

Impact of Training on the Use of Partograph on Maternal and Perinatal Outcome in Peripheral Health Centers

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Abstract

Objective: To assess the impact of training health workers at the primary healthcare level in partograph use on maternal and perinatal outcome in peripheral health units in a developing country.

Material and Methods: Experimental design in which pre- and post-intervention measurements were conducted after a training programme on partograph use in labour management. Duration of labour, level of transfer in labour, obstructed and prolonged labour, maternal and perinatal outcome were determined as outcome measures. Data were analysed using the SPSS statistical software package for personal computers. Discrete variables were expressed as percentages and presented as frequency tables and cross tabulations. χ^2 was employed as the test of association between proportions of respondents. Whenever expected cell frequencies were less than five, the likelihood-ratio χ^2 values were quoted rather than Pearson's. Statistical significance was accepted at p -values of <0.05 .

Results: Data on labour outcome on 242 labouring women who fulfilled inclusion criteria were collected prior and post training of fifty-six healthcare workers in the use of WHO partograph. There was increase in transfer in labour ($p=0.013$), but reduction in the duration of labour ($p=0.0001$), obstructed labour ($p=0.0001$); postpartum hemorrhage ($p=0.0001$), genital sepsis ($p=0.0001$); perinatal mortality ($p=0.0040$), and better neonatal Apgar scores at 1 and 5 minutes ($p=0.0001$) after introduction of partograph. Though augmentation of labour increased and caesarean section rates decreased following partograph use there was no significant difference. There was one uterine rupture and 2 maternal deaths before introduction of partograph but none after partograph introduction.

Conclusion: Introduction of partograph in peripheral health units in a developing country reduced labour complications with resultant reduction in maternal and perinatal mortality and morbidity.

Keywords: partograph, obstetric outcome, peripheral health units

Özet

Partograf Kullanımı Eğitiminin Periferik Sağlık Merkezlerinde Maternal ve Perinatal Sonuçlar Üzerindeki Etkisi

Amaç: Gelişmekte olan bir ülkede, periferik sağlık merkezlerindeki birinci derece hasta bakımı ile ilgili sağlık çalışanlarının maternal ve prenatal sonuçlara yönelik partograf kullanımı eğitimini almasının etkisini belirlemek.

Materyal ve Metot: Doğum yönetiminde partograf kullanımı ile ilgili bir eğitim programını takiben, pre- ve post-girişim ölçümlerini içeren deneysel bir düzenek uygulanmıştır. Doğum süresi, doğum esnasındaki transfer seviyesi, engellenmiş ve uzatmalı doğum, maternal ve perinatal sonuç, sonuç parametreleri olarak belirlenmiştir. Veriler kişisel bilgisayarlar için hazırlanmış SPSS istatistiksel yazılım paketi kullanılarak analiz edilmiştir. Değişkenler yüzdelerle ifade edilmiş ve frekans ve çapraz tablolarla gösterilmiştir. Denekler arasındaki oransal bağlantıları test etmek amacıyla χ^2 testi kullanılmıştır. Parametre sayısının 5'in altında olduğu her durumda, Pearson's testinden ziyade olasılık oranlı χ^2 değerleri tercih edilmiştir. İstatistiksel anlamlılık sınırı olarak $p<0.05$ değeri kabul edilmiştir.

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Sonuçlar: Elli altı sağlık çalışanının WHO partograf kullanım eğitimi öncesi ve sonrasında, kriterlere uyan doğum sürecindeki 242 kadının doğum sonuç verileri toplandı. Partograf eğitiminden sonra doğum için sevklerde artış ($p=0.013$); ancak doğum sürecinde kısılma ($p=0.0001$), ilerlemeyen eylem ($p=0.0001$), postpartum hemoraji ($p=0.0001$), genital sepsis ($p=0.0001$), perinatal ölümdede ($p=0.0040$) azalma ve daha iyi 1.-5. dakika Apgar skorları ($p=0.0001$) saptanmıştır. Partograf kullanımından sonra, doğum indüksiyon oranlarında artış ve sezaryen oranlarında azalma olmasına rağmen anlamlı bir farklılık yoktu. Partograf kullanımından önce, bir uterin rüptür ve 2 maternal ölüm gerçekleşti. Ancak bu durumlar partograf kullanımından sonra izlenmedi.

Tartışma: Gelişmekte olan ülkelerde periferik sağlık merkezlerinde partograf kullanımı, doğum komplikasyonları yanında maternal ve perinatal mortalite ve morbiditeyi de azaltmaktadır.

Anahtar sözcükler: partograf, obstetrik sonuç, periferik sağlık merkezleri

Introduction

About 99% of maternal deaths occur in developing countries (1-4). The foundational problem leading to this high maternal mortality is a complex admixture of socioeconomic, cultural and political constraints which result in non-availability of essential obstetric services at the grassroots level, poor or non-utilization of health facilities and deficient management of pregnant women antenatally, in labour and in the puerperium (3-5). Several interventions have been designed to curb this alarming high rate of maternal mortality rate. Among these interventions, skilled attendance during pregnancy, labour and delivery have been identified as the most important factor in the short term reduction of maternal mortality and morbidity in developing countries (2). A significant cause of maternal mortality in our population is prolonged labour and injudicious management of labour (2-4). The early detection of abnormal progress of labour by the use of partograph will prevent prolonged labour and its attendant risks of postpartum hemorrhage and sepsis, eliminate obstructed labour, uterine rupture and its sequelae; all of which are the major causes of maternal mortality and morbidity in our environment (3-4).

The contribution of the use of partograph to achieve the above aims is no longer in doubt in many developing countries (5-10). In Nigeria, West Africa, however the use of the partograph has not been aggressively pursued especially in the peripheral health centers. No wonder the maternal mortality from poor management of labour causes continues to rise. In developing countries, the use of partograph has been largely restricted to the tertiary hospitals. Though, the Life Saving Skills Initiative has recommended the use of partograph in peripheral health units in developing countries, this is yet to be given the due urgency that it demands despite the fact that most deliveries are conducted at this level than the tertiary level of healthcare. This project was an attempt to introduce its use in the peripheral health units that is managed by nurses and other lower cadres of health care workers. The gains registered from use of the partograph at hospital level are likely to be even greater at the level of health centers and maternities which rely on referral hospitals for emergency obstetric interventions (10-11). More objective criteria of delay in labour and a practical and methodological way of monitoring the progress of childbirth by using partograph would be a significant contribution to greater safety and would be a welcome aid to reduce the uncertainties and anxiety of health professionals.

The objective of the study was to determine the effect of the introduction of the partograph at the peripheral health centers on the incidence of prolonged labour, of augmented labour, and of operative delivery. It also aimed to determine whether appropriate intervention based on the partograph will reduce maternal and perinatal complications.

Materials and Methods

Design

This intervention study was conducted in Ife Central Local Government Area owned maternity centers with the headquarters at Enuwa maternity centre. This area was chosen because it forms the bulk of the referrals of obstetric emergencies in the Obafemi Awolowo University Teaching Hospital Ile-Ife, Osun State, Nigeria, West Africa.

Study instruments

The partograph guides I-IV (10-13) produced by World Health Organization (WHO) was used as a guide for the study design. Fifty-six health personnel trained included a general medical officer, nurses/midwives, and community health extension workers who have been conducting deliveries in the maternity centers.

Data collection

Data was collected prospectively at the health centers on 242 labouring women before introduction of WHO partograph (See Fig 1). This phase lasted for four months. The introduction of the partograph was preceded by an intensive period of training in its use by facilitators who were consultant obstetricians. Collection of data after introduction of the partograph was done prospectively for a period of seven months on another set of 242 labouring women. Essentially, the same parameters collected prior to introduction of partograph were collected post training.

Each questionnaire form was completed for each woman eligible for inclusion in the study.

Inclusion criteria

Inclusion criteria for the study were women with spontaneous labour in the first stage of labour with cervical dilatation not more than 7 centimeters, singleton pregnancy, gestation of at least 37 completed weeks, cephalic presentations and no additional complications.

Exclusion criteria

Exclusion criteria for the study were women with ante partum hemorrhage, breech presentation, multiple pregnancy, premature labour (before 37 weeks), eclampsia, elective caesarean section and induced labour.

Data analysis

Data were analyzed using the SPSS statistical software package for personal computers. Discrete variables were expressed as percentages and presented as frequency tables and cross tabulations. χ^2 was employed as the test of association between proportions of respondents. Whenever expected cell frequencies were less than five, the likelihood-ratio χ^2 values were quoted rather than Pearson's. Statistical significance was accepted at p -values of <0.05 . The data collected both before and after the introduction of the partograph were analyzed in such a way that a clear comparison could be made between the outcome of labour before and after the partograph introduction. Particularly critical comparisons were made between: neonatal outcome; maternal morbidity (obstructed labour, ruptured uterus, postpartum hemorrhage, and sepsis); length of time in labour; rates of operative deliveries; proportion of women transferred in labour; and the number of vaginal examinations. The adequacy of the partograph itself and of the training programme was analyzed. The partographs were critically examined for the accuracy of their completion. In particular, it was examined whether appropriate action was taken when cervical dilation moved to the right of either the alert line or the action line.

Table 1. Biodata of trained health workers		
Biodata	Number	Percentage
Age (years)		
≤30-years	14	25.0
31-40-years	17	30.4
≥41	25	44.6
Professional status		
Doctor	1	1.8
Nurse/midwife	3	5.3
Midwife	1	1.8
Maternal child health aide	51	91.1
Years of experience in maternity care		
1-5	13	23.2
6-10	10	17.8
11-15	4	7.2
16-20	9	16.1
21-28	20	35.7
Maternity centre of practice		
Enuwa Maternity Centre	33	58.9
Gbalefefe Health Centre	8	14.3
Abewela Health Centre	5	8.9
Ile-Kenani Health Centre	4	7.1
Igboya Health Centre	3	5.4
Sabo Health Centre	3	5.4

Table 2. Pre-intervention knowledge and use of partograph		
Knowledge and use	Yes (%)	No (%)
Ever heard of partograph	3 (5.4)	53 (94.6)
Ever seen a partograph	3 (5.4)	53 (94.6)
Ever trained in the use of partograph	1 (1.8)	55 (98.2)
Ever used a partograph	-	56 (100)

Results

Fifty-six health workers who were conducting delivery services in the Local Government owned maternity centers were trained. Table I showed selected biodata of the participants. Fourteen (25%) were aged 30-years and below, 17 (30.4%) were 31-40-years while 25 (44.6%) were aged 41-years and above. The personnel trained included 1 (1.8%) medical doctor, 3 (5.3%) nurse/midwives, 1 (1.8%) midwife and 51 (91.1%) community health extension workers. Thirteen (23.2%) had been conducting delivery services for 1-5 years, 10 (17.8%) for 6-10 years and 20 (35.7%) for 21-28 years. Most of the participants 33 (58.9%) were workers at Enuwa, followed in decreasing frequency Gbalefefe 8 (14.3%), Abewela 5 (8.9%), Ile-Kenani 4 (7.1%), Igboya 3 (5.4%), Sabo health centre 3 (5.4%).

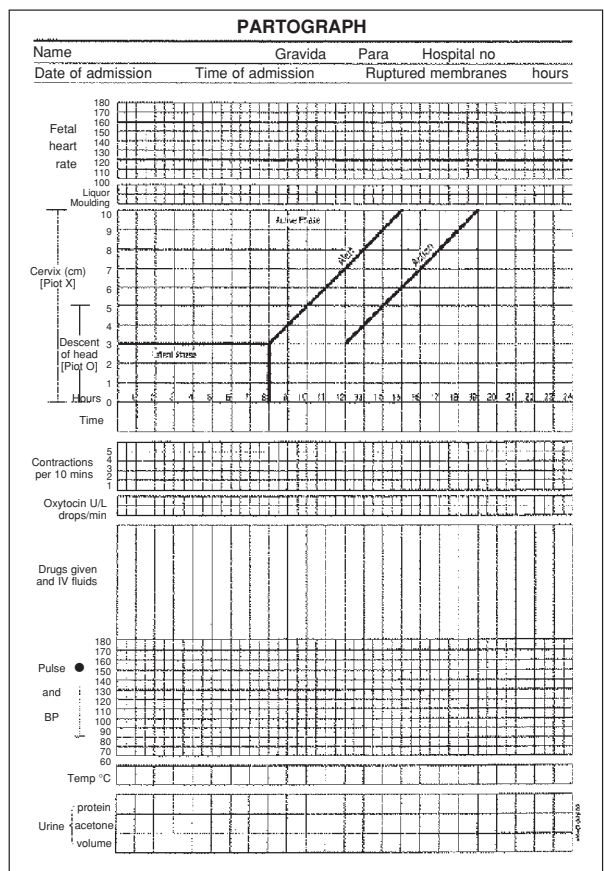


Figure 1. The components of the WHO partogram.

Table 3. Evaluation of impact of partograph on complication of labour and sequelae

	Before introduction of partograph	After introduction of partograph	χ^2	p value
Total cases (100%)	242 (%)	242 (%)		
Length of labour				
• <12 hrs	181 (74.8)	232 (95.9)	43.533	0.0001
• 12-24 hrs	45 (18.6)	9 (3.7)		
• >24 hrs	16 (6.6)	1 (0.4)		
Transferred in labour	14 (5.8)	31 (12.8)	2.49	0.013
Mode of delivery				
* Spontaneous vaginal	222 (91.7)	229 (94.6)	1.701	0.427
* Operative vaginal	4 (1.7)	12 (4.9)		
* Caesarean section	16 (6.6)	11 (4.5)		
Complications of labour				
Obstructed labour	19 (7.9)	2 (0.8)	3.50	0.0001
Uterine rupture	1 (0.4)	-	0.62	0.35
Postpartum haemorrhage	27 (11.2)	1 (0.4)	4.89	0.0001
Genital sepsis	47 (19.4)	-	7.06	0.0001
Neonatal asphyxia	32 (13.2)	6 (2.5)	4.87	0.0001
Perinatal mortality	10 (4.1)	2 (0.8)	2.05	0.0001
Maternal deaths	2 (0.8)	-	0.67	0.45
Labour augmentation	24 (9.9)	32 (13.2)	0.99	0.320
Number of vaginal examination				
1-2	22 (9.1)	133 (55.0)	159.906	0.0001
3-4	86 (35.5)	87 (36.0)		
≥5	134 (55.4)	22 (9.1)		
Neonatal Apgar scores at 1 min				
0-6	42 (17.4)	4 (1.7)		
7-10	200 (82.6)	238 (98.3)	145.592	0.0001
Neonatal Apgar scores at 5 min				
0-6	15 (6.2)	2 (0.8)		
7-10	227 (93.8)	240 (99.8)	145.592	0.0001

Table II showed the knowledge and use of partograph by the workers. Only 3 (5.4%) had ever heard of partograph, and also only 3 (5.4%) had ever seen a partograph while only one of them (a nurse/midwife) had been trained formally in the use of partograph. None of them had ever used a partograph.

The impact of partograph on complications of labour and sequelae was evaluated through a comparison of pre and post training data on the maternal and perinatal outcome (Table III) Parameters considered include length of labour, transfer in labour, mode of delivery and the incidence of obstructed labour among others. The use of partograph was associated with increase in transfer in labour ($p=0.013$), reduction in the duration of labour ($p=0.0001$), obstructed labour ($p=0.0001$); postpartum hemorrhage ($p=0.0001$) and genital sepsis ($p=0.0001$). The use of partograph was also associated with reduced rate of perinatal mortality ($p=0.0040$), and neonatal asphyxia ($p=0.0001$). Neonatal Apgar scores at 1 and 5 minutes improved after introduction of partograph ($p=0.0001$). Though there were more vaginal delivery after introduction of partograph and less incidence of caesarean section, it did not show statistical significance. There was also an increase in augmented labour from 9.9% to 13.2% after partograph introduction but did not show statistical significance. There was no maternal death or uterine rupture after partograph

introduction compared to one uterine rupture and two maternal deaths before partograph introduction.

Discussion

Although a considerable amount of experience and information on the use of the partograph has been accumulated in the past 35 years, it is not in use in many developing countries and there are significant gaps in existing knowledge (10-13). In particular, there has been little published evidence of the practical application of the partograph in primary health care centers where most deliveries take place and where many think it may be a particularly useful tool (7,15). This study on the introduction of WHO partograph (Figure 1) in Ife Central Local Government Area, southwest of Nigeria, West Africa showed a significant reduction in the incidence of labour lasting >12 hrs from 18.6% to 3.7% and labour lasting >24 hours from 6.6% to 0.4%, obstructed labour from 7.9% to 0.8% (0.0001), caesarean section reduced from 6.6% to 4.5%. The above findings are comparable to that reported from previous studies (6,10,16-19). All the labours which became obstructed during the partograph use were detected early at the stage of cephalopelvic disproportion and the patients were promptly referred. The ensuing delay before assenting to the referral led to the obstruction. Augmented labour increased from 9.9% to 13.2%.

This is in keeping with the finding that more labouring women were transferred in labour after introduction of partograph ($p=0.013$) due to early recognition of slow progress. It is therefore not surprising that complications such as uterine rupture, postpartum hemorrhage, genital sepsis, perinatal morbidity, neonatal asphyxia and maternal deaths were all significantly reduced after introduction of partograph (see Table 3). However there was an increase in operative vaginal delivery from 1.7% to 4.9%. This is also the result of earlier recognition and intervention in labour. If partograph were not used, these women might have ended up with prolonged second stage and probably obstructed labour. The above findings are comparable to that reported from previous studies (6,10,16-19). The significant reduction in frequency of vaginal examinations after introduction of partograph is worthy of note. Increasing the number of vaginal examination in labour increases the incidence of genital sepsis with the attendant late sequelae of uterine synechiae, chronic pelvic pain and secondary infertility. In addition genital infections increase the likelihood of neonatal infections with the attendant increase in morbidity and mortality.

Evaluation of neonatal outcome at 1 and 5 minutes showed a dramatic improvement after introduction of partograph ($p=0.0001$) respectively. While this is similar to findings from studies in Egypt (20), Zimbabwe (10) and Malawi (8,9), it differs from the findings of WHO multicenter trails in which dramatic improvement in neonatal outcome was not demonstrated (5,6).

Introduction of partograph at the maternity and health centers in developing countries is urgently needed to reduce the rising incidence of maternal and perinatal mortality and morbidity arising from mismanaged labour. This is especially important because more pregnant women patronize the maternity centers and health centres more than the tertiary hospitals with better equipped facilities due to aversion to caesarean section and financial constraints (2,4,20). The major obstacle to the introduction of partograph in peripheral centers in developing countries is because it was assumed that the community health extension workers who conduct most deliveries in primary health care centers have limited skills and knowledge required for use of the partograph in labour management. However the findings from our study had shown that with meticulous training these cadres of health workers can appropriately use the partograph. Apart from reducing the maternal and perinatal mortality and morbidity, it will also increase the quality and regularity of all observations on the fetus and the mother in labour and aids early recognition of problems with either (10).

The introduction of partograph at peripheral health units managed mostly by community health extension workers and few nurses and midwives resulted in reduction in prolonged and obstructed labour with a concomitant reduction in maternal and perinatal mortality and morbidity.

Recommendations

Based on the findings from this study it is recommended that:

- (1) Medical schools, midwifery schools and schools of technology should be encouraged to teach the principles and use of the partograph.
- (2) Partograph audits at maternity units should be performed routinely to monitor the unit's quality of care.
- (3) Because the partograph has been modified a number of times, in-service training is essential to make sure that health attendants and midwives skills and understanding of the partograph is updated.

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