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Obstetrics

The Study of Course of Labor Using Modified WHO Partograph

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Original Research Article

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Abstract: The modified WHO partograph is an inexpensive but valuable tool that provides a continuous pictorial overview of progress of labor. It helps to detect the abnormal progress of labor. It helps the obstetrician to decide about the need for augmentation of labor and helps to recognize prolong labor before obstruction occurs. The objectives were to study the course of labor in normal and abnormal partograph and to evaluate the maternal and perinatal outcome in normal and abnormal partograph. A prospective hospital based observational study of 400 selected cases coming for delivery during June 2016 to May 2017 was done. Progress of Labor was assessed by the use of Modified WHO Partograph. Various parameters like duration of normal and abnormal labor, type of labor abnormalities, mode of delivery, need for augmentation and maternal and perinatal outcome in normal and abnormal partograph were studied. In our study women with normal partograph mostly delivered normal vaginally, less instrumental and caesarean delivery, less required of augmentation of labor, less duration of labor, better maternal and perinatal outcomes as compared to women with abnormal partograph. Routine use of partograph helps in early detection of abnormal course of labor. It assures the best possible maternal and perinatal outcome .It is suggested that every woman in labour must be benefitted by this scientific approach of labor management i.e. with the use of Modified WHO partograph.
Keywords: WHO Modified partograph, Duration of active phase of labor, Labor abnormalities, maternal morbidity, Neonatal morbidity.

INTRODUCTION

Partograph is a graphic record of progress of labor and maternal and fetal condition during labor in a single sheet of paper which is useful in detecting the labour that is not progressing normally at an early stage and helpful in its management. The Partograph graphically represents key events in labor and provides an early warning system. The World Health Organization Partographs are the best-known Partographs in the low-resource setting. Partographs when used with defined management protocols is an inexpensive tool which can effectively monitor labor and be helpful in reducing incidence of both maternal and fetal morbidity and mortality by reducing the number of operative interventions, prolonged labor, obstructed labor and caesarean section [1]**.**
The present study was carried out with the following objectives-

PRIMARY OBJECTIVES

To evaluate the maternal and perinatal outcome by using WHO modified partograph

SECONDARY OBJECTIVE

Early diagnosis of abnormal pattern of labor like primary dysfunctional labor, protracted dilatation, arrest of descent and arrest of dilatation. To establish the predictive value of partograph in management of labor in term of numbers of NVD, numbers of assisted deliveries, numbers of LSCS.

MATERIALS AND METHODS

The prospective observational study was carried out in a Govt. Multispeciality hospital Chandigarh over a period of 1 years i.e. from june 2016 to August may 2107. 400 cases admitted to labour room were selected according to inclusion and exclusion criteria and monitored by using "Modified WHO Partograph."All 400 cases (primigravida) reporting to labour room with full term singleton pregnancy with vertex presentation, without any obvious risk factors and those who were suitable for vaginal delivery, on initial examination were included in the study.

Case Selection criteria

A.Inclusion Criteria

Consecutive women with live fetus aged

between 20-35 years presenting to department of Obstetrics & gynaecology, while in active phase of labor or those goes in to labor spontaneously while in the unit, were screened for enrollment.

- Primigravida women with spontaneous conception.
- Cephalic Presentation.
- Singleton pregnancy.
- Gestational age between 38-41Weeks.

B.Exclusion Criteria

- Age <20 years & >35 years.
- Multigravida.
- Gestational age less than 38 weeks and more than 41weeks.
- Malpresentation.
- Pregnancy with APH.
- Pregnancy with gross CPD, hydramnios, prematurity, PROM, IUGR, IUD, multiple pregnancy, contracted pelvis.
- Pregnancy with associated systematic diseases known to have effect upon course of labor like DM, heart diseases, asthma, hypertension , immune compromised status, severe anemia (Hb less than 6gm/dl) excluded.

The study group is divided into 2 groups as follows. Group I: Cervix dilatation and descent curve falling to the left of alert line (normal partograph): and group II: Cervix dilatation and descent curve falling to the right of alert line indicate dysfunctional labor (abnormal partograph). Patients were monitored in the labor room and progress of labor and the vital information were recorded in the WHO modified partograph.

Graphical recording were started when patient entered in active phase spontaneously i.e. when cervix is 4cm or more dilated. Per vaginal examination was performed at the time of admission to know the pelvic size, bishop score. Cervical finding was assessed 2 hourly by doing vaginal examination. Presence or absence of membrane, color of liquor, descent of the head and moulding of fetal skull were also recorded. Intensity and duration of uterine contraction were noted half hourly, FHS recorded with the help of stethoscope, half hourly and monitored more frequently if found abnormal.

Maternal blood pressure and temperature were recorded 2 hourly. Pulse was recorded half hourly. Urine examination for volume and protein (albumin) were carried out and recorded. Any medications and fluid intake given, also noted.

The time of start of recording partograh was taken as 0 time. Alert and action line were made to assess progress of labor with four hours difference. Progress of labor labeled normal if the plotting of cervical dilatation remained on the alert line or to the left of it.

The augmentation was decided according to the Bishop score, strength and duration of uterine contraction. Augmentation was done either with surgical method, that is amniotomy or with medical method, by using oxytocin. The augmentation was done with oxytocin infusion, whenever hypotonic uterine inertia would be diagnosed as the cause of delay in the progress of labor. Oxytocin infusion were expressed in terms of milliunit per minute .The drip was regulated by manually, counting the drop per minute. Oxytocin infusion was started with low dose 1-2mu/min & escalates by 1-2mu/min at every 30 min intervals up to 8mu/min. Dose was titrated against the uterine contractions aimed for maximum of 3-4 contraction every ten minutes lasting for 40-50 seconds. Adequate contractions were achieved up to the maximum dose of 16 mu/min. Maximum dose was not exceeded beyond the 32 mu/min. as a policy of active management of labor, ARM done at or beyond 5cm dilatation of cervix, even when course of labor is normal.

Partographs were maintained. Analgesia (buscopan/tramadol) was given whenever needed. Intramusculer inj.Drotin / epidosin were given to enhance the cervical dilatation in the active phase of labor. A maximum of 3 injections were given at an interval of half hour. Outlet forceps or vaccum were applied for prolonged second stage of labor (equal or more than 2 hours) & fetal distress. Caesarean section was performed whenever indicated (fetal distress, arrest of dilatation & descent, failed instrumental delivery).

Labor parameters like meconium staining of liquor, fetal heart rate abnormalities, need for augmentation of labor, duration of total labor, criteria for intervention if any and need for instrumental delivery or caesarean section were studied.

Maternal outcomes were analyzed by studying various parameters like mode of delivery, puerperal sepsis, postpartum haemorrhage, need for blood transfusion, tear (cervical, vagina & perineal), and maternal mortality.

The perinatal outcomes were analyzed by studying various parameters like condition of baby at birth (live birth/still birth), Apgar score at 1min and 5min, admission in neonatal intensive care unit.

Duration of labor in hours and mode of delivery (spontaneous vaginal, instrumental vaginal delivery or cesarean section) in relation to normal and abnormal partograph were noted.

RESULTS

The study group is divided into 2 groups as follows. Group I: Cervix dilatation and descent curve falling to the left of alert line (normal partograph); and group II: Cervix dilatation and descent curve falling to the right of alert line indicates dysfunctional labor (abnormal partograph). Patients were monitored in the labor room and progress of labor and the vital information were recorded in the WHO modified partograph. Graphical recording were started when patient entered in active phase spontaneously i.e. when cervix is 4cm or more dilated.

- Out of 400 study women, 320 (80%) women had normal partograph patterns, 80 (20%) had abnormal partograph patterns.
- The mean age of women of the normal partograph was 25.39 year with standard deviation of 3.347. The mean age of women of the abnormal partograph was 24.8 year with SD of 2.817. The difference in mean age in normal and abnormal partograph is not statistically significant (p value-0.145)
- The POG of women recruited in the study ranged between 38 to 41week. The mean POG of women of the normal partograph was 39.34 weeks with SD of 0.85. The mean POG of women of the abnormal partograph was 39.38 weeks with SD of 0.88. The difference in mean POG in normal and abnormal partograph is not statistically significant (p value-0.765).
- The mean duration of active phase was 3.97±0.69 hr, 5.98±1.67hr in normal and abnormal partograph respectively. The 2^{nd} stage duration was 0.85±1.65 hr, 1.35±0.64 hr in normal and abnormal partograph respectively. The difference in mean duration of active phase and 2^{nd} stage of labor in normal and abnormal partograph is statistically significant (p value <.01)
- In normal partograph 273 women (84.1%) did not require augmentation of labor, 47 women (14.7%) required augmentation of labor like amniotomy and oxytocin infusion. in abnormal partograph 21women (26.3%) did not require augmentation of labor, 59 women (73.8%) required augmentation of labor .The difference in augmentation of labor in normal and abnormal partograph is also statistically significant (p value-0.000).
- The mode of delivery in normal partograph are NVD, forceps, vaccum, and caesarean which are 306(95.6%), 2(.63%), 2(0.63%) and 10(3.1%) respectively. The mode of delivery in abnormal partograph are NVD, forceps, vaccum and caesarean which are 14(17.5%), 16(20%), 8(10%) and 42 (52.5%) respectively. The difference in mode of delivery in normal and abnormal partograph is also statistically significant.(p value-<0.01)
- The indication for instrumental and caesarean delivery in normal partograph is fetal distress (4.3%).
- The indications for instrumental and caesarean delivery in abnormal partograph are fetal distress (13.75%), protracted dilatation 14(17.5%), arrest of descent40 (50%) and arrest of dilatation15 (18.75%). The mode of delivery in arrest of descent is forceps, vaccum & caesarean delivery which are 20%, 17.5% & 62.5% respectively and mode of delivery in arrest of dilatation is vaccum & caesarean delivery which are 6.6% & 93.3% respectively. All women with protracted dilatation (17.5%) delivered normal vaginally.
- The maternal outcomes in normal partograph in terms of PPH, need for BT, trauma (cervical & vaginal tear) and puerperal sepsis are 3.80%, 1.90%, 2.5% and1.6% respectively. The maternal outcomes in abnormal partograph in terms of PPH, need for BT, trauma (cervical & vaginal tear) and puerperal sepsis are 22.50%, 12.50%, 6.30% and 13.75% respectively. The difference in maternal outcomes in normal and abnormal is also statistically significant (p value<0.01).
- The APGAR score at 1 min (more than 7) in normal and abnormal partograph is 94%, 73.80% respectively. The APGAR score at 1 min (less than 8) in normal and abnormal partograph is 5.60%, 26.30% respectively. The difference in APGAR score at 1 min less than 8 in normal and abnormal partograph is also statistically significant(p value<0.01)
- The APGAR score at 5 min (more than 7) in normal and abnormal partograph is 95.60%, 78.80% respectively. The APGAR score at 5 min (less than 8) in normal and abnormal partograph is 4.40%, 21.30% respectively. The difference in APGAR score at 5min (less than 8) in normal and abnormal partograph is also statistically significant(p value<0.01).
- The percent of neonates in NICU admission in normal and abnormal partograph are 10.90%, 40.10% respectively. The reason for NICU admission in normal partograph are MSL, asphyxia, delayed cry and LBW which are 2.50%, 3.10%, 3.40% and 1.90% respectively. The reason for NICU admission in abnormal partograph are MSL, asphyxia, delayed cry and LBW which are 10.0%, 16.30%, 10.0% and 3.8% respectively. The difference in NICU admission of neonates in normal and abnormal partograph is also statistically significant (p value<0.01).

Table-1: Result At A Glance (Maternal Outcomes in Normal and Abnormal Partograph)

MATERNAL MORBIDITY	NORMAL PARTOGRAPH (N=320)	ABNORMAL PARTOGRAPH (N=80)	p value
1.POSTPARTUM HEMORRHAGE	12 (3.8%)	18 (22.5%)	0.000
2. NEED FOR BLOOD TRANSFUSION	6 (1.9%)	10 (12.5%)	0.000
3.TEAR CERVICAL- VAGINAL-	 5 (1.6%) 3 (0.9%)	 3 (3.8%) 2 (2.5%)	 <0.05 <0.05
4.PUERPERAL SEPSIS	5(1.6%)	10(13.75%)	<0.05

NEONATAL OUTCOMES	NORMAL PARTOGRAPH (N=320)	ABNORMAL PARTOGRAPH (N=80)	p VALUE
1. APGAR SCORE- AT 1 MIN >7 <8 AT 5 MIN >7 <8	 302(94.4%) 18(5.6%) 306(95.6%) 14(4.4%)	 59(73.8%) 21(26.3%) 63(78.8%) 17(21.3%)	 0.002 0.001
2.NICU ADMISSION- A. MSL B. ASPHYXIA C. DELAY CRY D. LBW	 8(2.5%) 10(3.11%) 11(3.4%) 6(1.9%)	 8 (10%) 13 (16.3%) 8 (10%) 3 (3.8%)	
TOTAL	34 (10.9%)	32 (30.1%)	<0.05

DISCUSSION

In majority of cases, labour is a natural phenomenon occurring spontaneously; a few develop dystocia and result in prolonged labour. Hence it is essential to detect them and deliver by appropriate intervention. Partograph is a simple and efficient method of preventing prolonged labour and its complications, especially in developing countries. The partograph initially introduced by Philpott and endorsed by WHO is a simple and accurate instrument for early recognition of abnormal labour.

Active management of labour advocates early recognition of non-progressive labour. This can be done by using a partograph or graphical depiction of a labour curve.

In the prospective study conducted at Govt multispeciality Hospital, 16 sectors Chandigarh, 400 primigravida with active labour were analysed by modified WHO partograph and its effects on maternal and neonatal outcome were studied.

Cases admitted to labor room were selected according to the inclusion criteria and monitored by using modified WHO partograph. The study was done after receiving the approval of institutional ethical committee. Detailed history of past medical and present pregnancy was taken of all admitted patients and detailed general, systemic including per abdominal, per vaginal examination done.

Normal and abnormal partograph

In our study, 320 women out of 400 delivered with normal Partograph pattern in which progression of labor occurred left to alert line on partograph 306(95.6%) of women had normal vaginal delivery, 2 (0.63%) had forceps delivery, 2 (0.63%) had vaccum extraction and 10(3.1%) underwent caesarean delivery. 80(20%) women had abnormal labor pattern on partograph right to alert line. Out of 80(20%) with abnormal partograph, 14 women (17.5%) had normal vaginal delivery and rest are delivered with the help of forceps 16(20%) , vaccum extraction 8(10%) and caesarean42 (52.5%).

Table-2: Distribution of patients in relation to normal and partograph pattern in different studies

	NORMAL PARTOGRAPH	ABNORMAL PARTOGRAPH
Present study	80%	20%
Pneumadu study *et al.*[2]	67.2%	22.8%
Lakshmidevi study *et al.*[3]	66.5%	23.5%
Sanyal study *et al.*[4]	80.8%	19.2%
Shinde study *et al.*[5]	81%	19%

In our study, majority of women belong to normal partograph group as compared to abnormal partograph. Percent of women in normal and abnormal partograph are also comparable with the results of above mentioned studies.

Age and POG distribution

In the study, the age of women recruited in the study ranged between 20 to 35 years. The mean age of women of the normal Partograph was 25.39 year. The mean age of women of the abnormal partograph was 24.8 year. The difference in mean age in normal and abnormal partograph was also not statistically significant (p value-0.145).

In the study by fareeha and shazia shukar *et al*.[6] on 100 primigravida in karachi, the mean age of women in the study group was 25.39 years. In similar study by surekha Tayade [7] in Maharashtra on 100 women, the mean age of women in study group was 24.10 years.

In the present study, the POG of women recruited in the study ranged between38 to 41week. The mean POG of women of the normal partograph was 39.34 weeks. The mean POG of women of the abnormal partograph was 39.38 weeks. The difference in mean POG in normal and abnormal partograph is also not statistically significant (p value-0.765).

In the study by kunnal K Shinde *et al*.[5] on 100 women in Maharashtra, the POG of women ranged between 37 to 41 week.

Requirement of augmentation of labor in normal and abnormal partograph

In our study, in normal partograph 273 women (84.1%) did not require augmentation of labor, 47 women (14.7%) required augmentation of labor like amniotomy and oxytocin infusion , in abnormal partograph 21women (26.3%) did not require augmentation of labor, 59 women (73.8%) required augmentation of labor like amniotomy and oxytocin infusion. In present study more percent of women required augmentation of labor in abnormal partograph as compared to normal partograph. The difference in augmentation of labor in normal and abnormal partograph is also statistically significant (p value-0.000).

Table-3: Requirement Of Augmentation Of Labor

	REQUIREMENT OF AUGMENTATION OF LABOR	
	NORMAL PARTOGRAPH	ABNORMAL PARTOGRAPH
Present study	14.70%	73.80%
Kavitha G study et al[8]	13%	72%
Lakhshmi study et al[3]	15.8%	91%
Pneumadu study et al[2]	26.2%	76.8%

In kavitha G. pujar study *et al*. [8], Labour was accelerated with oxytocin in majority of cases in group II(dysfunctional labor) i.e 13 (72%) than in group I(left to alert line).

In lakhshmidevi study *et al*. [3], 15.8% women with normal partograph required augmentation of labor where as 91% women required augmentation of labor in abnormal partograph.

In pneumadu study *et al*. [3,4], 26.2% women with normal partograph required augmentation of labor where as in abnormal partograph 76.8% required augmentation of labor.

In our study, Percentage of women who required augmentation of labor in normal and abnormal partograph is also comparable of results of above mentioned studies. More augmentation of labor required in abnormal partograph as compared to normal partograph in both present and above mentioned study.

The mean duration of active labor and 2nd stage in normal and abnormal partograph

In the present study,In normal partograph mean duration of active phase was 3.95 hr. The mean duration of 2nd stage of labor was 0.850 hr. In abnormal partograph mean duration of active phase was 5.9 hr, the mean duration of 2nd stage of labor was 1.35hr. The difference in mean duration of active phase and 2nd stage of labor in normal and abnormal partograph is also statistically significant (p value <.01)

Table-4: The mean duration of active labor and 2nd stage in normal and abnormal partograph

	NORMAL PARTOGRAPH		ABNORMAL PARTOGRAPH	
	DURATION OF ACTIVE PHASE OF LABOR(HRS)	DURATION OF 2ND STAGE(min)	DURATION OFACTIVE PHASE OF LABOR(hrs)	DURATION OF 2ND STAGE OF LABOR(min)
Present study	3.95hr	85min	5.9hrs	95min
Shinde *et al.*[5]	4.02hrs	42mins	7.16hrs	92min
Kavith G *et al.*[8]	4.75hrs	45.58min	7.74hrs	85min

In study done by Shinde *et al.*[5], the duration of active phase of labour was 4.02 hours and 7.16 hours in cases with normal and abnormal labour patterns respectively. The duration of second stage of labour was 42 minutes and 92 minutes in cases with normal and abnormal labour patterns respectively. Similar results found in kavitha G. pujar *et al.* [8], the mean duration of active phase of labour was 4.75 hours in group I(left to alert line) and 7.74 hours in group II(right to alert line) and mean duration of 2nd stage of labor was 45.58min in group 1(left to alert line) and 85min in group 2(right to alert line). Present study is also comparable with studies done by Zhang *et al.*[9] and Lakshmidevi *et al.* [3]. The average first and second stage duration reported by various authors was 7hrs and 45 minutes respectively [10-14].

In present study mean duration of active phase and 2nd stage of labor in normal and abnormal partograph is also comparable with the results of above mentioned studies. There is prolonged duration of active phase and 2nd stage of labor in abnormal partograph as compared to normal partograph

Table-5: Distribution of patients in relation to mode of delivery in normal and partograph pattern in different studies

	NORMAL PARTOGRAPH			ABNORMAL PARTOGRAPH		
	NVD	INSTRUMENTAL	CS	NVD	INSTRUMENTAL	CS
Present study	95.6%	1.3%	3.1%	17.5%	30%	52.5%
Kavitha *et al.*[8]	63%	34%	2%	55%	23%	22%
Pneumadu *et al.*[2]	87.5%	0.6%	11.9%	41.4%	10.9%	47.5%
Lakhshmidevi *et al.*[3]	97.3%	0%	2.3%	48%	27%	20%
Shinde *et al.*[5]	96%	1.25%	2.4%	42%	16%	42%

In present study, Out of 320 women with normal partograph 306 (95.6%) women delivered by normal vaginal delivery, 4 (1.3%) delivered by instrumental and 10 (3.1%) women delivered by caesarean. Out of 80 women with abnormal partograph 16 (20%) delivered by forceps delivery, 8 (10%) women delivered by vaccum extraction and 42 (52.5%) women delivered by caesarean delivery.

In kavitha G pujar study *et al.*[8] , in normal partograph (left to alert line) 63% had vaginal delivery, 34% delivered by instrumental delivery and 2% underwent caesrean delivery and in abnormal partograph (right to alert line) 55% had vaginal delivery, 23% delivered by instrumental delivery and 22% underwent caesarean delivery.

In pneumadu study *et al.* [2], in normal partograph (left to alert line)87.5 % had vaginal delivery, 0.6% delivered by instrumental delivery and 2.4% underwent caesrean delivery and in abnormal partograph (right to alert line) 41.4% had vaginal delivery, 10.9% delivered by instrumental delivery and 47.5% underwent caesarean delivery.

Results of all these above mentioned studies were almost comparable with the result of present study. In present study more percentage of instrumental and caesarean delivery occurred in abnormal partograph as compared to normal partograph. The mode of delivery in normal and abnormal partograph is also statistically significant (p value<0.05). In the present study, the results of mode of delivery in normal and abnormal partograph are also comparable with above mentioned studies.

In present study, out of 80(20%) with abnormal partograph, 14(17.5%) cases of protracted dilatation delivered normal vaginally after augmentation of labor. Of the 40(50%) cases of arrest of descent, 8 (20%) delivered by forceps, 7(17.5%) had Vaccum extraction and 25(62.5%) underwent caesarean section. Out of 15(18.75%) cases of arrest of dilatation, 1(6.6%) delivered by vaccum extraction and 14(93.3%) delivered by caesarean.

In shinde *et al.* study [5], abnormal labour pattern was observed in 15 % of cases. Arrest of descent (46.66 %), protracted descent (26.66 %) and failure of descent (20%) were the commonest abnormalities found. Out of 15% cases that had abnormal labour pattern, 10% had undergone caesarean

section, 4% were delivered by instrumental delivery and one had normal vaginal delivery.

Maternal outcomes in normal and abnormal partograph

In the present study, the maternal morbidity was evaluated in relation to the type of partograph. The morbidity related to blood loss, need for BT ,trauma and puerperal sepsis was more in abnormal partograph as compared to normal partograph. The morbidity was 9.69 % in cases having normal partograph pattern whereas, it was 53.75 % in cases with abnormal partograph pattern. Morbidity was mainly related to blood loss, blood transfusion, and cervical & vaginal tear, puerperal sepsis (fever, wound complication and others). Out of 320 women with normal partograph, 12(3.8%) had postpartum hemoorhage. Out of 80 women with abnormal partograph 18(22.5%) had PPH. Out of 320 women with normal partograph 6(1.9%) required the need for BT. Out of 80 women with abnormal partograph 10(12.5%) required BT. out of 320 women with normal partograph 8 (2.5%) women had tear (cervical & vaginal). Out of 80 women with abnormal partograph 5(6.3%) women had torn. Out of 320 women with normal partograph, fever occurred in 3(0.93%) women and wound infection occurred in only 2(0.63%) women. Out of 80 with abnormal partograph, fever occurred in 6(7.5%) women and wound infection occurred in 5(6.25%) women. Thus, it was more in cases, who had abnormal partograph and needed interventions.

The similar results found in study done by kunaal K Shinde *et al*. [5], the maternal morbidity was evaluated in relation to the type of labour. The morbidity was 3.52 % in cases having normal labour pattern whereas, it was 53.33 % in cases with abnormal labour pattern. Morbidity was mainly related to infection, blood loss and wound sepsis.

Sanyal *et al*. study [4] also shows that postpartum hemorrhage occurred in 1.5% in normal labour and no one required blood transfusion. Postpartum hemorrhage was significantly greater in abnormal labour i.e. 8(8.3%) and 4 (50%) out of the 8 cases needed blood transfusion. Fever occurred in 1% cases of normal labour and 6.2% cases of abnormal labour. Wound complications were also more in abnormal labour. Thus, present study results also comparable with above mentioned studies. There were no cases of puerperal sepsis or maternal death and severe maternal complications were successfully averted.

Neonatal outcomes in normal and abnormal partograph

The incidence of neonatal morbidity was also more in women with abnormal course of partograph than with normal course of partograph. Babies born following normal course of partograph had milder form of asphyxia as compared to those born following abnormal course. There were no fresh still births in the present study due to routine use of partograph and by early detection of abnormal pattern of labour and its consequences and proper interference in time.

In present study 40.1% of babies required neonatal intensive care unit (NICU) admission in cases of abnormal pattern of partograph and 10.9 % in cases of normal pattern. Majority babies recovered completely before discharge from hospital. out of total 320 neonates with normal partograph 8 (2.5%) neonates had NICU admission due to MSL, 10(3.1%) neonates had NICU admission due to asphyxia , 11(3.4%) neonates had NICU admission due to delayed cry and 6 (1.9%) due to LBW. Out of 80 (20%) with abnormal partograph 8(10%) neonates had NICU admission due to MSL, 13(16.3%) neonates had NICU admission due to asphyxia, 8(10%) neonates had NICU admission due to delayed cry and 3(3.8%) neonates had NICU admission due to LBW.

Javed *et al*. study [15] reports that before introduction of partograph, 48 (9.6%) babies needed resuscitation with Apgar score less than 6. This need for resuscitation dropped to 21 (4.2%) in those delivering with partographic monitoring. Two fresh stillbirths and 7 neonatal deaths occurred in non partograph group and there were two fresh stillbirths in partograph group. Sanyal *et al*. study [4] evident that 44.8% of babies required neonatal intensive care unit (NICU) admission in cases of abnormal pattern of labour and 12.6 % in cases of normal pattern. Majority babies recovered completely before discharge from hospital. Neonatal mortality in the study group was 2.4%, eight in cases of abnormal pattern and four in cases of normal pattern of labour. Neonatal mortality was reduced by early detection of dystocia and timely intervention.

In present study, APGAR < 8 and cry after resuscitation were proportionately more in abnormal partograph than in normal partograph. Most babies (94.4%) in normal partograph had spontaneous cry and APGAR ≥8 at 1 minute. Most babies (95.6%) in normal partograph had APGAR ≥ 8 at 5 minute. Most babies (73.8%) in abnormal partograph had spontaneous cry and APGAR ≥ 8 at 1 minute. Most babies (78.8%) in abnormal partograph had APGAR ≥ 8 at 5 minute. In kavya study *et al*. study [2] 2015, there was no difference of mean birth weight between the three partogram groups. APGAR <7 and cry after resuscitation were proportionately more in Group B and C (right to alert line) than in group A (left to alert line). Most babies (92.4%) in all three groups had spontaneous cry and APGAR ≥7 at 1 minute and 5 minute. There were no neonatal deaths. In a similar study by Sharmin *et al*. [16] 2005 on 232 patients NICU care was required in 7 (3%) of the infants, cry after resuscitation was seen in 30 (12.9%) neonates,

Spontaneous cry seen in 195 (84.1%).

Thus, present study results also comparable with above mentioned studies. APGAR score less than 8 is more in abnormal partograph as compared to normal partograph. There was also no still birth and neonatal and mortality.

CONCLUSION

The WHO modified partograph is highly effective in reducing both maternal and neonatal morbidity. It aids in assessing the progress of labour and to identify when intervention is necessary. It is effective in preventing prolonged labour, obstructed labour, reducing operative intervention and improving maternal outcome (PPH/need for BT/Trauma/puerperal sepsis) & neonatal outcome (APGAR score at 1 and 5 min and NICU admission).

Duration of active phase and 2nd stage of labour is the main indicator for delayed progress of labor which in turn reflects the mode of delivery and need for augmentation of labour and helps in making an early decision for timing the necessary intervention and early intervention prevent maternal morbidities like PPH, need for BT, tears & puerperal sepsis and improve neonatal outcomes (APGAR score at 1min and 5 min and NICU admission).

In this study, mean duration of active phase and 2nd stage of labour increased as the partographic curve fell to the right of alert line (abnormal partograph). Women with abnormal partograph required more augmentation of labor due to prolonged duration of active phase and 2nd stage of labor & abnormal labor like protracted dilatation, arrest of dilatation and arrest of descent. The incidence of maternal morbidities (PPH, need for BT, trauma & puerperal sepsis) is more in women with abnormal partograph as compared to normal partograph. The incidence of poor neonatal outcome (low APGAR score at 1min and 5 min and NICU admission) is also more in neonates with abnormal partograph as compared to neonates with normal partograph.

Our study has shown that though the partogram is an old tool it still remains gold standard even for modern obstetric care.

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