Original Article

The Partograph: A Practical Guide for Preventing Prolonged Labour

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Abstract

Background: *The partograph, a graphic recording of labour and features in the mother and foetus has been used since 1970 to detect labour that is not progressing normally. The partograph serves early warning system and assist in early decision of transfer, augmentation and termination of labour. It also increases the quality and regularity of observing mother and foetus in labour.*

Objectives: *The study aimed to evaluate effect of using partograph on the management and outcome of labour.*

Materials and Methods: *It was a prospective cross-sectional observational study conducted in the Department of Obstetrics and Gynaecology at Sher-E-Bangla Medical College Hospital, Barishal; Bangladesh over one (1) year from January 2017 to December 2017. A total 280 patients were enrolled in this study. Plotting on the partograph was started at cervical dilation of 4 cm on alert line.*

Results: *The mean age of the participants was 23.4 ±4 years and mean gestational age was 38.3 ±1.74 weeks and 45% were primigravida. The mean Apgar score of the newborn after 5 minutes was 9.3 ±0.7. The mean duration for delivery on active labour was 4.3 ±2.5 hours in primigravida and 3.4 ±2.3 hours in multipara.*

Conclusion: *The proper use of partographs and the application of the right decision at the right time can be achieved the best for maternal and neonatal outcomes.*

Key words: *Partograph, Labour, Neonatal Outcome, Alert line, Primigravida, Mode of Delivery.*

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Introduction

Every day, 1500 women die from pregnancy or childbirth related complications. Approximately half a million women lose their lives every year because of complications of pregnancy and about 99% of these occur in the developing countries due to non- monitored labour complications and accidents. A women's lifetime risk of intra-natal death is 1 in 7300 in developed countries versus 1 in 75 in developing countries.[1] In Bangladesh 176 mother dies per 100000 live births.[2] Among these deaths 25% are due to prolonged and obstructed labour. One new born dies in every 3-4 minutes and one maternal death occur for every 14 perinatal deaths in Bangladesh.[3] This can be effectively averted by partograph, of every woman in labour.

Monitoring of the woman and foetus during labour is to ensure early identification and timely management of problems to prevent short and long-term morbidity and mortality.[4] Monitoring labour can be undertaken in various ways. One method commonly used in developing countries is the partograph, which help in the timely identification of obstructed labour, providing enough time for referral to a higher level health center. It is defined as a graphical representation of the changes that occur in labour, and a preprinted paper form that assists in identifying unsatisfactory progress in labour in a timely manner by charting cervical dilatation against time.[5]

The partograph, a graphic recording of labour and features in the mother and foetus has been used since 1970 to detect labour that is not progressing normally. The partograph is simple, being based on the rate of cervical dilatation and foetal descent during specific period of labour. No complicated apparatus is required; just the examining finger, a clock and a single sheet paper are enough. The partograph serves early warning system and assist in early decision of transfer, augmentation and termination of labour. It also increases the quality and regularity of observing mother and foetus in labour.

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It has shown to be effective in preventing prolonged labour, in reducing operative interference in monitoring patients with premature rupture of membrane and in improving maternal and neonatal outcome.[6] It helps to recognize cephalopelvic disproportion long before labour becomes obstructed.

Many of the serious complication of pregnancy and most of the hazards of labour can be prevented. Their dangerous consequences could be anticipated earlier. Early detection of abnormal progress of labour and prevention of prolonged labour would significantly reduce the risk of complication and their consequences.

In addition to cervical dilatation, most partographs also contain a foetal and maternal record. The foetal record may track foetal heart rate, descent of the foetal presenting part, condition of amniotic fluid, and molding of the foetal skull. The maternal record includes temperature/heart rate/blood pressure/urine (for protein and ketones), uterine contractions, and use of medications (such as oxytocin). This form allows health care providers to record, interpret, analyze, and use data to make decisions on labour management. Alert and action lines are printed on the partograph for the active phase of labor. An alert line starts at 4 cm of cervical dilatation and extends to the point of expected full dilatation at the rate of 1 cm per hour. In the active phase of labour, plotting of the cervical dilatation will normally remain on or to the left of the alert line. When dilatation crosses to the right of the alert line, it is a warning that labour may be prolonged. An action line is parallel and four hours to the right of the alert line. When cervical dilatation crosses this line, action must be taken immediately.[7,8]

This study was conducted to evaluate the effect of partograph in detection of abnormal labour and associated perinatal mortality and morbidity in those patients.

Materials and Methods

This is a prospective cross sectional observational study which was carried out in the Department of Obstetrics and Gynaecology, Sher-E-Bangla Medical College Hospital, Barishal; Bangladesh over a period of one (1) year from January 2017 to December 2017. Among admitted patients 280 were enrolled in the study.

The inclusion criteria were

Term Pregnancy (completed 37 to 42 weeks) with spontaneous onset of labour
Singleton pregnancy
Vertex presentation

The exclusion criteria were

Central placenta praevia
Contracted pelvis
Previous LSCS
Malpresentation
Multiple pregnancy

A detailed history was taken according to predefined Performa. A complete general and systemic examination, per abdominal and per vaginal examination was performed and labour was diagnosed on the basis of regular intermittent painful uterine contraction, cervical dilatation, presence of show and formation of bag of membrane. Plotting on partograph was started at cervical dilation of 4 cm on alert line. Foetal monitoring was done by auscultating foetal heart sound with stethoscope immediately after uterine contraction. The level of foetal head was assessed in rule of fifths. The frequency and strength of uterine contraction were studied half an hourly in active phase and the number and strength of uterine contractions in ten minutes were recorded. Per vaginal examinations to assess cervical dilatation, moulding of the foetal head and color of the liquor were done 4 hourly or more frequently as per requirement. In some cases augmentation of labour was done by amniotomy or oxytocin or both. Maternal pulse rate was recorded every half an hour, blood pressure and temperature once every four hours or more often if indicated. Volume of urine passed and estimation of sugar, protein and acetone in it were also assessed.

Statistical analyses were performed using the STATA package version 11. The means and or percentages for the different variables were calculated.

Results

During the one year study period a total of 280 patients were included in the study. Multiple variables were studied in these participants. The study results were reproduced in various tabulated forms.

Table I: Baseline characteristics of the participants

Variable	Range	Mean ±SD
Age (years)	18 – 36	23 .4 ± 4
Primigravida	45 %	-
Multipara	55%	-
Parity	0 – 4	2 ±1. 2
Gestational age (weeks)	37 – 42	38.3 ±1.74
Temperature (^{0}C)	36.6 – 37.4	37.0 ±0. 3
Pulse (bpm)	60 – 90	76.3 ±6.7
Diastolic blood pressure (mmHg)	60 – 90	74.6 ±8.9
Systolic blood pressure (mmHg)	90 – 120	109.4 ±8.7
Number of uterine contractions /10 minutes	3 – 6	4.3 ±1.4
Urine output (ml)	400 – 600	53 6 .4 ± 76. 5
FHR (bpm)	120 – 160	140.3 ±10. 4
Time from rupture of membranes to delivery (minutes)	30 – 240	56 ±38. 5

Table 1 demonstrates the characteristics of the study participants. The average age was 23.4 ±4 years and their average parity was 2 ±1.2. Regarding the gravidity 45% of participants were primigravida. The gestational age at onset of labor ranged from 37 to 42 weeks with mean ±SD = 38.3 ±1.74. The average temperature and heart rate were 37.0 ±0.3 0C & 76.3 ±6.7 beats per minute respectively. Their average diastolic blood pressure was 74.6 ±8.9 mmHg with the average systolic blood pressure 109.4 ±8.7 mmHg. Uterine contractions had an average of 4.3 ±1.4 contractions per 10 minutes, the foetal heart rate ranged from 120 to 160 with average of 140.3 ±10.4 beats per minute. The maternal urine output ranged from 400 – 600 ml with a mean of 536.4 ±76.5 ml. The time elapsed from the rupture of membranes to the delivery ranged from 30 – 240 minutes with an average 56 ±38.5 minutes.

Table II: Characteristics of the new-born

Variable	Range	Mean ±SD
Neonatal weight (gm)	2554 – 3800	3245.7 ±316.3
Female baby	51%	-
Male baby	49%	-
Apgar score after 1 minute	5 – 8	7.1 ±1
Apgar score after 5 minutes	7 – 10	9.3 ±0.7

Regarding the neonatal outcome; table II shows the average weight of the newborn was 3245.7 ±316.3 gm and 51% of them were females and 49 % males. The average Apgar score after 1 minute and 5 minutes were 7.1 ±1 & 9.3 ±0.7 respectively.

Table III: Time is taken for delivery on active labour (Hours)

Variable	Range	Mean ±SD
Primigravida	1 – 8	4.3 ±2.5
Multipara	0.3 5 – 6	3.4 ±2. 3
All women	0.30 – 7	3.6 ±2. 4

As regard to the average time for delivery among the primigravida women on active labour was 4.3 ±2.5 hours (ranged from 1 to 8 hours), while the average time for delivery among the multiparous women on active labour was 3.4 ±2.3 hours (ranged from 35 minutes to 6 hours) (Table III).

Table IV illustrates that most of the women 215 (76.79%) in the present study had normal vaginal delivery (91 primigravida and 124 multiparous women) whereas 54 (19.28%) had Caesarean section (28 primigravida and 26 multiparous women). Thus; 72.22% and 22.22% of the primigravida women; and 76.79% and 19.28% of the multiparous women had normal vaginal delivery and Caesarean section respectively. On the other hand a total of 2.86% and 1.07% women had Ventouse & Forceps delivery.

Table IV: Distribution of study participants according to mode of delivery N=

Mood of delivery	Primigravida= 126		Multipara= 154		All women= 280	
	N	%	N	%	N	%
Normal vaginal	91	72.22	12 4	80.52	215	76.7 9
Cesarean section	28	22 .22	26	16 .88	54	19.2 8
Ventouse	5	3.97	3	1.95	8	2.8 6
Forceps	2	1.59	1	0.65	3	1.07

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Discussion

Labour can be monitored in various ways. The partograph is commonly used in developing countries to monitor labour. Partograph serves as early warning system and assist in early decision of augmentation and termination of labour. It has shown to be effective in preventing prolonged labour, in reducing operative interference, in monitoring patients with premature rupture of membrane. The partograph is a tool that enables midwives and obstetricians to record maternal and foetal observations. The WHO has recommended universal use of a partograph during labor to aid in clinical decision-making.[9] This WHO recommendation has not changed despite a 2009 Cochrane review of five randomized controlled trials (including both high- and low-resource countries) which found that using a partograph had no benefit on reducing caesarean section rates, instrumental vaginal delivery, or Apgar scores of less than seven at five minutes post-birth.[10]

In this study, the partograph was used for the management of labour, out of 280 laboring women. Among all cases 45% cases were primigravida and 55% cases were multigravida. Their average diastolic blood pressure was 74.6 ±8.9 mmHg with their average systolic blood pressure 109.4 ±8.7 mmHg. Uterine contractions had an average of 4.3 ±1.4 contractions per 10 minutes. These results is slightly similar to the finding conducted in a tertiary care hospital of Uttar Pradesh, India which used the paperless partograph for out of 91 women who participated in the study which revealed that the mean systolic BP of the participants was 124 mmHg. The mean diastolic BP of the participants was 73 mm of Hg.[11]

Regarding, the average time for delivery on active labour; the study revealed that the total mean duration for delivery on active labour was 3.6 ±2.4 hours; the average time for delivery among the multiparous women on active labour was 3.4 ±2.3 hours (ranged from 35 minutes to 6 hours). These results were nearly corresponding to the study findings conducted by Agarwal et al (2013) 11 which used the paperless partograph for the management of labour, out of 91 participants, the study revealed that the mean duration for delivery on active labour was 4.3 hours. The mean duration for delivery on active labour 4.3 ±2.5 hours in primigravida and 3.4 ±2.3 hours in multipara was similar to the WHO recommendation for partograms with a four-hour action line denoting the timing of intervention for prolonged labour.[9]

The present study exposed that the most of the women had vaginal delivery (Normal vaginal delivery: 76.79%, Ventouse delivery: 2.86 & Forceps delivery: 1.07), whereas only 19.28 % of them had caesarean section. These findings were nearly corresponding with other study which used the paperless partograph for the management of labour.[11] In patients where the partograph findings crossed the action line and in the patients who developed fetal distress, emergency caesarean section was done.

Different rate of caesarean section in various studies ([12, 13, 14]) were as per Table V.

Table V: Different rate of caesarean section in various studies.

Composite WHO partograph WorldHealth Organization,division of family health, maternal health and safe motherhood program Preventing prolonged labour: A practical guide the partograph [12]	4.5%
Mathews and Mathai, on simplified partograph Mathews JE, Rajaratnam A, George A, et al. Comparis of two World Health Organization partographs [13]	3.2%
Himali Patel1, Aartee Taraiya, H.B. Saini: Influence of partograph tracing on the management of labour [14].	30%
Present study	19.28%

The rate of caesarean sections varies widely in various studies due to reasons of varied study population, parity, labour management protocols.

Considering the neonatal outcome; all the newborn weights were within normal. The average Apgar score after 1 minute and 5 minutes are 7.1 ±1 & 9.3 ±0.7 respectively. So there was no newborn need to be admitted to the Neonatal Intensive Care Unit (NICU). This result revealed the positive effect of partographs on neonatal outcomes but this result need to be proved by other research; as minor studies focused on the effect of paperless partographs on labour outcomes, unfortunately; no one studied the effect of using it on neonatal outcomes.[11,15- 17]

Effective partograph initiatives need to be cost-effective, and intuitive, need to promote training and ongoing education, and must work within the complex set of issues contributing to staff and supply shortages in developing countries.

Conclusion

The proper use of partograph and by application of the right decision at the right time can prevent unnecessary operative intervention, and prolonged and obstructed labour to achieve the best maternal and neonatal outcome. This method should be implemented as an essential part of care in all health facilities, and used by all clinical training sites to allow trainees (doctors, nurses and midwives) to use it.

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References

1. WHO formal publication: A Document on Partograph. Partograph: A Managerial Tool for Prevention of Prolonged Labour. Part-1 2.

2. Bangladesh Maternal mortality rate - Demographics - Index-Mundi https://www.indexmundi.com/bangladesh/maternal_mortality_rate.html.

3. Uzma Syed. Newborn lives initiative. State of the World's Newborn: Bangladesh. Save the Children USA, Sept. 2001.

4. Lavender, T., Hart, A. & Smyth, R. (2008). Effect of partogram use on outcomes for women in spontaneous labour at term. Cochrane Database of Systematic Reviews. 2008 (4):CD005461.

5. Ogwang, S., Karyabakabo, Z. & Rutebemberwa, E. (2009). Assessment of partogram use during labour in Rujumbura Health Sub District, Rukungiri District, Uganda. African Health Sciences. 2009; 9(Supplement 1):27–34.

6. World Health Organization. The application of the WHO partograph in the management of labour. Report of a WHO multicenter study 1990-91. Maternal Health and safe motherhood Programme, Geneva, 1994 (WHO document WHO/FHE/MSM/94.4.

7. World Health Organization (2007). Maternal mortality in 2005. Estimates developed by WHO, UNICEF, UNFPA and the World Bank, Geneva.

8. Mitchell, K. (2010). The Paperless Partogram: The 20-Second Tool for Preventing Prolonged Labor. Accessed at 12/5/2014.

9. Banerjee, M. & Sharma, D. (2008). Maternal and Child Health Community. Solution Exchange for the Maternal and Child Health Community. Discussion Summary. Promoting Active Management of Third Stage Labour (AMTSL). Issue Date: 25 August 2008. Accessed at 1/2/2015.

10. World Health Organization (2014). Effect of partogram use on outcomes for women in spontaneous labour at term page. WHO website. Available at: http://apps.who.int/rhl/pregnancy_childbirth/ childbirth/routine _care/cd005461_ sonibl_com/en/index.html. Accessed December 30, 2014.

11. Agarwal, K., Agarwal, L., Agrawal, V., Agarwal, A. & Sharma, M. (2013). Evaluation of paperless partogram as a bedside tool in the management of labor. J Fam Med Primary Care 2013; 2:47-49.

12. Composite WHO partograph, World health organization, division of family health, maternal health and safe motherhood programme. Preventing prolonged labour: A practical guide the partograph 12. Part II: User's manual. 1994; WHO/FHE/MSM/93.9.

13. Mathews and Mathai, on simplified partograph Mathews JE, Rajaratnam A, George A, et al. Comparison of two world health organization partographs. Int J Gynaecol Obstet., 2007; 96: 147-150.

14. Patel H, Taraiya A, Saini HB. Influence of partograph tracing on management of labour. IAIM, 2016; 3(12): 55-58.

15. Debdas, A. (2008). Paperless partogram. 41st Annual Scientific Sessions: Sri Lanka College of Obstetrics and Gynaecologists. SLJOG Vol. 30. 2008; 1:124.

16. Elizabeth, A. (2010). The Paperless Partogram: A Simplified Tool to Prevent Prolonged Labor. Available from: http://www. Healthynewbornnetwork. org/blog/paperless-partogram simplified- tool-prevent-prolonged-labor. Accessed at 12/5/2014.

17. Mitchell, K. (2010). The Paperless Partogram: The 20-Second Tool for Preventing Prolonged Labor. Accessed at 12/5/2014.