difference regarding progress of labour among patients with normal and abnormal labour (p value = <0.0001).

**Table 5 & Figure 3:** Mode of Delivery in terms of Modified WHO Partograph according to pattern of Labour

Mode of Delivery	Normal Active Phase (n=139)		Moved between alert and action line (n=53)		Reached or crosses action (n=8)		P value
	Normal (n=139)	Abnormal (n=0)	Normal (n=31)	Abnormal (n=22)	Normal (n=0)	Abnormal (n=8)	
Vaginal	130 (93.5)	0 (0.0)	26 (83.87)	15 (68.2)	0 (0.0)	0 (0.0)	<0.0001
Vaginal Instrumental	1(0.71)	0(0.0)	4(12.9)	3(13.6)	0 (0.0)	0 (0.0)	0.082
LSCS	8 (5.8)	0 (0.0)	1 (3.2)	4 (18.2)	0 (0.0)	8 (100.0)	0.0001
Total	139 (100.0)	0 (0.0)	31 (100.0)	22 (100.0)	0 (0.0)	8 (100.0)	

While analysing the mode of delivery in terms of Modified WHO Partograph according to pattern of labour there was a significant difference regarding the above. Data is presented in Table 5.

**Table 6 & Figure 4:** Neonatal Morbidity in terms of Pattern of Labour

Neonatal Morbidity	Normal Labour (n=170)		Abnormal Labour (n=30)		p value
	Frequency	Percentage	Frequency	Percentage	
Birth Asphyxia	7	4.1	6	20.0	0.002
Neonatal Sepsis	3	1.8	4	13.3	0.004
Hyperbilirubinemia	3	1.8	3	10.0	0.030
Meconium Aspiration	5	2.9	2	6.7	0.305
HIE	0	0.0	2	6.7	0.008

Table 6 presents the data regarding the neonatal morbidity among patients with normal and abnormal labour. It shows that neonatal morbidity such as birth asphyxia, neonatal sepsis, hyperbilirubinemia, meconium aspiration and HIE was significantly higher among patients with abnormal labour compared to normal labour (p value = <0.05).

**Table 7 & Figure 5:** Maternal Morbidity

Maternal Morbidity	Normal Labour (n=170)		Abnormal Labour (n=30)		p value
	Frequency	Percentage	Frequency	Percentage	
PPH	2	1.2	5	16.7	0.0001
Blood Transfusion	2	1.2	5	16.7	0.0001
Fever	1	0.6	7	23.3	<0.0001
Wound Complications	0	0.0	2	6.7	0.008
Sepsis	0	0.0	2	6.7	0.008

Table 7 presents the data regarding the maternal morbidity among patients with normal and abnormal labour. It shows that maternal morbidity such as PPH, blood transfusion, fever, wound complication and sepsis was significantly higher among patients with abnormal labour compared to normal labour (p value = <0.05).

## Discussion

The present study was conducted in the Department of Obstetrics and Gynecology, MGM Medical College & Hospital. A total 200 pregnant women with term pregnancy in labour were selected for the present study.

The demographic characteristics of the present

study reveal that Majority of the subjects in the present study were aged between 31 to 40 years (49%) followed by 18 to 30 years (45%) and (41 to 45 years (6%). The mean age was 30.23 ±6.20 years. Majority of the study participants were multigravida (56%) and 44% were primigravida. Majority of the study subjects had gestational age

between 37-40 weeks (57%) and 43% had gestational age between 41 weeks 1 day to 42 weeks. The mean gestational age was  $39.72 \pm 1.72$  weeks. Majority of the patients (53.5%) had cervical dilatation  $4 < \text{cm}$  at the time of admission and 46.5% (93) had dilatation of cervix  $\geq 4 \text{cm}$ .

Observations regarding the various parameters according to the WHO partograph are as follows:

The partograph indicates majority of the study subjects (69.5%) had normal active phase while 26.5% moved between alert and action line and 4% reached or crossed action line. Most of the patients had spontaneous labour (57.5%) while 42.5% had induced and 21% had augmented labour. In our study 30 (15%) patients had abnormal labour while 170 (85%) had normal labour. Arrest of descent was the most common (40 %) abnormal labour pattern observed; followed by protracted active phase dilatation (26.7%), other being Protracted descent (20 %) and Failure of descent (10 %).

Active first stage labour ( $3.25 \pm 0.85$  hrs vs.  $6.50 \pm 1.04$  hrs), second stage labour ( $42.99 \pm 5.83$  minutes vs.  $102.56 \pm 9.90$  minutes) and total duration of labour ( $3.97 \pm 0.85$  hrs vs.  $8.18 \pm 1.10$  hrs) was significantly higher among patients with abnormal labour compared to normal labour (p value = 0.045,  $< 0.0001$  and 0.014 respectively).

The observation of the present study reveals there was a significant difference regarding progress of labour among patients with normal and abnormal labour (p value =  $< 0.0001$ ).

The observation of the present study also reveals that patients with normal active phase and patients moved between alert and action line showed significant difference among multigravida and primigravida women (p value = 0.001 and 0.003 respectively) while patients reached or crossed action line showed no significant difference (p value = 0.238).

While analysing the incidence of augmented labour in terms of Modified WHO Partograph according to pattern of labour there was a significant difference regarding the above. Partograph according to gravidity shows a significant difference regarding the above as well.

While analysing the mode of delivery in terms of Modified WHO Partograph according to pattern of labour there was a significant difference regarding the above.

While analysing the mode of delivery in terms of Modified WHO Partograph according to gravidity there was a significant difference regarding the above as well

Neonatal morbidity such as birth asphyxia, neonatal sepsis, hyperbilirubinemia, meconium aspiration and HIE was significantly higher among patients with abnormal labour compared to normal labour (p value =  $< 0.05$ ). Similarly, maternal morbidity such as PPH, blood transfusion, fever, wound complication and sepsis was also significantly higher among patients with abnormal labour compared to normal labour (p value =  $< 0.05$ ).

The results of the present study match with the results of many other studies. The intervention reduced the incidence of prolonged labour and its sequelae. The graphic form introduced by **Philpott and Castle** showed that once the alert line is crossed, the attendant is alerted of the possibility of an abnormal situation and crossing of the action line effectively separates the dysfunctional or abnormal labour requiring immediate action.<sup>[5]</sup>

**Philpott and Castle** series showed that 89.8% of women, who delivered before reaching the alert line, had spontaneous vaginal delivery. Ten percent were delivered by vacuum extraction, 0.40% cases had caesarean section. In the same study, cases crossing the alert line and delivering before action line, it was observed that 79.4% had normal vaginal delivery, 20.5% had ventouse extraction and no case required caesarean section. They showed that 72.1% of cases crossing the four hourly action line required some interference (caesarean section rate 20.6% and vacuum extraction 51.6%).<sup>[6]</sup>

**Drouin et al** showed that only 1.3% of women delivered within the alert line required medical or operative interventions, while 26.7% of the women, delivered after crossing only the alert line and 72% of the women, delivered after action line

had to be intervened before delivery.<sup>[7]</sup>

**Vaidya P.R et al** showed that 99% of the cases delivering before the alert line had normal vaginal delivery and only 1 % of them required forceps application. Of the cases falling outside the alert line 70% had normal vaginal delivery, 26% required forceps application and 4% required vacuum extraction. 88% of cases with the labour curves crossing the four hourly action line required interference. Forceps application and vacuum extraction were done in 52% cases and caesarean sections were done in 36% cases.<sup>[8]</sup>

**Shortri A.N. et al** in her study observed that 79.9% primigravida delivered normal vaginally, 5.7% required caesarean section before alert line was crossed. The incidence of caesarean section was 26.7% in those cases whose alert line was crossed. The *observation* in all the above series show that the surgical operative interference is increased as the labour curve moves to the right of the alert line and it is significantly increased as the labour curve crosses the action time.<sup>[9]</sup>

### Conclusion

- Partogram based on WHO model has been used for many years in the peripheral maternity clinics around the world.
- The observation of the present study based on WHO partograph reveals that routine use of partogram during labour management help in early detection of abnormal labour, guiding timely intervention, leading to avoidance of problems of prolonged labour and its sequelae.
- It also assures the best possible maternal and neonatal outcome. It is suggested that every woman in labour must be monitored by this scientific approach of labour management i.e. with the use of Modified WHO partograph.

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