Effectiveness of paperless partograph in the management of labour

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Abstract:

Background: The partogram has gained acceptance as one of the most valuable tools to prevent prolongation of labor, making it possible to minimize maternal- infant's adverse outcomes. Paperless partograph is simple new method with no graph paper , no extra time and using the residents already using it to follow up progress of labour.

Aim: To evaluate the effectiveness of paperless partograph in the management of labour.

Setting: Labour room in Mukalla Maternity government Hospital in Hadhramout Yemen.

Population: Sample of 100 women who have met the criteria of full term, spontaneous labour, single fetus and cephalic presentation with no previous uterine surgery or acute obstetrics complications like acute antepartum heamorrhage or hypertension.

Methods: Hospital based prospective analytical study was carried on within the period of 6 months, from 13th March to 3rd September 2016by trained residents by following women during labour and filling the well-structured questionnaire. Statistical analysis was done by SPSS package version 25 using appropriate analysis and chi square test were P value less than 0.05 was considered significant.

Results: Mean age of the participant women was27.7 years and mean gestational age were 39weeks. More than half of them (55%) were multipara . Vaginal delivery occurs in 89% of women. Cesarean section delivery occurs in 11%. Mean duration of delivery for all women was 3.9 hours , primiparous women was 4.2hours while it was 3.8hours in multiparous. All vaginal deliveries occurs before reaching the ACTION ETD.

Conclusion: Paperless partograph is an effective tool on the management of labour.

Keywords: Paperless partograph, management of labour, effectiveness.

فعالية المخطط الوليدي اللاورقي (بدون رسم بياني) لمتابعه تطور المخاض

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المقدمة: تقدم كبير حققه المخطط الوليدي الورقي كواحد من اهم الادوات النافعة لمنع استطالة المخاض , جاعلاً هناك إمكانيه لتقليل الردود العكسية التي تحصل للام والطفل.

الهدف: تقييم فعالية المخطط الولادي اللاورقي (بدون رسم بياني) في متابعة تطور المخاض.

مكان البحث: غرفة الوضع في مستشفى المكلا للأمومة والطفولة الحكومي في محافظه حضرموت في اليمن.

عينة البحث: تم اجراء الدراسة على مائه امراه اثناء المخاض , تتوفر فيهن المواصفات التالية : ان تكون مدة الحمل كاملة , ويكون المخاض عفويا , وجنين واحد فقط , وان يكون المجيء بالراس , ولا توجد عمليات سابقة لعضلات الرحم , ولا مضاعفات ولاديه حاده اثناء هذا الحمل مثلنزف ما قبل الولادة او ارتفاع ضغط الدم.

طريقة البحث: دراسة استطلاعيه وصفيه عملت من تاريخ 13 مارس 2016 حتى 3 سبتمبر 2016 قامت بها الطبيبات المقيمات اللاتي تدربن على استخدام المخطط الولادي اللا ورقي (بدون رسم بياني) في متابعة تطور المخاض وتم ذلك في غرفة الوضع لمتابعه النساء الحُمل اثناء المخاض , وكذلك تعبئة الاستبيان المعد مسبقا لهذه الدراسة , و بعد ذلك تم عمل التحليل الاحصائي للبيانات.

النتائج : كان متوسط العمر للحالات في هذه الدراسة بالسنوات هو : 27.7 سنه , والانحراف المعياري هو 5.8 , وكان متوسط مدة الحمل بالأسابيع هو : 39 اسبوع , والمتوسط المعياري 0.94 , وكانت نسبة النساء الولود في هذه الدراسة اكثر من النصف (55٪) .كانت نسبة الولادة الطبيعية (89٪) بينما كانت نسبة الولادة بالعملية القيصرية (11٪). كان متوسط مدة المخاض الطبيعي في اجمالي الحالات بالساعات هو 3.9 ساعة , والانحراف المعياري هو 1.5 , وفي الحُمل الخروس بالساعات هو 4.2 ساعة , بينما كانت مدة الولادة بالساعات في الحُمل الولود هو 3.8 ساعة وتمت الولادات الطبيعية جميعها قبل الوصول الي وقت متوقع الولادة التداخلي.

الملخص: المخطط الوليدي اللا ورقي اداة فعاله لمتابعه تطور المخاض.

الكلمات المفتاحية : فعالية , المخطط الوليدي اللا ورقي , متابعة تطور المخاض.

Introduction:

The partogram has gained acceptance as one of the most valuable tools to prevent prolongation of labor, making it possible to minimize maternal-infant's adverse outcomes.[1]

A long-lasting active stage of labor is known to bring a higher risk of uterine rupture, postpartum hemorrhage,maternal sepsis and death and perinatal anoxia, infection and death .[2,3].

The current partograph is designed to monitor the progress of labour and condition of the mother and the fetus during labour. It includes dilatation of the cervix , uterine contractions , fetal heart rate , maternal blood pressure , which plotted on the preprinted partograph paper.[4]

It is use is advocated by WHO as a necessary tool to monitor progress of labour and has global agreement that it is one of the most important advances in modern obstetric care[2,3].

Although the partograph is simple and inexpensive , it is not widely implemented. in some countries , the rate of its use has beenvery low. For example in Africa the rate was 25% in Nigeria , 11% in Kenya [5] and 5% in Côte d'Ivoire[6] .

Use of WHO partograph was more implemented in tertiary level facilities rather than secondary and primary levels where it should be more important. This was attributed to non-availability of preprinted partograph , lack of sufficient knowledge and workload pressure in the later levels[7,8].

Dr. Debdas argues that due to the complexity of the WHO`s partograph it fails to meet the local needs as it is not acceptable to those who use it and cannot be used given the available resources. Consecutive simpler versions of the partogram have been designed byDr.Debdas,the paperless partogram . No particular training and no plotting, is free of encumbering details and suitable in low staffing facilities. It relies on the two benchmarks of the partogram: the ALERT and ACTION lines. From these lines are derived the ALERT expected time of delivery (ETD) and ACTION ETD,the only ones to adhere to[5,9,10].

Until now no study has been published in Yemen regarding implementation of partograph. Many hospitals in Yemen not implement WHO partograph, even when used, it was not well interpreted .

Aim: to evaluate the effectiveness of paperless partograph in the management of labour.

Setting: Labour room in Mukalla Maternity government Hospital in Hadhramout Yemen.

Population: Sample of 100 women who have met the criteria of full term, spontaneous labour, single fetus and cephalic presentation with no previous uterine surgery or acute obstetrics complications like acute antepartum heamorrhage or hypertension.

Method:

Hospital based prospective analytical study was carried on within the period of 6 months, from 13th March to 3rd September 2016.Structured Questionnaire filled by resident doctors working on duties in the labour room. They were trained about the use of Paperless partographto follow up progress of labour.

In the paperless partogram model , doctors calculate tow times , an ALERT ETD (estimated time of delivery) and an ACTION ETD. ALERT ETD was calculated according to Freidman partograph time analysis. [11]

rule that the cervix dilates about 1 cm per hour in active phase of labour. The doctor then simply added the remaining times in hours till the women reach the ALERT ETD (full cervical dilatation of 10 cm).

If the woman not delivered at the ALERT ETD ,the doctors added 4 hours to the ALERT ETD to get the ACTION ETD. Both ETDs were written in big letters on a woman own case management sheet, the ACTION ETD was circled in red. If the woman had not been delivered at the time of the ACTION ETD diagnosis of abnormal labour was made and delivery was done by suitable medical or surgical intervention. The labour was followed from the active phase when cervical dilatation reach 4 cm or more until delivery.

Purposive random sample of 100 women as minimum sample size advised is 30 .The collected data was analyzed using the Statistical Package for Social Science(version 25 for Windows) and chi square test were P value less than 0.05 was considered significant.

Results:

Results:

Table 1 shows the characteristics of the participated women in the current study .The present study enrolled 100 women in labour, their ages ranged from 19 to 44 years with average 27.7 ±5.8 years and their average parity was 2 ±2.

Regarding the parity45% of participants were nuliparous. The gestational age at onset of labor ranged from 37 to 42 weeks with mean of39 ± 0.94 weeks. Assessment of the women at onset of labor revealed that their averagediastolic blood pressure was 72.4 ±5.9 mmHg, their average systolic blood pressure was 107.6 ±8.8 mmHg.

The average weight of the new-born was 3.2 ±0.48 kg and51 % of them were females and 49 % males.

The average time for delivery among the nulliparous women was 4.15 ±1.6 hours (ranged from 2 to 9 hours), while the average time for delivery among the multiparous women was 3.77 ±1.4 hours (ranged from 2 to 8 hours) Although time taken till delivery in multiparous women was shorter than primiparous women there was no significant statistical difference(P<0.5).

Table 2 showed that most of the participants 84% delivered vaginally before reaching the ALERT ETD and 12.3% of cases delivered at the ALERT ETD. A minor proportion (3.4%) delivered beyond the ALERT ETD but not reaching the ACTION ETD.

Table 3 represent mode of delivery among the participants were most of the women 89 (89%) in the present study had normal vaginal delivery , 82.2% of primiparous and 96.4% of multiparous women. whereas 11 (11%) had Caesarean section ,9 of them were (17.8%) primiparous and 2 (3.6%) multiparous women).

There was no significant statistical difference (P<0.5) regarding mode of delivery and parity.

Discussion:

Monitoring labor can be undertaken in various ways. WHO has recommended universal use of a partograph during labour to aid in clinical decision-making (Banerjee et al ,(2015)[12].The evidence to support this recommendation is limited; even after the WHO simplified the partograph model to make it more user-friendly, itis still rarely used in low-resource areas, and when actually used, it is rarely interpreted correctly (WHO, 1994) [2].The paperless partograph is a low-skill method for preventing abnormal labor (Agarwal et al , 2013 [5]. It is designed to monitor not only the progress of labor, but also the condition of the mother and the fetus during labor. Paperless partograph needs no graph paper, no extra time to do it and uses the routine that the nurses are already used to.Very little published researches were done to evaluate the effectiveness of paperless partograph in the management of labour [1].

In this study, the paperless partogram was used for evaluation of its effectiveness in management of labor among 100 women in labour.

Regarding the parity 55% of participants in this study were multiliparous unlike the study done by Fetouh et al , study in Egypt among 100 women in labour ,most of them were multipara 87%[13]. The gestational age at onset of labor ranged from 37 to 42 weeks with mean 39 ± 0.94. Assessment of the women average diastolic blood pressure in this study was 72.4 ±5.9 mmHg, their average systolic blood pressure was 107.6 ±8.8 mmHg it was

Comparable to the average diastolic blood pressure done by Fetouh et al ,[13]. It was 75.1 ±9.8 mmHg, their average systolic blood pressure was107.5 ±9.9 mmHg.. The systolic BP in the current study was lower than results conducted in a tertiary care hospital of Uttar Pradesh -India by Agrawal et al , which used the paperless partogram for out of 91 women who participated in that study which revealed that the mean systolic BP of the participants was 124 mmHg[4] .The mean diastolic BP of the participants in this study(72.4) was almost similar to this study whish was 73 mm of Hg.

The average time for delivery in the present study among after the ALERT ETD was 3.9 ±1.5 hours which is nearby to that reported by Fetouh et al ,3.4 ±2 hours[13]. These result were also similar to the study findings conducted by Agarwal et al , which revealed that the mean duration for delivery after ALERTETD was 3.4 ± 2.1hours.

In nulliparous women the mean duration of labourin this study was 4.15 ±1.6 hours (ranged from 2 to 9 hours), which is higher than that reported by Fetouh et al , 3.5± 2.1 and lower than that reported by Agrawal et al , which was 4.7 ± 1.9 [4,13]. In the present study the average time for delivery among the multiparous women was 3.77 ±1.4 hours (ranged from 2 t0 8 hours) which is similar to that recorded by Agrawal et al , which was 3.7 ± 1.8 and Fetouh et al , (3.5±2.1(4,13)These results was similar to the WHO recommendation for partogram with a four-hour action line denoting the timing of intervention for prolonged labor (Banerjee et al , [12].

Although time taken for delivery in multiparous women in the current was shorter than primiparous women but difference is statistically not significant (P<0.5) and the same was noticed by Agrawal et al [13].

Most of the women 89% in the present study had normal vaginal delivery , whereas 11% had Caesarean section which is the same to that reported by Fetouh et al ,(88%normal vaginal delivery , 12 %caesarean section) [13]. These findings were nearly corresponding also with other study done by(Agrawal et al , which used the paperless partogram for the management of labor; were the labour ended by vaginal delivery in 87% of cases [4].The success rate of spontaneous deliveries in the recent study done in India by Deka et al, was 88.5% [14] . Similar results were also observed by Lingegowda et al, 74% cases monitored by paperless partograph had a spontaneous delivery [15].

As regard to distribution of cases in relation to ALERT and ACTION ETD in the present study, most of the participants 84% delivered vaginally before reaching the ALERT ETD and 12.3% of cases delivered at the ALERT ETD. A minor proportion (3.4%) delivered beyond the ALERT ETD but not reaching the ACTION ETD. This results almost consistent with those reported by Deka etal,in study which involved 200 cases .He was observedthat most of the cases delivered before reaching ALERT ETD 77% as present study, 18.5% delivered between the ALERT ETD and ACTION ETD (14) .But in Deka etal, study found minor proportion 2% of cases delivered beyond the ACTION ETD[14] .

Almost similar results were seen in a study conducted by Deblina et al , in West Bengal observed that 14.5% cases monitored by the paperless partograph delivered between alert and action ETD and only 1.8% beyond the action ETD [16].

Another study conducted with the Paperless partograph in Odessa by Prakash et al, found that 75.5% of primiparous delivered before ALERT ETD and 90.7% of multiparous delivered before the ALERT ETD which was higher than reported by the present study[17].

Fortunately in the present study and Fetouhet al , study there was uncomplicated labor, in contrast with finding of a study used the WHO partogram; in which 51.3% of women were diagnosed as being in prolonged labor [13,18]. These results had been interpreted as; the use of paperless partograph was highly effective during the management of labor which shown to be effective in preventing prolonged labor, in reducing Cesarean Section. The most of cases in the current study not reach to action line and those who reach to it were given the appropriate care in suitable time, so no one of them complicated by prolonged labor.

As regard to the neonatal outcome average weights of the new-born were within normal (3.2 ±0.48 kg) and this was also reported by Fetouh et al , [13].

In this study only 3 newborn admitted to the nursery , one delivered vaginally and 2 by cesarean section while in Fetouh et al , study; there was no newborn need to admit to Neonate Intensive Care Unit (NICU) or need ventilation. These result revealed the positive effect of paperless partogram on neonatal outcome but also this result need to be proved by other researches [13].

So the present study as also other studies done by Fetouh et al , and Agrawal et al , are support to the research hypothesis which hypothesized that the use of the paperless partograph will be easy and effected design for the management and outcome of labor in contrast to WHO partograph which is very complicated and require more training before using it (4,13). This finding was supported by Debdas (2008) which argues that the partogram of WHO fails to meet the organization's own requirements for appropriate technology and has not been adapted to local needs, is not acceptable to those who use it and too complicated for many skilled birth attendants many of whom have not received higher education [9].

Also it was reported that despite the proven effectiveness of traditional partogram, members pointed out they are not frequently used at all health care facility level [9]. One study found that less than 10 % of providers (nurses, midwives, and community health care workers) routinely use the partogram in peripheral centers in Nigeria [19]. Additionally; some argue that use of the partogram is complex and too time consuming for effective use in low-resource countries that have inadequate health care staffing [20].

Understanding barriers facing partograph use, and the limitations facing low-resource areas as in Yemen, is an essential first step in effectively addressing the low rates of partograph completion and use. Effective partograph initiatives need to be cost-effective, 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 like Yemen. The Paperless partogram attempts to provide a low-cost, intuitive solution to many of the barriers facing effective partograph use in the developing world.

Conclusion and Recommendations:

The paperless partograph was found convenient and effective in the management of Labour.

The paperless partograph shown to be effective in preventing prolonged labor and reducing Cesarean

improving the neonatal outcome. The paperless partograph should be implemented as essential part of care in all health facilities, and used by all clinical training sites to give trainees (doctors , midwives and nurses) an opportunity to use it. Ministry of Health should encourage to actively participating in activities to increase use of this tool. Further studies should be done regarding the effectiveness of the paperless partograph in management of labour.

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Table 1 : Characteristics of the participated 100 women in the current study.

Characteristics	Parity					
	Nullipara		Multipara		Total	
	Mean	SD	Mean	SD	Mean	SD
Age(Years)	25	4.5	29.7	5.8	27.75.8	
Parity	0	0	2.8	2	1.622	
Gestational Age (weeks)	39	0.9	39	0.9	39.10.94	
Weight (Kg)	66.3	14.2	70.6	11.8	68.713.1	
Body Mass Index	27.4	5.6	28.1	4.9	27.8 5.2	
Systolic BP(mm Hg)	109	9.9	71.4	5.3	107.68.8	
Diastolic BP (mm Hg)	105	6.8	73.6	72.4	72.45.9	
Average time for delivery in hours *	**4.151.6**		**3.771.4**		**3.91.5**	

*(P<0.5).

Table 2 : Distribution of cases in relation to ALERT and ACTION ETD (89 cases).

Parity	Duration of delivery					
	Before ALERT ETD		At ALERT ETD		After ALERT ETD	
	N	(%)	N	(%)	N	(%)
Primiparous women N 39	28	37.3	3	27.3	0	0
Multiparous women N 61	47	26.6	8	72.7	3	100
Total	**75**	**84**	**11**	**2.3**	**3**	**3.4**

Table 3 : Mode of delivery among the participant women(P<0.05):

Mode of delivery	Nulipara		Multipara		All women	
	N	%	N	%	N	%
Vaginal	36	82.2	53	96.4	89	89
Cesarean	9	17.8	2	3.6	11	11