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# Partograph versus no partograph: effect on labour progress and delivery outcome: a comparative study

**1-Dr. Fatma Abdulla Emtawel**

**2-Prof.Musa .O. Busarira**

1,2-Assistant Lecturer, Department of Obstetrics and Gynecology, Faculty of Medicine, University of Benghazi, Libya

Fatma.emtawel@uob.edu.ly

**3- ZMA Sulayman Alhasy**

3-Department of Anatomy and Embryology, Faculty of Medicine, Omar Almoktar University, Libya

Zakiaalhasy01@gmail.com

**Abstract:**

Background:Worldwide, more than a million women between the ages of 15 and 49 years die each year from complicationsof pregnancy and childbirth. The use of partograph(or labour chart) to monitor the progress of labour is one of the globally recognized tools for reducing maternal mortality.

Aim:To evaluate the effect of use of Partograph on progress of labour and on delivery outcome.

Methodology: Prospective randomized comparative study.Thestudywas conductedin the Department of Obstetrics and Gynecology, Benghazi Medical Center,From1st ofAprilto30th ofJune2020.Pregnantwomenwererandomlyassignedto two groups, of 200 each,after satisfying the inclusionand exclusion criteria.

Results: Use of partograph significantly reduced the totalduration oflabour (active phase duration and second stage duration )p-value =0.0001.Augmentation of labour by Oxytocin and ARM were slightly reduced in group one (p value = 0.059). Inthepresentstudynormal vaginal deliverywasrecorded in96%offirstgroupand 93% of second group, C/S done to 4% of 1st group and 7% of 2nd group , this difference was not statistically significant p value was 0.273.Neonatal out comes were better in partograph group . Mean fetal heart record was more in 1st gr o u p ( pvalue = 0.0001).

RecommendationThe use of partograph is actually required to get a healthy mother and a healthy baby ,and in early identification of slow progress in labour ,so use of partograph should be included as an essential pre-requisite while conducting deliveries in all labour wards.

Key words :partograph, progress of labour , Apgar score.

**Introduction:**

Worldwide, more than a million women between the ages of 15 and 49 years die each year from complications of pregnancy and child birth. About 500,000 women die annually with a huge number left with injury as a result of pregnancy related causes ( World Health Organization; 2007).' For each maternal death more women suffer serious complications.

Unfortunately, developing countries disproportionately bear this burden despite global attention and efforts. Poor outcome during labour accounts for about 19% of maternal deaths in these countries. Maternal mortality remains between 500-1000 deaths per 100,000 live births in developing countries (Opiah MM, 2012).

Although the maternal mortality ratio (MMR) has dropped by approximately 45% in the last two decades, around 300,000 women continue to die each year globally due toavoidable pregnancy related complications ( World Health Organization; 2014). . Obstructed labour is a leading cause of maternal and neonatal mortality, especially in developing countries(Harrison MS, Asibong U, Mathai M.)

Globally, it is estimated that obstructed labour occurs in 5% of pregnancies and accounts for an estimated 8% of maternal deaths (Mathai M., Kayiga H,Kabakyenga JK ).
Obstructed labour may result in serious complications such as obstetric fistula, uterine rupture,puerperal sepsis and postpartum haemorrhage( Mukasa PK et all ,Kushwah B et all )

Evidencepointstoa44%declineintheglobalmaternalmortalityrate,from385to216deathsper100000livebirthsbetween1990and2015(WHO, 2015).[12]This significant achievementisattributed inpart totheuseofthePartogram toimprovelabourmanagement.TheSafeMotherhoodInitiativeconcludedthatuseofthePartogram reduced maternal and foetal morbidity and mortality, especially in under-resourced countries(Mathibe-Neke JM,2009, HealthTech USAID, Yisma E 2014).

The partogram is a graphical representation of the events in labour. As part of the Safe Motherhood Initiative launched in 1987, the World Health Organization (WHO) hasproduced, promoted, modified thepartogram andrecommends itsuse in labour in order to improve labour management and reduce maternal and fetal morbidity and mortality. Partogram use in the active management of labour has been reported to reduce the occurrence of prolonged labour and need forcaesarean section (Okusanya BO et al, 2018).

Thepartograph isapre-printed paperwithavisual/graphicalrepresentationof observationsmadeonawomanandfoetusduringthecourseoflabour.Theobservationsarecomprisedoftheprogressoflabour,maternalvitalsignsand foetalheartcondition.Theseobservations aredisplayed onthepartographforeasy andquickreviewofon-goinglabourandtimingofmanagementdecisions.The partographisusedasatoolforriskassessmentandiseffectiveindetecting abnormal labour during the first stage of labour. When used correctly, the partographhelpstoidentifyproblemsandinterventionscanbetimelyinitiated thereby preventing morbidity and mortality(WHO,jhpiego,

A World Health Organization (WHO) study in South East Asia involving 35,484women foundthatusingapartograph contributed toreduced (a)prolonged labourfrom6.4%to3.4%,(b)needforaugmentationoflabourwithoxytocinfrom20.7%to9.1%,(c)occurrenceofcaesarean sectionsfrom9.9%to8.3%, and(d) intrapartum stillbirths from 0.5% to 0.3%. Based on these findings, in 1994, the WHO declared universal use of the partograph in all settings in monitoring labour to help identify abnormal progress and provide timely intervention when required(Mandiwa et al 2017).

History of the partograph The partograph use dates back to the 1950s. It was developed by Friedman, an obstetrician, who had used it to monitor cervical dilation and called it the cervicograph (Friedman EA,1955).

In 1972; Philpott further developed the cervicograph into the partograph which became a practical tool for recording all intrapartum observations in addition to cervical dilation. In Philpott's partograph, he designed alert and action lines which helped to capture prolonged labour. (Philpott RH; Castle WM, 1972)In 1988, Safe Motherhood Initiative launched the use of partograph as an international standard practical tool to monitor labour and prevent prolonged labour. In 1994, WHO extensively tested its efficacy and established its scientific basisandrationale foritsuseinprevention ofprolonged labor(Lancet;1994). Itsusereduces the incidence of prolonged/ obstructed labour and can also detect foetal heart abnormalities which can result in intrapartum foetal hypoxia. In 1994 WHO declareduniversalapplicationof the partographin all settings.

**Aim:**ToevaluatetheeffectofuseofPartographonprogressoflabourandondeliveryoutcome.

**Methodology:**

Typeofthestudy:**Prospectiverandomizedcomparativestudy.**

Place:**DepartmentofObstetrics and andGynaecology, Benghazi Medical Center.**

Durationofthestudy:From**1stofAprilto30thbofJune 2020.**

Patients: Pregnant women were randomly assigned totwogroups, of200each, aftersatisfying theinclusion andexclusion criteria. Women assigned toGroup1 hadtheiractivelabourusingpartograph whereasthoseassignedtoGroup2were not monitored using the partograph.

**Inclusioncriteria:**Age**:**18yearsandabove, Gestationalage:37-42weeks,Singleviablepregnancy,Cephalic presentation, Cervicaldilatation4cmorbeyond.

**Exclusioncriteria:** Non-cephalicpresentation,uterinescar and other contraindications for vaginal delivery.

Patients who satisfied the inclusion criteria and had given their consent tobe includedintothestudywere randomlyallottedeitherinto,Group1:Patientswho were tobe monitored in the active phase oflabour using Partograph.Group2:PatientswhoseactivelabourwasnotmonitoredusingPartograph, Allthepatients wereroutinelyexamined anddetailedhistorywastaken asperthe prepared proforma. Patients fulfilling the inclusion criteria, after being admitted werequestionedandthoroughlyexaminedwithpre-designedpre-testedproforma. General, systemic and obstetric examinations were done.

Per-abdominalexamination:heightofuterus,presentation,engagementandfetal heart rate were noted.

Per-vaginalexamination:presentation,position,engagement,cervicaldilatation, Effacement, station, status of membranes, color of liquor (if membrane were absent), adequacy of pelvis was done.Wheninactivelabour,thedetailsoflabourandotherrelevantdetailswere recorded on the Partograph in group1.Durationofactivephase,Durationsecondstage,Totaldurationoflabour,Needforaugmentation (ARMandoxytocin),Modeoftermination and intervention required, Apgar score at birth, NICU admissions.Activephaseofgroup2patientswasmonitoredarbitrarily without recordingtheir findings on Partograph.

**Statisticalmethods:**

Statistical analysis onstudyresultswasper-formed bytheapplication oftheSPSS version22.For comparison of mean oftwo groups independent T-test was applied. For categorical variables, chi-square test wasapplied. $P<0.05$ was determined to be statistically significant. The variables in the two groups were tabulated and compared. Figure weredone byMicrosoft office Excel 2010.

**Results**

Statistical analysis onstudyresultswasper-formed bytheapplication oftheSPSS version22.For comparison of mean oftwo groups independent T-test was applied. For categorical variables, chi-square test wasapplied. $P<0.05$ was determined to be statistically significant. The variables in the two groups were tabulated and compared. Figure weredone byMicrosoft office Excel 2010.

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Table 1: Duration of active phase in Partogram group and no Partogram group.

| Durationofactive phase/hours | Partogramgroup | | NoPartogramgroup | |
|---|---|---|---|---|
| | No. | 0 p | No. | $0_0$ |
| 0.3-1.3 | 20 | 10.4 | 3 | 1.6 |
| 1.31—2.3 | 45 | 23.4 | 19 | 10.2 |
| 2.31-3.3 | 38 | 19.8 | 20 | 10.8 |
| 3.31—4.3 | 42 | 21.9 | 46 | 24.7 |
| 4.31—5.3 | 32 | 16.7 | 34 | 18.3 |
| 5.31—6.3 | 10 | 5.2 | 18 | 9.7 |
| 6.31—7.3 | 3 | 1.6 | 24 | 12.8 |
| 7.31—8.3 | 2 | 1 | 16 | 8.6 |
| 8.31—9.3 | 0 | 0 | 6 | 3.3 |
| Total | 192 | 100 | 186 | 100 |

Chi-square = 64.385 with 8 degrees of freedom; P = 0.0001(Highly significant.

Partogram:Mean=3.4hours.Std. Deviation=1.5hours.Median=3.2hours. Minimum=1hour.Maximum=8.30hours.

No Partogram: Mean =5.1 hours.Std.Deviation =2 hours.Median=5 hours. Minimum =1.30 hours. Maximum =9.30 hours.

t= -9.518with376degreesoffreedom;P=0.0001(Highlysignificant).

Table2: Total duration of labour (active phase duration and second stage duration)inPartogramgroupandnoPartogramgroup.

| Timeinterval/ hours | Partogramgroup | | Nopartogramgroup | |
|---|---|---|---|---|
| | No. | $0_0$ | No. | $0_0$ |
| 1-2.3 | 43 | 22.4 | 10 | 5.4 |
| 2.31–4 | 59 | 30.7 | 22 | 11.8 |

| | | | | |
|---|---|---|---|---|
| 4.01—5.30 | 64 | 33.3 | 56 | 30.1 |
| 5.31–7 | 22 | 11.5 | 41 | 22 |
| 7.01—8.3 | 2 | 1 | 36 | 19.4 |
| 8.31-10 | 2 | 1 | 21 | 11.3 |
| Total | 192 | 100 | 186 | 100 |

Chi-square =89.756 with 5 degrees of freedom; P = 0.0001(Highly significant).
Partogram: Mean =3.7.Std.Deviation =1.5.Median=3.5. Minimum =One hour. Maximum =9.10.

Nopartogram:Mean=5.7.Std. Deviation=2. Median=5.5.Minimum=1.50. Maximum =9.50.

t=-11.198with376degreesoffreedom;P=0.000(Highlysignificant)

Table3: Comparisonbetween Partogram group and no Partogram group based on mode of delivery.

| Modeofdelivery | Partogramgroup | | Nopartogramgroup | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Normalvaginal delivery | 192 | 96 | 186 | 93 |
| C/S | 8 | 4 | 14 | 7 |
| Total | 200 | 100 | 200 | 100 |

Chi-square=1.203with1degreeoffreedom;P=0.273(Notsignificant)

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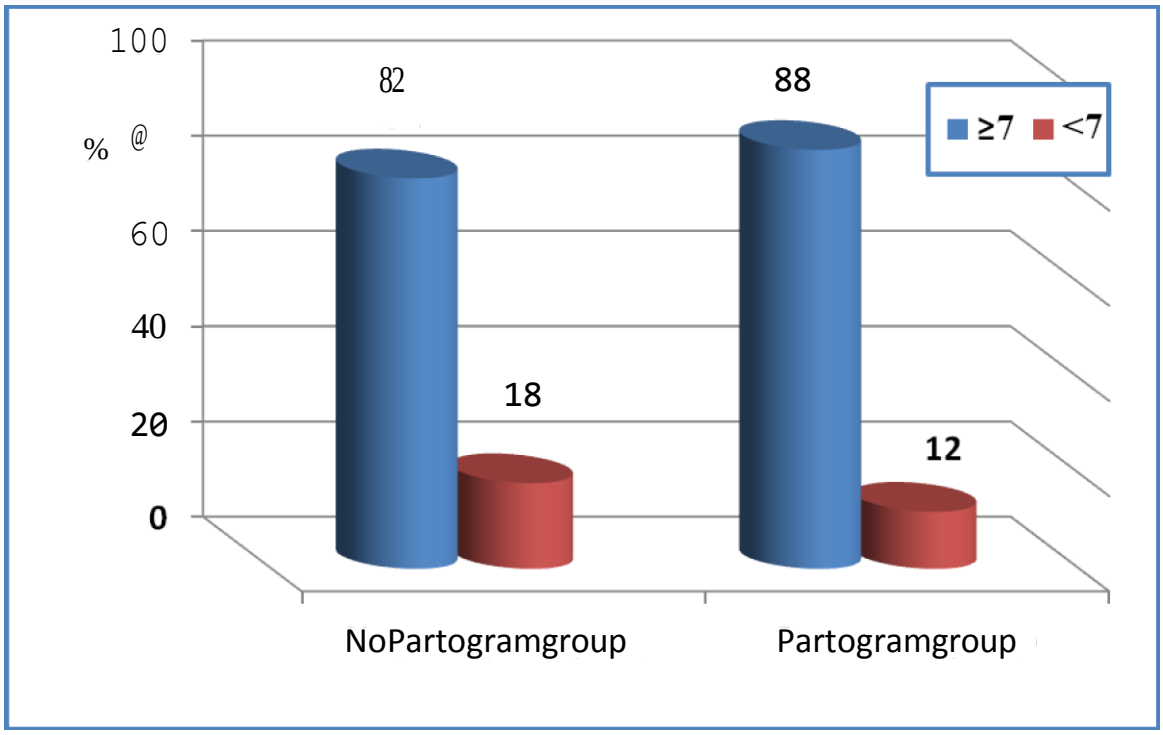
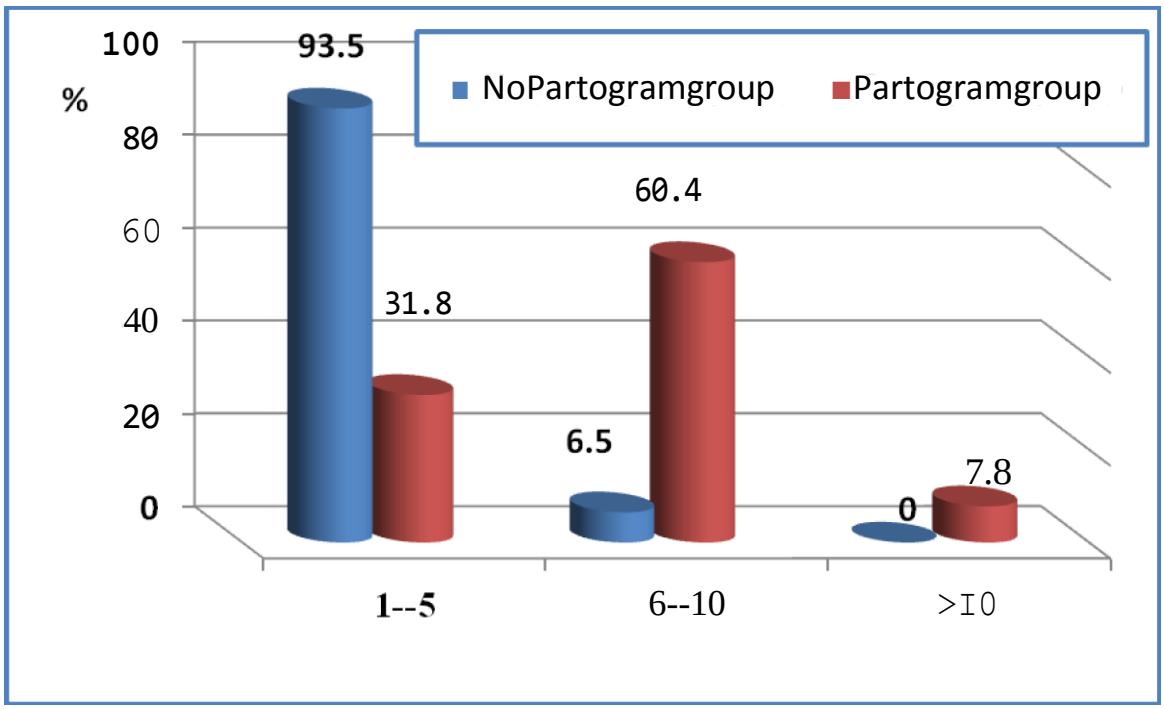



Chi-square=2.373with1degreeoffreedom;P=0.123(Notsignificant).

Fig.1:Comparison of APGAR score at birth of new-born between Partogram group and no Partogram group.




Partogram:Mean=6.7times.Deviation=2.9timesMedian=6timesMinimum =2times.Maximum=16times.

Nopartogram:Mean=3.1times.Std.Deviation=1.8times
Median=3timesMinimum =Once. Maximum = l0times.

t=14.678with376degreesoffreedom;P=0.0001(Highlysignificant).

Fig.2: Comparisonbetween partogram group and no partogram group based on number of records of fetal heart.

Table 4: Comparisonbetween Partogram group and no Partogram group based on presence of meconium.

| Presence of meconium | Partogramgroup | | Nopartogramgroup | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Yes | 12 | 6 | 15 | 7.5 |
| No | 188 | 94 | 185 | 92.5 |
| Total | 200 | 100 | 200 | 100 |

Chi-square=0.159with1degreeoffreedom;P=0.690(Notsignificant).

Table 5: Comparisonbetween Partogram group and no Partogram group based on no significant difference

| **Variable** | **Group 1 (partograph use)** | **Group 2 (No partograph use)** | **P-value** |
|---|---|---|---|
| Maternal Age | 18-46 | 18-47 | 0.081 |
| Gestational age (mean) | 39.5 | 39.6 | 0.475 |
| Presence of meconium | 6% | 7% | 0.690 |

Table 6:Comparisonbetween Partogram group and no Partogram group based on significant difference

| Variable | **Group 1 (partograph use)** | **Group 2 (No partograph use)** | **P-value** |
|---|---|---|---|
| Duration of active phase | 3.4±1.5hours | 5.1hours ±2hours | 0.0001 |
| Total duration of labour(mean) | 3.7 | 5.7 | 0.0001 |
| Need for augmentation of labour | 30% of patients | 39.5% of patients | 0.059 |
| Oxytocin use | 16.7% | 14% | |
| ARM | 33.3% | 35.4% | |
| ARM + Oxytocin | 50% | 50.6% | 0.059 |

| | | | |
|---|---|---|---|
| Normal vaginal delivery | 96% | 93% | 0.273 |
| Cesarean section rate | 4% | 7% | 0.273 |
| Apgar<7 | | | 0.123 |
| Number of recorded fetal heart (mean) | 6.7 | 3.1 | 0.0001. |

## Discussion:

The study included 200 patients done partogram (1st group) and 200 patientsnot done (2nd group), the maternal age of 1st group was ranged betweenl8years and 46 years,whilethesecond grouptheiragerangedbetween 18and47years,therewas no significant difference between the mean age of both group p=0.081.Gestational age <40 weeks constitute to 49% of 1stgroup and45%in 2ndgroup, gestational age ñ40weeks was 51% in 1stand 55% in 2nd group, these differences were not statistically significant p value =0.475.
group,thisdifferencewasnotstatisticallysignificantpvalue=0.690.

Duration ofactive phaseinpartogram group was ranged from 1hour to8.30hours, with mean equal to 3.4+1.5 hours, while range in no partogram group was 5.1hours to 9.30hours, with mean equal to 5.1hours +2hours, this difference between thetwo group was highlysignificant pvalue was 0.0001.This result was comparableto studies done by Sharma AK et al,2016[25]and study byAmedBenazir etal,2016

Duration of second stage in partogram group was ranged from 2.3minute to 60 minutes, with mean equal to 24.5 minute +12.4 minute, and in no partogram the duration of second stage was ranged from 10 minutes to 70minuts, with range equalto42.3minute+18minutes,thisdifferencewashighlysignificantpvalue=0.0001. AmedBenazir etal(2017)[24]foundthemeanduration ofsecond stageingroup1 was34.78+20.59minutes andingroup2was 56.46+23.94 minutes, whileSharmaAK et al,[2,] reported the mean duration of 2nd stage a labour in his study using Partograph to be 33.64+23.85minutes.(Sharma AK,2016)

Totalduration oflabour (active phase duration and second stage duration )in partogram group was ranged from one hour to 9.10hours, the mean was 3.7 hours+1.5hours, while the total duration of labour in no partogram was ranged from 1.50hours to 9.50hours , the mean was 5.7 hours +2 hours, this difference was highlystatisticallysignificantp value0.0001.Thisresultwascomparabletostudyconducted byPinkyRachhoyaPeta1[26]andstudybyAmedBe nazir etal[24]

Augmentation was needed by30% of patients in 1st group and 39.5% of 2nd group , ARM was done to 33.3% of 1st group and 35.4% of 2ndgroup , Oxytocin was given to 16.7% of 1st group and 14% of 2nd group, while ARM + Oxytocin recorded in 50% of 1st group and 50.6% of second group , this difference was slightly significant pvalue=0.059, which was parable tostudybyAmed Benazir et al[24]were the augmentation was required to 33.5% in group with partogram compared to 44%of no partogram.

In the present study normal vaginal delivery was recorded in 96% of first group and 93% ofsecond

group, C/S done to4%of1st group and 7% of2nd group, this difference wasnotstatisticallysignificant pvaluewas0.273.Inotherstudythere were91% normalvaginaldeliveriesin group1 and81.5%in group2.

StudybyDivyaSetalreported83.8%spontaneous vaginaldeliveries inpatients followed by Partograph (cases) and 69.4% normal vaginal deliveries in patients not monitored by Partograph (controls). [27]Apgar score was>7in88% in 1st group and 82%of 2nd group, this difference was not statistically significant p value = 0.123.

Inother study, 6.5% Sharma AK et al,in his study demonstrated 6%ofnewborns with Apgar score <7 at birth which was comparable to the present study.[25]
Pinky R et al. demonstrated an Apgar score of <7 at birth in 2.4% of the newborns born to mother monitored using partogram. [28]
Admission to NICU was recorded in 11.5% of 1st group and 13% of 2nd group, 34.8% of 1st group had Apgar score ñ7 and 65.2% had Apgar score <7, while in 2nd group 3.8% had Apgar score ñ7 and 96.2% Apgar score <7, this difference between the two group was statistically significant pvalue =0.015.

The present study was comparable tothe study conducted bySurekha Tetal who found asignificant reduction in NICU admissions ofcontrol group not monitored by Partograph (17%) as compared to the cases (6%)[29]
Mean fetal heart records in 1st group was 6.7times + 2.9times, wand ranged from 2times to l6times, while in2nd group themean was 3.1times +1.8times with range one to 10 times, these differences were highly significant p value = 0.0001Inothersstudyamong100ofthemodifiedWHOpartographsreviewed,foetal heartratewasnotrecordedin9(9%)andwassub-standardin13(13%)while monitored up tothe recommendedstandard in 78(78%) ofthepartographs. [30]Presence of meconiumwas present in 6% of 1st group and 7.5% in 2nd group, this difference was not statistically significant pvalue =0.6

**Conclusion:**

This study shows that the Partograph helps in reducing the active phase of labour, second stage of labour and hence the total duration of labour. It also effective in reducing the need for augmentation and allows the labour to progress spontaneously without the need of unnecessary interventions.

Proper and correct interpretation of Partograph increases the number of normal vaginal deliveriesbyreducingtheunnecessaryinterventions thatwouldhavebeen taken when Partograph is not used.

The neonatal condition, as assessed by Apgar score after the baby is born, isalsobetterwhenthelabourismonitored usingPartograph. Admission ofbabiesto NICU also less in partograph group than no partograph group, so partograph improving the outcome of mothers and babie

**Recommendation:**

Theuseofpartograph isactually required togetahealthymother andahealthy baby, and in early identificationofslow progress in labour, so use ofpartograph shouldbeincluded asanessential pre-requisite whileconducting deliveriesinall labour wards.

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