

Comparison of who Partograph with Paperless Partograph in the Management of Labour and to Determine which is More User Friendly

S. Bhuvanewari*, L. Krishna**, B. Sailaja**, V. Anuradha**

Abstract

Background: The partogram is a pre-printed paper on which labour observations are recorded. The aim of the partogram is to provide a pictorial overview of labour, to alert midwives or obstetricians to deviations in maternal or fetal wellbeing and labour progress. **Objective:** To compare the efficacy of WHO and paperless partograph in the management of labour and to determine which is more user friendly. **Materials and Methods:** The study was conducted in PESIMSR, Kuppam over 200 uncomplicated pregnant women. WHO partograph was used in 100 and paperless partograph was used in another 100 women. In WHO partograph group conventionally P/V examination was performed every two hours, where as in paperless partograph, alert ETD (Expected Time of Delivery) and action ETD were noted. Per vaginal examination was done only at alert and action ETD. We tried to determine which partograph was more user friendly. We also noted the duration of labour, number of P/V examinations, usage of syntocinon and infectious morbidity in both mother and fetus. **Results:** In the present study the labour was augmented in 11% in Paperless partograph group and 41% in WHO partograph group (<0.001). The success rate in terms of spontaneous vaginal delivery was 74 and 44% in Paperless partograph and WHO partograph groups

which was statically significant. The Paperless partograph has the advantage of promoting normal course of labour with less interventions. **Conclusions:** Paperless partograph is very simple to understand and implement even in rural setup and by midwives with minimal training. As the sample size in this study was small and the time period over which it was conducted was less we are including only low risk pregnancies further study is required to its applicability for larger group of patients and in high risk pregnancies.

Keywords: WHO Partograph; Paperless Partograph; User Friendly.

Introduction

The partogram is usually a pre-printed paper form, on which labour observations are recorded. The aim of the partogram is to provide a pictorial overview of labour, and to alert midwives or obstetricians to any deviations in maternal or fetal wellbeing and labour progress [1].

Despite extensive research particularly in the 1970s, the active management of labour remains a topic of controversy [2]. Practices vary enormously worldwide and within individual health systems. This disparity exists against a background of depressingly high maternal mortality rates throughout most of the developing world [3] and a rising caesarean section rate in the developed world, but with little evidence that fetal outcome is better for it [4,5]. Most of the maternal deaths, complications are preventable by proper intrapartum care [6].

Skilled management of labour using a partograph, a simple chart for recording

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information about the progress of labour, condition of a woman and fetus during labour, is key to the prevention of prolonged labour and its complications. It serves as an “early warning system” and assists in early decision on transfer, augmentation and termination of labour. The universal use of the partograph during the Safe Motherhood Initiative Nairobi Conference was encouraged by WHO in 1987 [7].

Even after the WHO simplified the partograph model to make it more user-friendly in 2000, the partograph is still rarely used in low-resource areas, and, when actually used, it is rarely interpreted correctly [8]. Dr. Debdas argues that the WHO’s partograph fails to meet the organization’s own requirements for appropriate technology. Dr. Debdas believes the partograph is simply too time-consuming for overburdened clinicians and too complicated for many skilled birth attendants. The new, low-skill method for preventing prolonged labour is paperless partogram. It takes 20 seconds, requires only basic addition and the reading of a clock or watch, and holds potential for more effectively mobilizing clinicians to prevent prolonged labour [9].

This prolonged labour prevention strategy is cheap and easy to use, even for health workers without much formal education. The simplicity of this model also makes the paperless partogram an effective hand-over tool when clinicians change shifts, ensuring women continue to be monitored for prolonged labour if their care providers change [10].

Methodology

It is an observational study conducted among 200 singleton pregnant women delivering at PESIMSR, Kuppam

Method of Collection of Data

A total of 200 pregnant women with singleton pregnancies meeting the inclusion criteria and delivering at PESIMSR, Kuppam will be recruited after obtaining informed voluntary consent. The participants will be interviewed on admission to labour room ward using predesigned proforma. The recruited women will be categorised into 2 groups 100 for WHO partograph and 100 for paperless partograph.

Plotting of Paperless Partograph

In the paperless partogram, clinicians calculate two times, an ALERT ETD (estimated time of delivery)

and an ACTION ETD. The ALERT calculation uses Friedman’s widely accepted rule that that cervix dilates 1cm per hour while a woman is in active labor. The clinician simply adds 6 hours to the time at which the woman becomes dilated to 4cm to find the ALERT ETD (when cervical dilation is at 10cm). The clinician adds 4 hours to the ALERT ETD to get the ACTION ETD. Both ETDs should be written in big letters on a woman’s case management sheet, the ACTION ETD circled in red.

At the time of the ALERT ETD, clinicians should be sensitized to the fact that the woman has not yet delivered and, if the current facility lacks C-section capabilities, make arrangements for transportation to a facility with available emergency obstetric care. At the time of the ACTION ETD, if the woman has not yet delivered, she is at risk for prolonged labor and the clinician must deliver her now by suitable medical treatment or surgical intervention. The paperless partogram also helps prevent prolonged labor by prompting clinicians to work towards a roughly “on time” delivery. For example, if uterine contractions are poor close to the ALERT ETD, clinicians can give the woman oxytocin or an equivalent to strengthen contractions.

If a woman faces obstetric complications before any ETD, clinicians should pursue medical interventions to keep her and her child healthy regardless of ETD.

Inclusion Criteria

1. Any parturient irrespective of age and parity in established labour (1 contraction in 10 min or more frequently) with cephalic presentation, irrespective of whether the membranes are intact or ruptured.
2. Onset of labour has to be spontaneous (not induced)
3. The parturient must be atleast 4cm or more dilated at the point of inclusion.
4. Gestational maturity should be 37 completed weeks or more.

Exclusion Criteria

1. Induced labour
2. Previous caesarean
3. Multiple pregnancy
4. Pregnancy Induced Hypertension
5. Antepartum hemorrhage
6. Obstetrical and medical complications

Results

It is a observational study conducted among 200 singleton pregnant women delivering at PESIMSR, Kuppam.

Table 1 compares the demographic data in two study groups.

Mean age group in WHO partograph is 23.49±2.410 and in paperless is 23.35±2.823. In WHO partograph 62% of women were primis and 38% were multtis, in papaerless partograph 57% were primis and 43% were multtis. In WHO partograph 86% were registered and 14% were unregistered where as in paperless 88% were registered, 12% were unregistered. Mean gestational age in WHO partograph was 38.9±1.053 and in paperless mean gestational age was 39.0±1.088. All parameters were comparable in both the study groups.

Table 2 compares the dilatation in two study groups.

In WHO partograph group 57% , 24%, 18% and 1% of subjects entered the study at 4, 5, 6 and 7 cms of dilatation respectively. In paperless partograph 60%, 18%, 21% & 1% of cases were entered the study at 4, 5, 6 and 7 cms of dilatation respectively

The table 3 and Figure 1 compares the distribution of subjects who have crossed Alert ETD in both the study groups.

23% of subjects in WHO partograph and 28% of subjects in paperless partograph crossed Alert ETD

The Table 4 and Figure 2 compares the distribution of subjects who have crossed Action ETD in two study groups.

3% of subjects in WHO partograph and 5% of subjects in paperless partograph crossed Action ETD

The Table 5 and Figure 3 compares the usage of oxytocin in two study groups.

In WHO partograph 41% of women required oxytocin, where as in paperless partograph 11% of subjects required oxytocin for accleration of labour.

Table 1: Partograph- Demographic data

Variable	WHO		Paperless		P value
	N	Mean ± SD/ %	N	Mean ± SD/ %	
Age (mean in yrs)	100	23.49±2.410	100	23.35±2.823	0.706
Parity					
Primi	62	62.0%	57	57.0%	0.471
Multi	38	38.0%	43	43.0%	
Registered	86	86.0%	88	88.0%	0.674
UnRegistered	14	14.0%	12	12.0%	
Gestational age					
<32 wks	0		0		0.696
32-37wks	3	3.0%	5	5.0%	
37- 40 wks	75	75.0%	76	76.0%	
>41 wks	22	22.0%	19	19.0%	
Gestational Age	100	38.9±1.053		39.0±1.088	0.589

Table 2: Partograph - Cervical dilatation

Group	Dilatation								χ ² Value	'p' value
	4		5		6		7			
	n/t	%	n/t	%	n/t	%	n/t	%		
WHO	57/100	57.0%	24/100	24.0%	18/100	18.0%	1/100	1.0%	1.165	0.761
Paperless	60/100	60.0%	18/100	18.0%	21	21.0%	1/100	1.0%		

Table 3: Partograph -crossed Alert ETD in two study groups

Group	Crossed Alter ETD				χ ² Value	'p' value
	No		Yes			
	n/t	%	n/t	%		
WHO	77/100	77.0%	23	23.0%	0.658	0.417
Paperless	72/100	72.0%	28	28.0%		

Table 4: Partograph -crossed Action ETD

Group	Crossed Action ETD				χ^2 Value	'p' value
	No		Yes			
	n/t	%	n/t	%		
WHO	97/100	97.0%	3	3.0%	0.521	0.470
Paperless	95/100	95.0%	5	5.0%		

Table 5: Partograph -oxytocin augmentation

Oxytocin used	Group				χ^2 Value	'p' value
	WHO		paperless			
	n/t	%	n/t	%		
yes	41/100	41.0%	11/100	11.0%	24.442	<0.001
No	59/100	59.0%	89/100	89.0%		

Table 6: Crossed Alert ETD- Oxytocin augmentation

Alert ETD	Oxytocin	Group				χ^2 Value	'p' value
		WHO		Paperless			
		n/t	%	n/t	%		
Not crossed	Yes	41/77	53.2%	5/72	6.9%	37.378	<0.001
	No	36/77	46.8%	67/72	93.1%		
Crossed	Yes	9/23	39.1%	12/28	42.9%	0.072	0.788
	No	14/23	60.9%	16/28	57.1%		

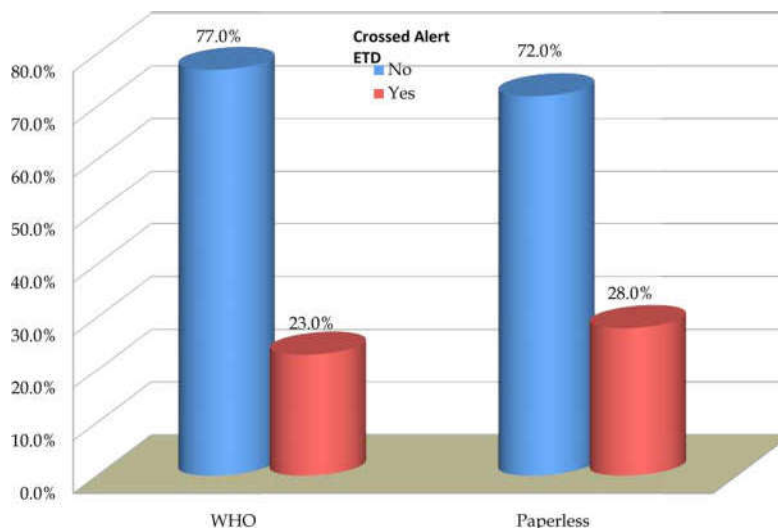
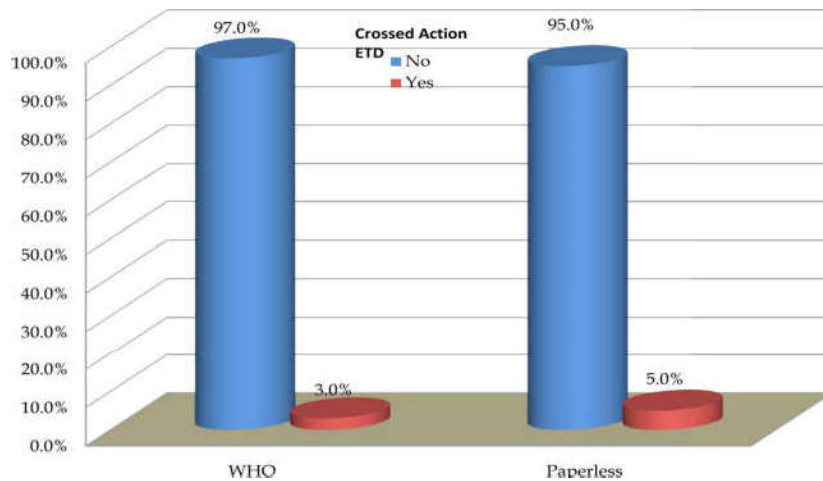


Fig. 1: Distribution of subjects who have Crossed Alert ETD in study groups

Fig. 2: Distribution of subjects who have Crossed Action ETD in study groups



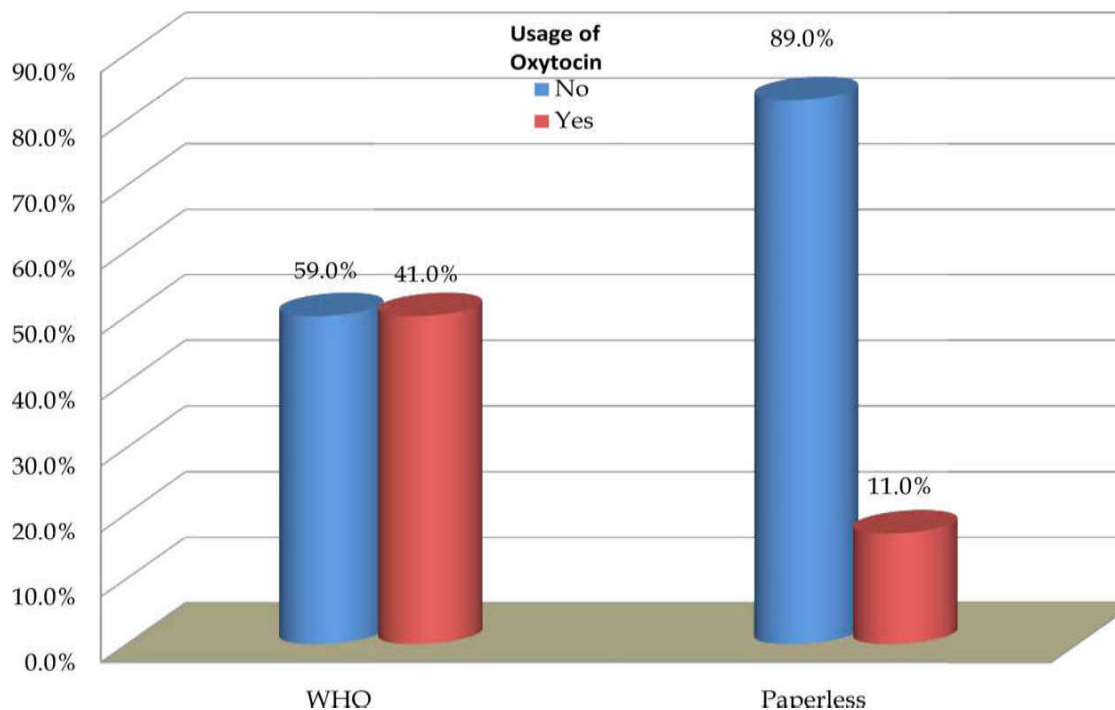


Fig. 3: Distribution of Usage of Oxytocin in study groups

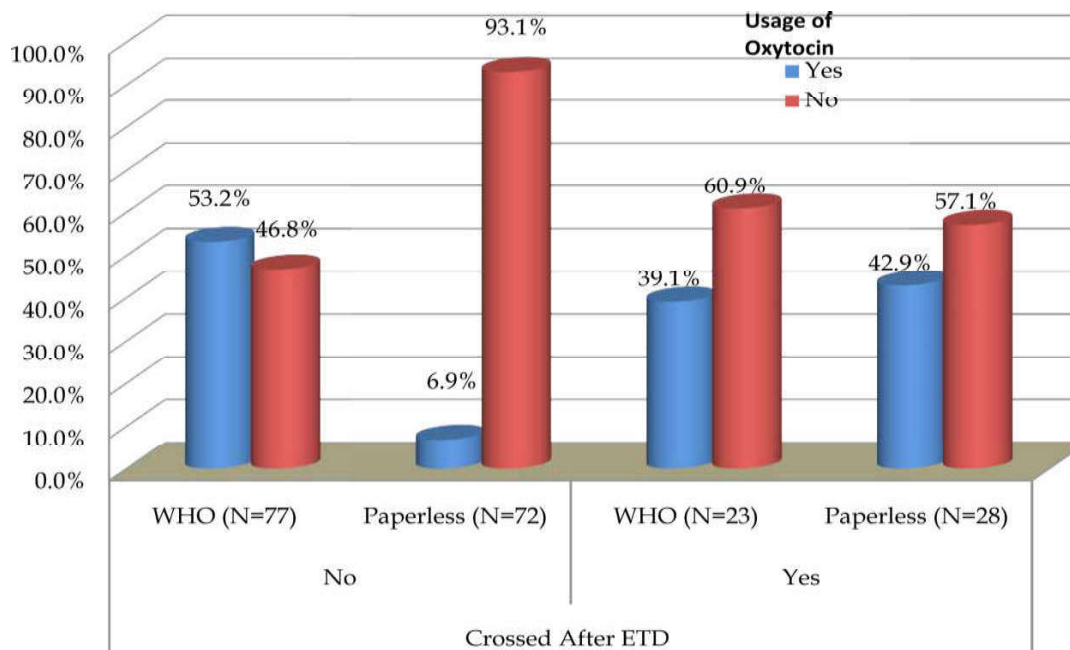


Fig. 4: Comparison of Usage of Oxytocin among subjects who have Crossed Alert ETD in study groups

Table 7: Crossed Action ETD- Oxytocin augmentation

Action ETD	Oxytocin	WHO		Group		χ^2 Value	'p' value
		N	%	N	Paperless %		
Not crossed	Yes	48/97	49.5%	14/95	14.7%	26.504	<0.001
	No	49/97	50.5%	81/95	85.3%		
Crossed	Yes	2/3	66.7%	3/5	60.0%	0.036	0.850
	No	1/3	33.3%	2/5	40.0%		

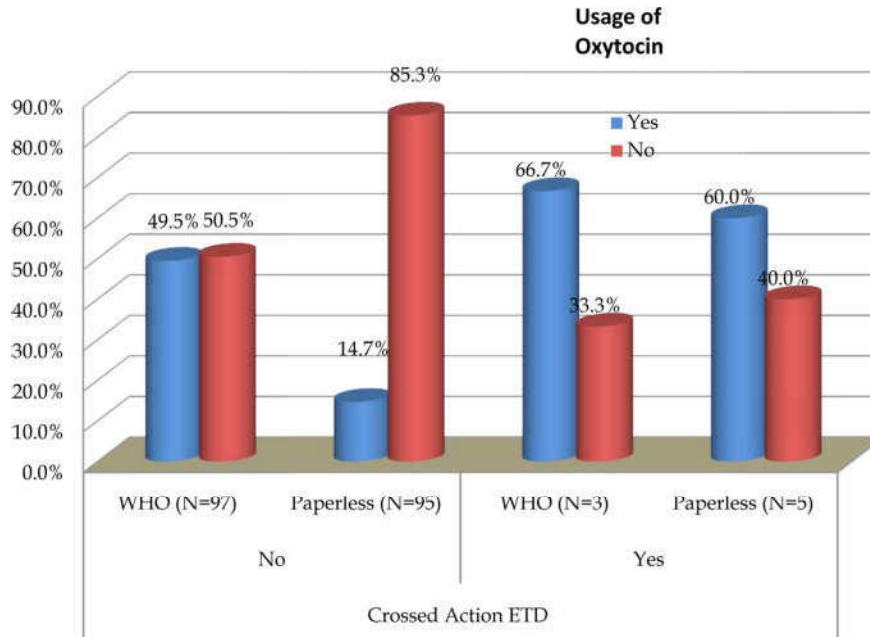


Fig. 5: Comparison of Usage of Oxytocin among subjects who have Crossed Action ETD in study groups

Table 8: Partograph- Duration of labour

	N	Min	Max	Mean(minutes)	SD	't' value	'p' value
WHO	100	61	589	248.3	130.764	0.137	0.712
Paperless	100	61	659	241.4	133.298		

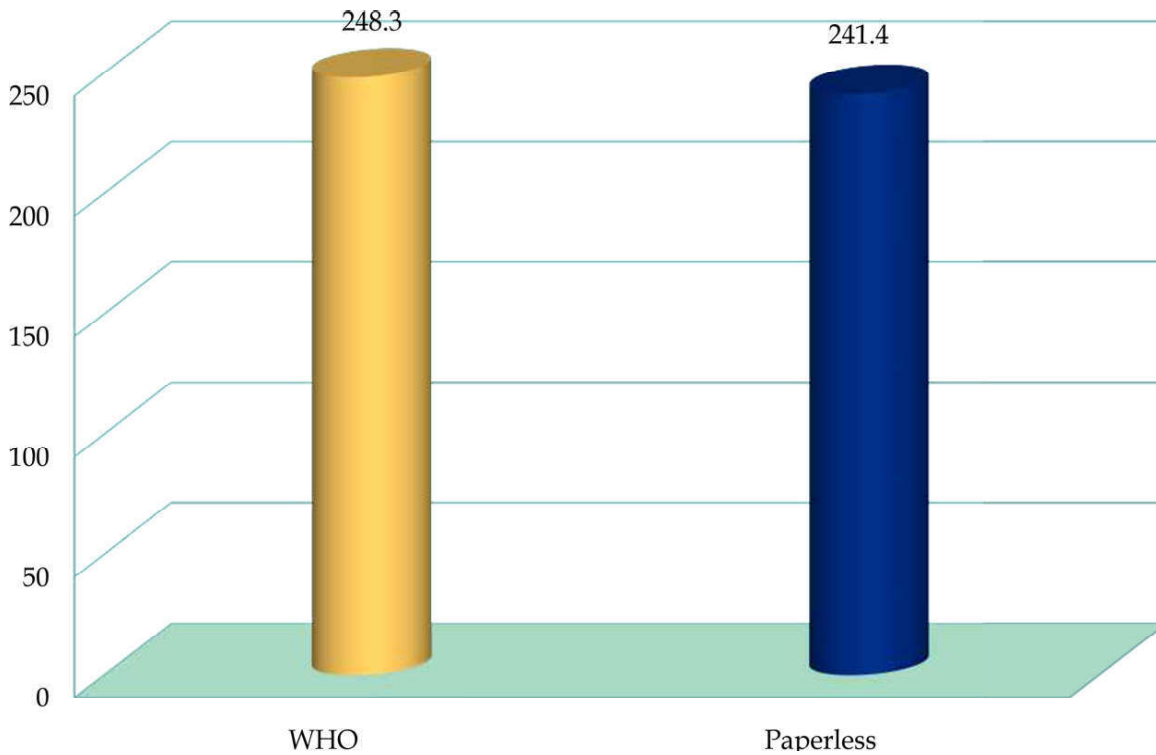


Fig. 6: Comparison of Mean Duration of Active Phae among Study Groups

The Table 6 and Figure 4 compares the usage of oxytocin among subjects who have crossed Alert ETD in two study groups.

Oxytocin was used in 53.2% of subjects who had not crossed Alert ETD in WHO partograph, where as in paperless partograph oxytocin was used in only 6.9% of cases who had not crossed Alert ETD. Oxytocin was used in 39.1% of subjects who crossed Alert ETD in WHO partograph, where as in paperless partograph oxytocin was used in 42.9% of cases who crossed Alert ETD.

The Table 7 and Figure 5 compares the usage of oxytocin among subjects who have crossed Action

ETD in two study groups. Oxytocin was used in 49.5.% of subjects who had not crossed Action ETD in WHO partograph, where as in paperless partograph oxytocin was used in only 14.7% of cases who had not crossed Action ETD. Oxytocin was used in 66.7% of subjects who had crossed Action ETD, in paperless partograph oxytocin was used in 60% of subjects who had crossed Action ETD.

The Table 8 and Figure 6 compares the duration of active phase in two study groups.

Mean duration of active phase in WHO partograph was 248.3, in Paperless mean duration of active phase was 241.4.

Table 9: Partograph- Pervaginal examination

Group	Number of pervaginal examinations(PVs)						χ ² Value	'p' value
	1	2	3	4	5	6		
WHO	1	33	21	28	13	4	75.900	<0.001
	1.0%	33.0%	21.0%	28.0%	13.0%	4.0%		
Paperless	4	87	9	0	0	0		
	4.0%	87.0%	9.0%	.0%	.0%	.0%		

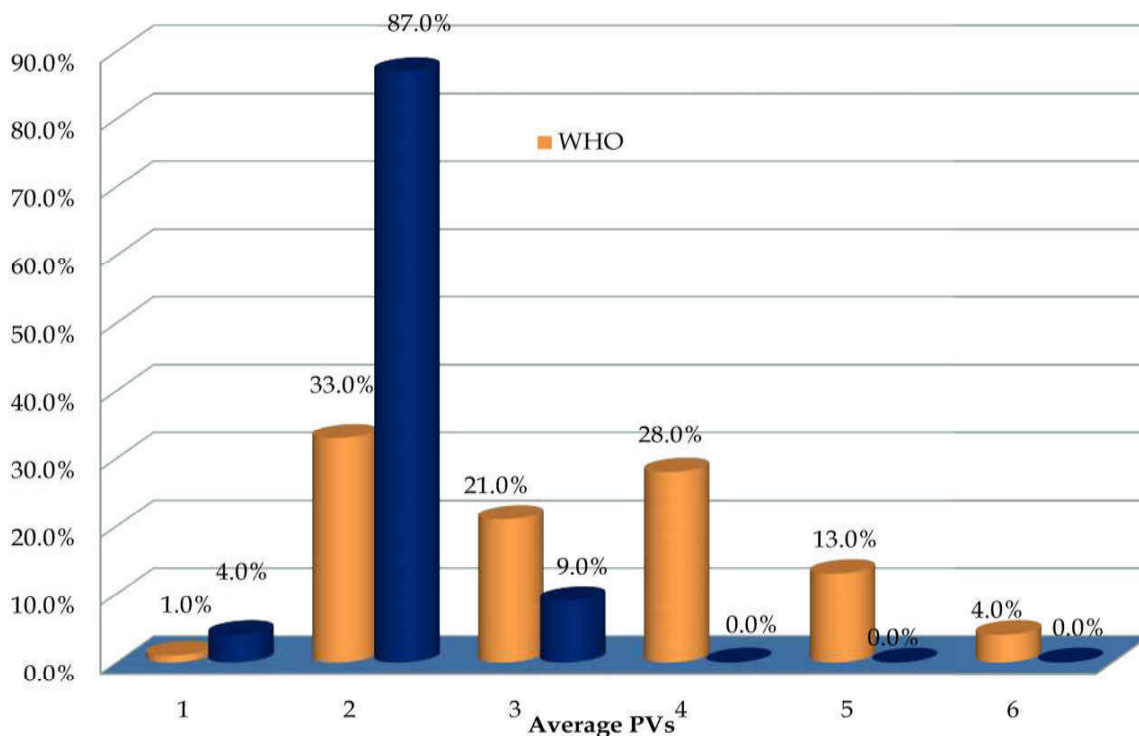


Fig. 7: Distribution of Average PVs among the Study Groups

Table 10: A Partogram-Mode of delivery

	Spontaneous		Instrumental		Emergency LSCS			
	n/t	%	n/t	%	n/t	%		
WHO	44/100	44.0%	3/100	3.0%	12/100	12.0%	25.312	<0.001
Paperless	74/100	74.0%	4/100	4.0%	11/100	11.0%		

The Table 9 and Figures 7 show the comparison of distribution of average number of Pervaginal examinations in two study groups.

In WHO partograph 66 women required more than 2 pervaginal examinations and 4 of them even required 6PVs. In Paperless partograph 87 required only 2 pervaginal examinations and only 9 required the 3rd one, none of them required more than 3PVs

The Table 10a and Figure 8 compares the distribution of mode of delivery among study groups. 74% in Paperless group had spontaneous vaginal delivery where as in WHO group only 44% had spontaneous vaginal delivery. In WHO group 41% were augmented with syntocin, in paperless group only 11% required oxytocin. In WHO and paperless partograph rate of c-section (12vs11), forceps (2vs2) and ventouse (1 vs 2) were not statistically significant

The Table 10b shows the indications for instrumental delivery and c-section. Emergency LSCS

was done for CPD(73.9%), NRFS (21.7%) cervical dystocia(4.3%). Indications for forceps were failure of secondary forces in 3 women and maternal exhaustion in 1. Ventouse was used in 2 women for NRFS and in 1 woman for Rh negative pregnancy as prophylaxis

The Table 11 and Figure 9 compares the maternal outcome in two study groups. Among 100 subjects 2 had developed sepsis in WHO partograph, and 1 women out of 100 developed sepsis in paperless partograph developed sepsis

The Table 12 and Figure 10 compares the perinatal outcome in both the study groups. Mean Apgar in WHO partograph at 1 and 5 minutes was 7.70±0.980 and 8.83±0.792 respectively. In paperless partograph mean Apgar at 1minute is 8.83±0.792 and at 5minutes mean Apgar is 8.96±0.315. Mean birth weight in WHO and paperless partographs was 3080.7±362.478 and 3053.4±447.275 respectively. 22% in WHO partograph group and 18% in paperless

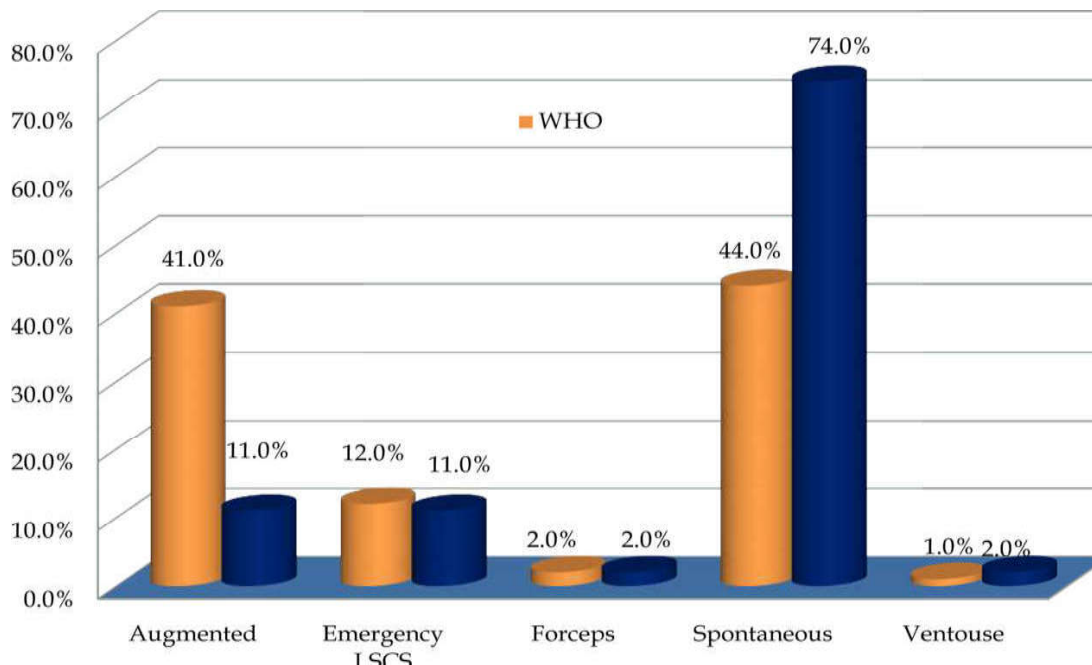


Fig. 8: Distribution of Mode of Delivery among the Study Groups

Table 10 b: Indications for instrumental delivery and c-section

Indication for	Indication					
	Cervical dystocia	CPD	Fail of sec forces	Maternal exhaustion	NRFS	Prophylactic Rh -ve
Emergency LSCS	1	17	0	0	5	0
	4.3%	73.9%	.0%	.0%	21.7%	.0%
Forceps	0	0	3	1	0	0
	.0%	.0%	75.0%	25.0%	.0%	.0%
Ventouse	0	0	0	0	2	1
	.0%	.0%	.0%	.0%	66.7%	33.3%
Total	1	17	3	1	7	1
	.5%	8.5%	1.5%	.5%	3.5%	.5%

Table 11: Comparison of maternal outcome in two study groups

Group	Maternal Sepsis				Total	χ^2 Value	'p' value
	Yes	No	Yes	No			
	n	%	n	%			
WHO	2	2.0%	98	98.0%	100	0.338	0.561
Paperless	1	1.0%	99	99.0%	100		

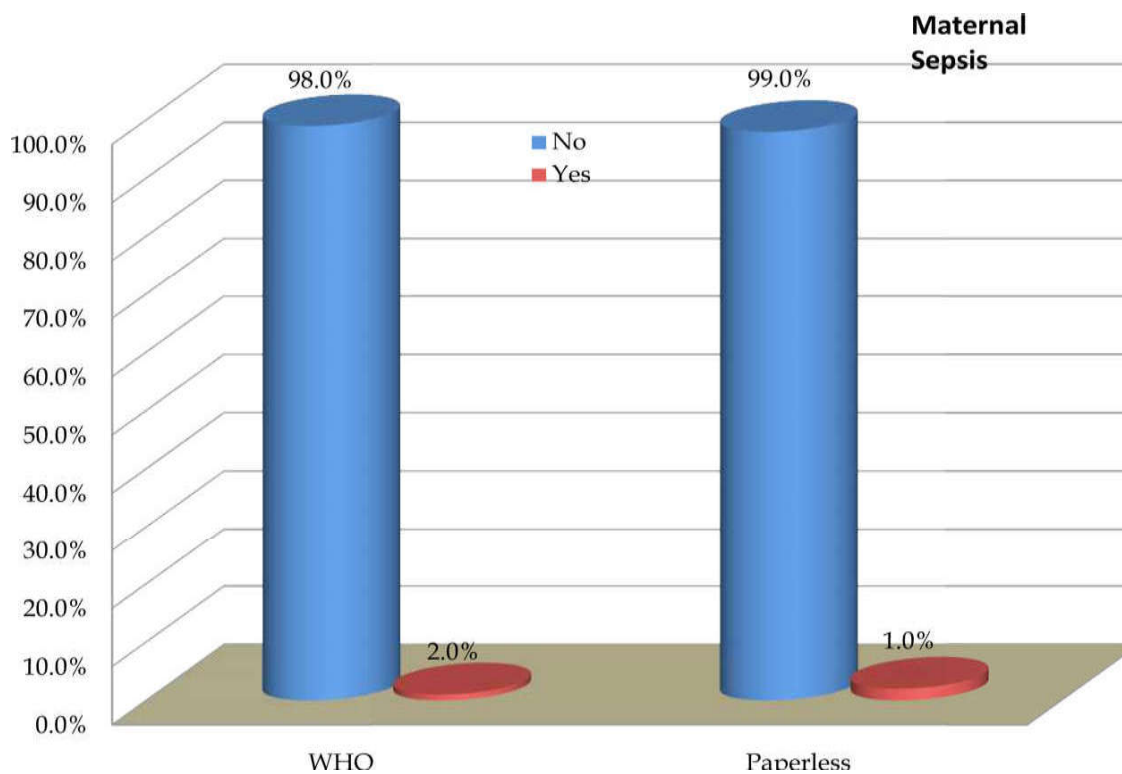


Fig. 9: Distribution of Maternal Sepsis in study groups

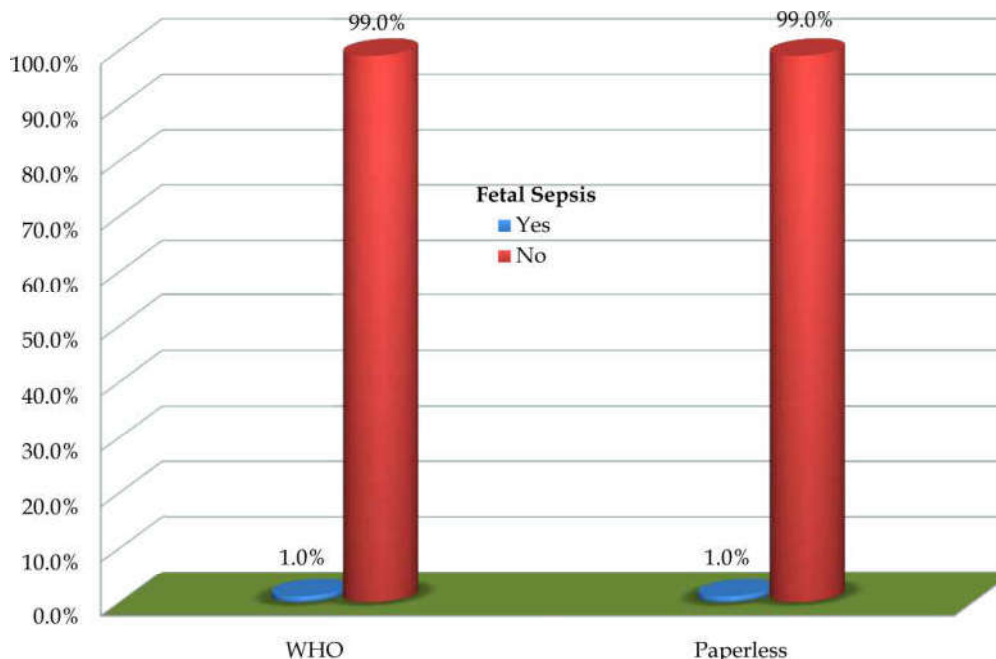


Fig. 10: Distribution of Fetal Sepsis among study groups

Table 12: Comparison of perinatal outcome in two study groups

Variable	WHO		Paperless		P value
	N	Mean \pm SD / %	N	Mean \pm SD / %	
Apgar 1 min	100	7.70 \pm 0.980	100	7.89 \pm 0.0650	0.108
Apgar 5 min	100	8.83 \pm 0.792	100	8.96 \pm 0.315	0.129
Brith Weight(kgs)	100	3080.7 \pm 362.478	100	3053.4 \pm 447.275	0.636
NICU admission					
Yes	22	22.0%	18	18.0%	0.480
No	78	78.0%	82	82.0%	
Reason of NICU admission					0.448
Birth Asphyxia	5	22.7%	2	11.1%	
MSL	13	59.1%	14	77.8%	
Observation	4	18.2%	2	11.1%	
Fetal Sepsis					1.000
Yes	1	1.0%	1	1.0%	
No	99	99.0%	99	99.0%	

group required NICU admission. In WHO group 77.8% of babies were admitted in NICU for meconium stained liquor and 59.1% needed NICU admission for the same in paperless group. 22.7% of babies were admitted for birth asphyxia and 18.2% of babies were admitted in NICU for observation in WHO group and 11.1% of babies were admitted for birth asphyxia and for observation in paperless group. 1% in both study groups developed neonatal sepsis.

Discussion

E.A, Friedman in 1954 following a study on a large number of women in the USA, described a normal cervical dilatation pattern. Philpott in extensive studies of primigravidae in Central and Southern Africa constructed a partogram for cervical dilation in his population and was able to identify deviations from the normal and provide a sound scientific basis for early intervention leading to the prevention of prolonged labour [11]. The WHO model of the partograph was designed as a simplified format including the best features of several partographs [12]. With the institution of partograph there is a decrease in perinatal mortality.

Although the WHO [13] recommended universal application of the partogram. Even after the WHO simplified the partograph model to make it more user-friendly in 2000, the partograph is still rarely used in low-resource areas, and when used, it is rarely interpreted correctly. Debdas [14] believes that the partograph is simply too time-consuming for overburdened clinicians and too complicated for many skilled birth attendants – many of whom have not received higher education. The paperless partogram proposed by Dr. Debdas is a low-skill

method for preventing abnormal labor. very few reports available comparing the two WHO partographs. The present study was conducted at a tertiary care teaching hospital to compare the WHO and paperless partographs and its user friendliness. This is a novel comparison between two partograms and no current studies are available to compare .

In the present study, labor crossing the alert line was found in 23% WHO group and 28% in Paperless group. Kenchaveeriah et al [15] Reported 28.2% of patients in the composite partograph group and 13.7% of patients in the \simplified partograph group (p=0.0001). Similar study done at Vellore, India reports 17.7% and 15.1% in the two groups respectively [16]. A study done in Pakistan showed 11.6% of labors to cross the alert line in the simplified partograph group [17]. 23.6% of patients crossed the alert line when the composite partograph was plotted in a study conducted in Medan, Indonesia [18].

Labor crossing the action line was observed in 3% and 2% in Paperless and WHO group. Kenchaveeriah et al reported 10.8% and 1.96% parturients in the composite and simplified group respectively (p=0.005). Almost similar observations were made by the study done at Vellore where labor had crossed the action line in 7.0% in the composite group as compared to 1.0% in the simplified group [16].

Out of 200 participants, labor was augmented in 11% of cases in paperless partogram and 41 % of the cases in WHO group. it has the advantage of promoting normal course of labour and less interventions . Augmentation was higher in patients in whom labor had crossed the alert and action lines. Similar results were noted in a study done in Belgium where 26% had crossed the action line even after augmentation, when the composite partograph was used [19].

The success rate in terms of spontaneous vaginal delivery in our study is 74 and 44 % in Paperless and WHO groups which is statically significant . Kenchaveeriah et al reported 76.08% in the composite group and 89.9% in the simplified partograph group. A study done in Calcutta had 80.6% of cases who delivered vaginally in the composite group and 82.7% in the simplified group.

The caesarean section rate in Paperless & WHO partograms was 12% and 11% respectively. A study from Calcutta had similar results, where it was 10% and 8.9% in each [20]. Published literature from Dublin, Ireland, highlights 5.4% of patients undergoing cesarean section in the composite partograph group, [20] but a study from Vellore showed only 8.8% and 2.35% of parturients undergoing cesarean section [16].

The NICU admissions 18vs 22 in WHO and paperless partograms were not statistically significant. Kenchaveeriah et al reported 19.4% and 8.9% in their composite and simplified groups respectively. The Vellore study had similarities with our results, where the admissions to NICU care were 20% in the composite group and 16% in the simplified group [16].

As the sample size in this study was small and the time period over which it was conducted was less we recommend planning of a larger study so that favourable results of this study can be reproduced

Conclusion

We found that Paperless partogram was user friendly because it was easy to use because it did not have graph paper, did not require extra time, extra work, there was no dot to plot, line to draw and curve to chase. Where as plotting of WHO partograph was complex because of Reluctance about plotting data on graph paper, complex face of partograph paper, busy schedule of the staff and unavailability of partographic chart paper.

Number of pv examinations was significantly higher in WHO partograph compared to paperless partograph, how much ever stringent we were in our aseptic precautions pervaginal examinations were known to cause infection both mother and fetus. This helps us to reduce both maternal and perinatal morbidity and mortality due to sepsis.

Injudicious usage of oxytocin is cutdown in paperless partograph compared to WHO. Oxytocin usage has not accelerated the labour instead it has reduced the chance of spontaneous vaginal delivery

significantly. However WHO has not significantly increased the instrumental delivery rate.

However Problems related to increased pv examinations and excessive oxytocin usage need to be confirmed by larger study. As partograph is utilized mainly in tertiary health facilities and knowledge about partograph among peripheral workers is poor hence further research in this field and training of personnel is mandatory. This paperless partograph is very simple to understand and implement even in rural setup and by midwives with minimal training. The appropriate time of referral needs more emphasis in continuing education and partograph should be promoted for use by midwives and MBBS doctors who care for labouring women in primary health care centers.

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