



WHO Modified Partograph Versus Paperless Partograph in Monitoring Labour Progress at Delivery Wards of General Hospitals, Katsina State

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Abstract

The World Health Organisation has approved the use of the partograph in monitoring of all labours and most importantly in Low and Middle Income Countries like Nigeria. Nevertheless, the use of the partograph is reported to be low in many facilities because mostly of its technicalities. The paperless partograph can be a simpler version of the tool. This study was aimed at comparing between the paperless partograph and WHO modified partograph in monitoring labour outcomes. A quasi experimental comparative design was used in the study where 34 Midwives and 422 pregnant women were recruited using multi-stage sampling technique. Data collection involved midwives using the two main tools; paperless partograph and the WHO modified partograph to monitor women in labour. The outcome of labour in the two groups of women provided the data for analysis. Ethical approval was obtained from Katsina State ministry of health and Informed consent (written) was obtained from participants, privacy and confidentiality were ensured throughout the study. The results obtained were analysed using descriptive and inferential statistical techniques on SPSS version 23. Frequencies, percentages, mean and standard deviation, were used to analyse the socio-demographic data and outcome of labour, while chi-square and t-test analysis were used in testing hypotheses. Findings revealed that the paperless partograph is effective for monitoring labour with 91% of labours within normal time and through spontaneous vaginal delivery similar to the results obtained in the WHO modified group. No difference was significantly apparent between the paperless partograph and the WHO modified partograph when used on women in labour in the delivery wards of GHs in Katsina State ($p = 0.942$ and 0.076). It was concluded that the paperless partograph is effective in monitoring labour progress, and therefore recommended that midwives be trained in using the paperless partograph in our hospitals to ensure appropriate monitoring of labour progress.

Keywords: WHO Partograph; Paperless Partograph; Labour; Midwives; Katsina

Introduction

The [1] estimated that 303,000 women died from problems that are preventable in pregnancy and childbirth, 90% of which occur in developing countries like Nigeria. Africa accounted for more than half the global burden. As such, one in every 37 women will likely die from complications in child birth. This is no comparison to one in 3,400 women in Europe [2,3]. Though Nigeria constitutes

1% of the worlds' population, it contributes 14% - 19% to the global maternal deaths [4,5]. The 2018 Nigeria Demographic and Health Survey (NDHS) reported a MMR of 512/100,000 in Nigeria [6]. This figure can be as high as 1000-1500/100,000 live births in northern Nigeria, a figure much higher than in the southern part of the country (Nyango., et al. 2010). Katsina State was reported with a Maternal Mortality Rate of 1,596/100,000 live births with

a regional record of 1,549 deaths per 100,000 live births in North West [7]. This indicates the dire need for maternal mortality reduction strategy in the State.

The 90% of the global maternal mortality in the developing world is a gruesome figure that needs urgent attention. There has been tremendous increase in maternal and perinatal survival in the industrialized world, but yet deaths occur in the developing nations due to substandard care [8]. Several studies reported a life time risk of a mother dying as a result of pregnancy and childbirth approximately 200 times less in developed countries than in developing ones [4,7,9].

Maternal death is highly tragic but fortunately preventable in nearly all cases. Beside the death, maternal morbidities are associated problems that the surviving mother and her family have to contend with [10]. Preventing prolonged labour is a pertinent step that can reduce maternal mortality and the development of the partograph as a tool to ensure adequate monitoring of the woman in labour is timely so that assistance when necessary can be given on a timely manner [1]. Even though it is effective, the partograph remains technologically difficult for application in many developing countries as a result of problems ranging from its unavailability, cumbersomeness, and technicality [11,12]. A lot of healthcare service facilities find it difficult to maintain its usage due to staff strength problems in the developing nations of the world Nigeria inclusive [13]. Effective and comprehensive filling of the partograph that is necessary for decisions to be made in labour becomes too-time consuming for the small number of midwives in attendance and other clinicians also. It is at the same time too technical for skilled birth attendants' level of competence that man most primary health care facilities in the developing nations [11-14]. As a result, there is the need for an optional tool that can replace the WHO modified partograph.

The paperless partograph may assist in addressing these problems by replacing the WHO modified partograph, because it allows the use of cervical dilation to predict two time frames that can be used to guide the attending midwife; the alert ETD and the action ETD that use the alert line and the action line of the conventional partograph [14]. The two time frames are calculated based on the time the woman begins active labour and they are recorded boldly on the client's file and kept as reference point to the attending midwife. It therefore tells the midwife when to intervene by augmenting labour, referring or planning for Ceasarean delivery [15]. This tool has been tested in some studies

in India, Egypt and Rwanda and was found to be as effective as the modified partograph there [11,16,17] but it has not been tested in Nigeria. This study tests the use of the paperless partograph in Nigeria, in order to add to the knowledge of a different mode of the partograph, and can inform policy making in Nigeria through providing evidence base on the effectiveness of the partograph for implementation in management of labour.

To this end, the need for a means that promises an improvement in management strategies is apparent. The paperless partograph was later established (2006) and has been tested in India, Egypt and DR Congo. This study is the first test of the paperless partograph in Nigeria. It shades light to the effectiveness of the paperless partograph in the management of labour cases. It will be a channel through which the paperless partograph will be introduced and understood by the midwives working in GHs in Katsina State. The study also opened up an understanding of this tool by other midwives, doctors, nurses and other health care personnel that are working in the management of women during labour.

The aim of this study is to compare the paperless partograph with the WHO modified partograph in monitoring labour among women.

Materials and Methods

The study uses a comparative design that is aimed at identifying the effectiveness of the paperless partograph especially when compared with the WHO modified partograph. It involve the training of midwives on the use of the paperless partograph and then investigated the recorded duration of labour when the paperless partograph is used in management and compare that with the duration recorded when the WHO modified partograph is used. The study further compare the mode of delivery in the women managed with the paperless partograph and in those women managed with the WHO modified partograph.

The study was undertaken in delivery units of major GHs in Katsina State. These centers were used because the high record of attendance obtainable gave access to many women and therefore an increased accessible population. So also, GHs are managed by the State government and they have midwives as key personnel that render maternal and child health services particularly delivery services. Therefore, having midwives as the population of study, the GHs present the right avenue to getting access to them in practice.

Katsina State ministry of health gave their ethical approval (Assigned number: MOH/ADM/SUB/1152/1/232) for the conduct of the study in their general hospitals. This was communicated to the Medical Directors (MD) of the three hospitals and chief nursing officers (CNO) of the hospitals for an ethical clearance before the study. Head matron of the delivery units were copied from the MD’s approval.

A total of thirty four (34) midwives employed in the three general hospitals (GHs) participated in the study. Sixteen (16) midwives, used the paperless partograph and eighteen (18) midwives used the WHO modified partograph in monitoring labour. Four hundred and fourteen (414) women were monitored through labour across the three GHs. The women were divided into two groups each group with two hundred and seven (207) women based on the sample

size determined. The study group involve monitoring labour using the paperless partograph and the control group involve monitoring labour using the WHO modified partograph.

Results

After data collection, the process of data cleaning saw the elimination of those records that were not complete. At the end 30 data collection forms from the study and control groups where eliminated from the 414 records leaving 394 records for analysis, 192 in each of the paperless and the WHO modified partograph groups.

Socio-demographic characteristics of participants

This section presents the socio-demographic characteristics of the pregnant women involved in the study.

Variables	Paperless Partograph (n = 192)	WHO modified Partograph (n = 192)	χ ²	P
	F (%)	F (%)		
Age (years)			2.610	0.919
15-19	27(14.1)	24(12.5)		
20-24	65(33.9)	68(35.4)		
25-29	36(18.8)	43(22.4)		
30-34	34(17.7)	28(14.6)		
35-39	15(7.8)	16(8.3)		
40-44	9(4.7)	9(4.7)		
45-50	4(2.1)	4(2.1)		
Level of education			7.776	0.100
Quranic only	20(10.4)	21(10.9)		
Primary	42(21.9)	36(18.8)		
secondary	88(45.5)	75(39.1)		
Tertiary	40(20.8)	50(26.0)		
None	2(1.1)	10(5.2)		
Occupation			0.888	0.346
Not working	84(43.8)	82(42.8)		
Petty trading	71(37.0)	72(37.5)		
Artisans	14(7.3)	17(8.9)		
Civil servant	14(7.3)	14(7.3)		
Others	9(4.7)	7(3.7)		
Parity			0.300	
0	46(24.0)	52(27.1)		
1-4	83(43.2)	90(46.9)		
5-9	51(26.6)	42(21.9)		
10-14	12(6.3)	8(4.2)		
Cervical dilatation (cm)			0.318	
4	32(16.7)	72(37.5)		
5 -7	12(6.1)	95(49.5)		
8	33(17.2)	25(13.0)		

Table 1: Socio-demographic Characteristics of Pregnant Women.

Age distribution shows the highest concentration of women in labour to be within the 20 – 24 years age range in both groups. It forms 33.9% in the paperless partograph group and 35.4% in the WHO partograph group. The frequency seem to be dwindling as the age grows higher. The women have varied levels of educational attainment, but majority in both groups have secondary school education as their highest level of education (45.8% and 39.1%).

According to occupation, majority of the women (43.8% and 42.8%) were full time house wives with no occupation, but alongside that, 37.0% of the women in the paperless partograph group and 37.5% in the WHO partograph group are petty traders. But there are still a few artisans and civil servants in both groups.

In all cases the χ^2 values showed no significant difference across the socio-demographic characteristics of the women in both groups.

Half of the women in this study are multigravidas with 1-4 deliveries (43.2% and 49.6%). But yet a good number of the participants (46, 24% and 52, 27.1%) are primiparas. The women can be seen to be admitted at different levels of cervical dilatation because the distribution of the participants along this parameter is sparse. When 30.2% of the women in the paperless partograph group were admitted with 6 cm cervical dilatation, 37.5% of those in the WHO partograph group were admitted at 4 cm cervical dilatation.

Variable	Paperless Partograph (n = 192)		WHO Partograph (n = 192)	
	F (%)		F (%)	P-value
Duration of Labour				0.395
Within Normal Range				
Within Alert ETD	69(35.9)		57(29.7)	
Within Action ETD	61(31.8)		103(53.6)	
After Action ETD	46(24.0)		28(14.6)	
Abnormal range of time				0.481
Prolonged	16(8.3)		4(2.1)	
Augmentation	58(31.1)		39(20.3)	
Amniotomy	20(10.4)		21(10.9)	
Oxytocin	38(19.8)		28(14.6)	
Amniotomy + oxytocin	42(21.9)		40(20.8)	
No augmentation	134(69.8)		153(74.5)	
Mode of Delivery				0.942
Spontaneous Vaginal	175(91.1)		175(91.1)	
Delivery Assisted Vaginal	8(4.1)		7(3.6)	
Delivery	9(4.7)		10(5.2)	
Caesarean Section				

Table 2: Outcome of Labour in Paperless Partograph and WHO Modified Partograph Groups.

Key: ETD – Expected Time of Delivery.

Table above compares the outcome of delivery in the two groups of women. The difference is more apparent in the number and percentage of women that deliver within the action expected time of delivery or within 6 to 10 hours of labour i.e. after the alert ETD/line of the partograph is crossed. In the paperless partograph group, 31.8% of the women delivered within this time frame, but in the WHO partograph group, 53.6% deliveries were recorded.

Covering up this difference is the number and percentage of women that delivered after the action ETD/line is reached. In the paperless partograph group, 46 women (24%) are recorded in this group while only 28 women (14.6%) were recorded in the WHO partograph group. Cumulatively, 91.7% of women in the paperless partograph group deliver within normal range of time while 97.9% did so in the WHO partograph group. The P –value of 0.395

confirms the lack of significant difference in the mean duration of labour between the two groups of women.

In the paperless partograph group, 69.8% of the women were not given any augmentation so are 75% of the women in the WHO partograph group. Looking at the mode of delivery, there is no remarkable difference between the two groups. When the paperless partograph group recorded 8 (4.1%) assisted vaginal delivery

cases and 9 (4.7%) Ceasarean sections, the WHO partograph group recorded 7 (3.6%) assisted vaginal delivery cases and 10 (5.2%) Ceasarean sections. Both had 91.1% of deliveries via spontaneous vaginal delivery. A P- value of 0.942 confirms that there is no profound difference between the outcome of labour in both groups, which determine the effectiveness of the paperless Partograph to be similar to that of the WHO modified Partograph.

Group	Mean duration of labour(hours)	SD	SE of mean	t- test	P value
paperless partograph	8.7	4.44	0.32	-0.852	0.395
WHO modified partograph	12.8	66.24	4.78		

Table 3: Mean Duration of Labour in The Paperless Partograph and WHO Modified Partograph groups.

The t- statistics on mean duration of labour as a measure of effectiveness in monitoring labour progress is displayed above. It showed a mean duration in the paperless partograph group to

be 8.7 hours and that in the WHO modified group as 12.8 hours. The computed t of -0.852 is below the critical value of 1.96 at 95% significance level and a p-value of 0.395 is higher than 0.05.

Group	Mode of Delivery			Total	χ^2	P value
	SVD	Assisted Vaginal	CS			
Paperless partograph	175	8	9	192	0.119	0.942
WHO modified partograph	175	7	10	192		
Total	350	15	19	384		

Table 4: Detecting Abnormal Labour in Paperless Partograph and WHO Modified Partograph Groups.

The Table shows a χ^2 calculated value of 0.119 that is less than the critical value of 5.99 at df 2.

Discussion

Three parameters are used in measuring the outcome of labour in this study; the duration of labour, mode of delivery and the application of augmentation of labour. The use of progress of labour, mode of delivery and augmentation as primary measures of outcome has been supported in literatures (WHO), and studies world wide [11,18,19]. The duration of labour used in this study takes into cognisance the period from when active phase of the first stage of labour commences to delivery of the baby. The latent phase could not be captured because admission of the women initiated only when the active phase has started [20,21]. The duration was

categorised into four categories; within the alert Expected Time of Delivery (ETD) is less than 6 hours from beginning of active phase, within action ETD is duration from 6 hours to 10 hours. Those categorised as after action ETD are those that deliver between 10 hours to 16 hours while those that deliver after 16 hours are categorised under prolonged labour as approved by the FMOH Nigeria (2006) clinical guidelines. 12 hours of active phase of the first stage, 3 hours maximum of second stage of labour and 1 hour for the third stage of labour [21]. Within these categories, the first four groups – within alert ETD, within action ETD and after action ETD - fall within normal range of timing of labour, while the last group captures abnormal range of time.

Comparing the findings of the two goup, this study reported very few of the women in the paperless partograph group and few

in the WHO modified partograph group had a labour that exceeds sixteen hours that placed them under prolonged labour but the mean duration of labour in the paperless partograph group is 8.7 compared to 12.8 in the WHO a partograph group. This outcome nevertheless can be attributed to the fact that the women may have a labour period that is long but their condition remains stable from their vital signs and foetal condition. A t-test compared the mean duration of labour in both groups and showed that the difference in duration is not significant. This led us to accepting the hypothesis that Stated 'there are no significant differences between the results of paperless partograph and WHO modified partograph in the effectiveness of monitoring labour progress'. The mean duration of labour recorded in the intervention group in this study is similar to the outcome of a study in DR Congo where the mean duration was reported to be between 8-9 hours [22]. In their study in India Argawal., *et al.* (2014), reported a mean duration of 14.3 hours (4.3 hours after alert ETD) in the women monitored using the paperless partograph.

The mode of delivery recorded in the two groups was used as the measure of early detection of abnormal labour (Table 4). Chi-square is used to compare the mode of delivery in the women monitored using the two forms of the partograph as a measure of effectiveness of the paperless partograph. This is used because of the multiple options available of the dependent variable. A chi-square (χ^2) analysis of the different modes of delivery showed no significant difference between the paperless partograph group and the WHO modified partograph groups. This led us to accepting the hypothesis that 'There are no Significance Differences between the Results of Paperless Partograph and WHO Modified Partograph in the Effectiveness in Early Detection of Abnormal Labour'. This finding showed a decrease in CS rates from 11.3% reported in a study in Sokoto Nigeria [23] in Kenya (reported 15.9%) [2], and proved that the use of the partograph can change the CS rates by reducing it as opined by a WHO supported review [24].

Conclusion

Based on the findings of this study, the conclusion drawn is that the paperless partograph is an effective tool that can be used in the monitoring of labour progress to prevent prolonged labour in women thereby reducing morbidity in the mother and the baby associated with labour process.

Recommendations

Against the background and findings in the study, the following recommendations were made to further strengthen delivery services for improved maternal and foetal wellbeing:

- The paperless partograph should be adopted by the management for monitoring labours in hospitals.
- Training of midwives in the use of the paperless partograph should be organized and conducted by the health care management to ensure reduction in morbidity and mortality in women and infants.
- A system of performance monitoring should be mounted and enforced by the state government in the delivery wards in order to ensure that staff are being monitored and adequately supervised in the services they render. This monitoring activity will go a long way in ensuring that staff that were trained are utilizing the knowledge they acquire and also to see whether trainings, new knowledge and skills have any impact on health service delivery.

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Conflict of Interest

There is no conflict of interest encountered in the course of this study.

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