

# **Prospective Comparison of Rectal Misoprostol versus Oxytocin Infusion for Prevention of Post-Caesarean Section Primary Postpartum Hemorrhage.**

## **ABSTRACT**

### **BACKGROUND**

The drug of choice recommended by the WHO for the prevention of primary postpartum hemorrhage after vaginal or post Caesarean delivery is oxytocin. However, oxytocin is labile in hot tropical climates as in Africa with reduced efficacy. Misoprostol may be an alternative as it has most properties of oxytocin. This study is to compare the efficacy, storage of misoprostol with oxytocin in the prevention of primary post-partum hemorrhage.

### **AIM**

To compare efficacy, storage of rectal misoprostol with oxytocin in preventing primary postpartum hemorrhage after Caesarean Delivery.

Methodology.

### **STUDY DESIGN.**

This study was a double blind, randomized controlled trial - non-inferior design.

One hundred and forty women who were suited for Cesarean delivery were randomly selected into two groups of 70 parturient each. One arm have oxytocin infusion and the other had 600µg of rectal misoprostol inserted after the Caesarean section to prevent primary post-partum hemorrhage. The 24 hour post-partum blood loss was collected, measured and compared.

### **ANALYSIS**

All data extracted were entered into SPSS version 25.0 and analyzed. The statistical significance was set at p-value of 0.05.

## RESULTS

There was no statistically significant difference between the Misoprostol and Oxytocin groups in preventing primary postpartum hemorrhage after Caesarean section delivery. ( $106.8 \pm 48.6$  ml vs.  $131.7 \pm 161.4$  ml,  $p= 0.839$ ). 38.6 % vs. 10.0 % respectively).

## CONCLUSION

Rectally administered misoprostol was as effective as oxytocin infusion in the prevention of primary postpartum hemorrhage after vaginal or Caesarean delivery, giving Obstetricians choices of drugs to use.

**KEY WORDS:** Misoprostol, Oxytocin infusion, Caesarean section, postpartum hemorrhage, vaginal delivery, Obstetric interventions

## INTRODUCTION

The Sub-Saharan Africa has one of the highest maternal mortality ratio (MMR) of 533 maternal deaths per 100,000 deliveries in the world sub regions and obstetric hemorrhage is one the six leading causes of these maternal deaths in sub-Saharan Africa.<sup>1, 2,3.</sup>

Whatever be the mode of delivery of a pregnant woman, the cardinal symptom is hemorrhage and the degree of loss may be quantified further by route of delivery of the baby: For vaginal and Caesarean deliveries, blood loss per vaginal equal or above 500ml and for Caesarean section blood loss of equal or greater than 1000 ml in the first 24 hours is termed primary post-partum hemorrhage respectively. Any amount of blood loss that affects the hemodynamic status of the patient is also termed primary post-partum hemorrhage.<sup>4</sup> The best practice for every Obstetrician is to stem the tide of bleeding in labor or after child birth. This is because, these are the two most vulnerable points where women are at high risk of dying. While the uterine anatomy is specifically built for the purpose of improving the hemostatic stability of the would-be mother in anticipation of hemorrhage in labor, delivery or immediately after childbirth. The hemostatic process is also helped by the physiological changes in pregnancy which prepares the impending parturient for excessive blood loss like increased blood volume, increased clotting factors in pregnancy that would compensate for anticipated blood loss at the point of delivery. However it has become conventional in obstetric practice to augment natural hemostasis process

at delivery with either the use of two uterotonic drugs –Oxytocin or misoprostol and other drugs. The uterotonic drugs mimic the natural rhythmic uterine contractility thereby maintain hemostasis after delivery. This pattern of uterine contraction is to allow the latter to maintain its blood supply in the interval of the contractions and prevent it from ischemia and organ damage. For the purpose of this study, we will dwell on oxytocin and misoprostol, the two utero-tonic drugs conventionally used for prevention of primary post-partum hemorrhage after vaginal or Caesarean delivery. We will compare the efficacy of the two drugs, their potential use in tropical climate, storage, side effects, accessibility in terms of routes of administration, cost and also compare the two drugs, whether one has advantage(s) over the other in terms of prevention of primary post-partum hemorrhage which is a challenge in sub-Saharan Africa.

### **PHARMACOKINETICS OF OXYTOCIN.**

Oxytocin is a Nona peptide hormone secreted from the hypothalamus, but stored in the posterior pituitary gland. The commercially available preparation has little or no antidiuretic or vasopressor action when given at the recommended dosage. Oxytocin injection is stored at a temperature between 2 °c and 8 °c but not exceeding 25 ° c in tropical climates, because its efficacy reduces in these hot tropical climates as in sub-Saharan Africa.<sup>5</sup> Oxytocin is destroyed in the gastrointestinal tract, thus it must be given parentally. Uterine response to oxytocin is almost immediate with intravenous administration but takes between three and five minutes with intramuscular administration with uterine response subsiding in approximately two to three hours for intramuscular administration and one hour for intravenous administration<sup>6, 7</sup>. The drug is rapidly degraded in the liver and kidneys and excreted in urine. The drug is contraindicated once cephalo-pelvic disproportion in labor has been confirmed. Side effects of the drug include: (water intoxication, fetal distress, precipitate labor, uterine rupture, etc.) which are usually due to inappropriate use or too high a dose of the drug

### **PHARMACOLOGY OF MISOPROSTOL**

Misoprostol is a synthetic prostaglandin E<sub>1</sub> analogue. The drug was originally used to treat peptic ulcer disease but later found to have uterotonic qualities and since been deployed in obstetric practice.<sup>8, 9, 10</sup>. Like oxytocin, misoprostol has been used for labor induction, cervical ripening, and prevention of primary post hemorrhage after vaginal or Caesarean delivery. Misoprostol is

stable in in hot climates. Misoprostol can also be given through different routes like vaginal, rectal. Sublingual, oral routes<sup>9, 10</sup>. With these similarities and differences with oxytocin, we found it justifiable to compare the two drugs so that Physicians could have a wider spectrum of drugs to choose from in the prevention of post-partum hemorrhage.

## METHODOLOGY

This is a , double blind randomized control trial sampling, non-inferior design) conducted at the Federal Medical Centre, Yenagoa, Nigeria to compare Misoprostol to Oxytocin in terms of their effectiveness in preventing primary post-partum hemorrhage consequent on Caesarean delivery.

One hundred and forty women with clear indications for elective Caesarean section were divided randomly into two groups of 70 women each. One arm had Oxytocin infusion and the other arm had rectal misoprostol all for a duration of 24 hours. Permission was sought from the hospital ethical committee and it was granted. The consent of the subjects for the study were also sought and obtained.

The exclusion criteria for the study included those who did not give their consent, those with overt risk factors for primary post- partum hemorrhage like placenta praevia, previous Caesarean sections, abnormal lies and presentations, referred cases who had been in labor somewhere, were all excluded.

## RESULTS

Table 1: **Socio-demographic characteristics of participants in the Misoprostol and Oxytocin infusion study groups.**

Characteristics	Total	Misoprostol group	Oxytocin infusion group	Test of Significance	df	P Value
	N = 140 (%)	N = 70 (%)	N = 70 (%)			

<b>Age group</b>						
< 25 years	9 (6.4)	6 (8.4)	3 (4.3)	3.19 <sup>a</sup>	3	0.363
25 – 29 years	37 (26.4)	20 (28.6)	17 (24.3)			
30 – 34 years	34 (24.3)	13 (18.6)	21 (30.0)			
≥ 35 years	60 (42.8)	31 (43.3)	29 (41.4)			
<b>Mean Age ± SD</b>						
<b>in years</b>	32.4 ± 5.7	32.4 ± 6.2	32.4 ± 5.2	0.05 <sup>b</sup>	138	0.965
<b>Ethnicity</b>						
Ijaw	91 (65.0)	46 (65.7)	45 (64.3)	4.92 <sup>a</sup>	3	0.178
Igbo	19 (13.6)	6 (8.6)	13 (18.6)			
Urhobo/Isoko	11 (7.9)	3 (4.3)	8 (11.4)			
Others	19 (13.6)	10 (14.3)	9 (12.9)			
<b>Parity</b>						
Nullipara	29 (20.7)	16 (22.9)	13 (18.6)	0.81 <sup>a</sup>	3	0.846
Primipara	26 (18.6)	14 (20.0)	12 (17.1)			
Multipara	50 (35.7)	23 (32.9)	27 (38.6)			
Grandmultipara	35 (25.0)	17 (24.3)	18 (25.7)			
<b>Median Parity</b>						
<b>(Range)</b>	2.0 (0.0 – 8.0)	2.0 (0.0 – 8.0)	2.0 (0.0 – 0.5)			

<sup>a</sup>Test of significance is Chi-square test, <sup>b</sup>Test of Significance is t-Test. SD – Standard deviation

### 5.3 BASELINE CLINICAL CHARACTERISTICS OF PARTICIPANTS IN THE STUDY GROUPS.

Table 2 shows a baseline description of the clinical features of participants in both study arms of the trial. Both study arms were similar in terms of mean gestational age, type at Caesarean delivery, pre-operative hematocrit and the duration of surgery ( $p > 0.05$ ). Table 2 also shows that the intra-operative blood loss for both study groups were not significantly different ( $603.5 \text{ ml} \pm 153.8 \text{ ml}$  vs  $597.4 \text{ ml} \pm 200.9 \text{ ml}$ ,  $p = 0.839$ ).

Table 2: Baseline clinical characteristics of Parturient and Caesarean section features in the study groups.

Characteristics	Total N = 140 (%)	Misoprostol group N = 70 (%)	Oxytocin infusion group N = 70 (%)	Test of Significance	df	pValue
<b>Gestational Age</b>						
<b>in weeks, Mean ± SD</b>	38.3 ± 1.2	38.2 (1.1)	38.3 (1.4)	-0.42 <sup>b</sup>	138	0.678
<b>Gestational Age</b>						
<b>in days, Mean ± SD</b>	267.9 ± 9.3	268.2 ± 8.0	267.5 ± 10.5	0.42 <sup>b</sup>	138	0.972
<b>Type of CS</b>						
Emergency	97 (69.3)	51 (72.9)	46 (65.7)	0.84 <sup>a</sup>	1	0.360
Elective	43 (30.7)	19 (27.1)	24 (34.3)			
<b>Pre-operative PCV</b>						
Mean ± SD in %	35.9 ± 5.5	35.6 ± 6.0	36.1 ± 5.1)	-0.54 <sup>b</sup>	138	0.592
<b>Duration of Surgery</b>						
Mean ± SD in hours	1.2 ± 0.3	1.2 ± 0.2)	1.2 ± 0.3	-1.72 <sup>b</sup>	138	0.188
<b>EBL at Surgery</b>						
(ml)	600.4 ± 178.3	603.5 ± 153.8	597.4 ± 200.9	0.204 <sup>b</sup>	138	0.839

<sup>a</sup>Test of significance is Chi-square test, <sup>b</sup>Test of Significance is t-Test. SD – Standard deviation, CS – Caesarean section, PCV – Packed cell volume, EBL- Estimated blood loss

Table 3: Indications for Caesarean section in the Misoprostol and Oxytocin infusion groups.

Characteristics	Total N = 140 (%)	Misoprostol group N = 70 (%)	Oxytocin infusion group N = 70 (%)	Test of Significance (Chi-square)	df	PValue
<b>Severe Preeclampsia with unfavourable cervix</b>						
Yes	27 (19.3)	12 (17.1)	15 (21.4)	0.41	1	0.520
No	113 (80.7)	58 (82.9)	55 (78.6)			
<b>Breech Presentation</b>						
Yes	9 (6.4)	4 (5.7)	5 (7.1)	0.12	1	0.730
No	131 (93.6)	66 (94.3)	65 (92.9)			
<b>Multiple gestation</b>						
Yes	3 (2.1)	1 (1.4)	2 (2.9)	0.34	1	1.000 <sup>a</sup>
No	137 (97.9)	69 (98.6)	68 (97.1)			
<b>Multiple previous CS</b>						
Yes	4 (2.9)	2 (2.9)	2 (2.9)	0.00	1	1.000
No	136 (97.1)	68 (97.1)	68 (97.1)			
<b>Previous CS + Multiple gestation</b>						
Yes	3 (2.1)	2 (2.9)	1 (1.4)	0.34	1	1.000 <sup>a</sup>
No	137 (97.9)	68 (97.1)	69 (98.6)			
<b>Previous CS+ Hypertension</b>						
Yes	6 (4.3)	4 (5.7)	2 (2.9)	0.69	1	0.404
No	134 (95.7)	66 (94.3)	68 (97.1)			
<b>Previous CS+ Uterine Fibroid</b>						
Yes	5 (3.6)	0 (0.0)	5 (7.1)	5.19	1	0.023
No	135 (96.4)	70 (100.0)	65 (92.9)			
<b>Previous CS + Prolong latent phase of labour</b>						
Yes	3 (2.1)	0 (0.0)	3 (4.3)	3.07	1	0.080
No	137 (97.9)	70 (100.0)	67 (95.7)			
<b>Previous CS + Foetal Macrosomia</b>						
Yes	9 (6.4)	8 (11.4)	1 (1.4)	5.82	1	0.016
No	131 (93.6)	62 (88.6)	69 (98.6)			

<b>Previous CS + PET</b>						
Yes	6 (4.3)	2 (2.9)	4 (5.7)	0.69	1	0.404
No	134 (95.7)	68 (97.1)	66 (94.3)			
<b>Previous CS + Transverse Lie</b>						
Yes	1 (0.7)	0 (0.0)	1 (1.4)	1.01	1	0.316
No	139 (99.3)	70 (100.0)	69 (98.6)			
<b>Abruptio placenta</b>						
Yes	6 (4.3)	3 (4.3)	3 (4.3)	0.00	1	1.000
No	134 (95.7)	67 (95.7)	67 (95.7)			
<b>Abruptio placenta+ Preeclampsia</b>						
Yes	3 (2.1)	3 (4.3)	0 (0.0)	3.07	1	0.080
No	137 (97.9)	67 (95.7)	70 (100.0)			
<b>Cephalopelvic disproportion</b>						
Yes	23 (17.1)	10 (14.3)	13 (18.6)	0.47	1	0.494
No	117 (83.6)	60 (85.7)	56 (81.4)			
<b>Cephalopelvic disproportion + Hypertension</b>						
Yes	1 (0.7)	0 (0.0)	1 (1.4)	1.01	1	0.316
No	139 (99.3)	70 (100.0)	69 (98.6)			
<b>Uterine Fibroid + Fetal Macrosomia</b>						
Yes	1 (0.7)	0 (0.0)	1 (1.4)	1.01	1	0.316
No	139 (99.3)	70 (100.0)	69 (98.6)			
<b>Fetal Macrosomia+ Prolong latent phase</b>						
Yes	1 (0.7)	0 (0.0)	1 (1.4)	1.01	1	0.316
No	139 (99.3)	70 (100.0)	69 (98.6)			
<b>Obstructed labour</b>						
Yes	9 (6.4)	5 (7.1)	4 (5.7)	0.12	1	1.000
No	131 (93.6)	65 (92.9)	66 (94.3)			
<b>Placenta praevia</b>						
Yes	10 (7.1)	7 (10.0)	3 (4.3)	1.72	1	0.326
No	130 (92.9)	63 (90.0)	67 (95.7)			
<b>Failed instrumental Delivery</b>						
Yes	4 (2.9)	3 (4.3)	1 (1.4)	1.03	1	0.620
No	136 (97.1)	67 (95.7)	69 (9.6)			



## 5.5 DISTRIBUTION OF KNOWN RISK FACTORS FOR PRIMARY POSTPARTUM HAEMORRHAGE AMONGST THE PARTURIENTS.

In Table 4, the most common risk factor for primary postpartum hemorrhage in this study is maternal age > 35 years (36.4 %), though the proportion of women in the Misoprostol group with this risk factor (37.1 %) was slightly higher than those in the Oxytocin infusion group (35.7 %), there was no significant difference ( $X^2 = 0.03$ ; p- 0.861). Other risk factors for primary postpartum haemorrhage include previous uterine surgery (31.4 %), use of magnesium sulphate (26.4 %) and grandmultiparity (25.0 %). Yet, there was no statistically significant difference between both trial groups in terms of distribution of known risk factors for primary post-partum hemorrhage.

**Table 4: Distribution of known risk factors for post-partum haemorrhage among participants in the study groups.**

Characteristics	Total N = 140 (%)	Misoprostol group N = 70 (%)	Oxytocin infusion group N = 70 (%)	Test of Significance (Chi-square)	df	pValue
<b>Prolong Labour</b>						
Yes	20 (14.3)	10 (14.3)	10 (14.3)	0.00	1	1.000
No	120 (85.7)	60 (85.7)	60 (85.7)			
<b>Induction of Labour</b>						
Yes	5 (3.6)	2 (2.9)	3 (4.3)	0.21	1	0.649
No	135 (96.4)	68 (97.1)	67 (95.7)			
<b>Augmentation of labour</b>						
Yes	30 (21.4)	12 (17.1)	18 (25.7)	1.53	1	0.217
No	110 (78.6)	58 (82.9)	52 (74.3)			
<b>Grandmultiparity</b>						
Yes	35 (25.0)	17 (24.3)	18 (25.7)	0.04	1	0.846
No	105 (75.0)	53 (75.7)	52 (74.3)			
<b>Class II Obesity</b>						

Yes	13 (9.3)	5 (7.1)	8 (11.4)	0.76	1	0.382
No	127 (90.7)	65 (92.9)	62 (88.6)			
<b>Polyhydramnios</b>						
Yes	3 (2.1)	1 (1.4)	2 (2.9)	0.34	1	1.000
No	137 (97.9)	69 (9.6)	68 (97.1)			
<b>Placenta praevia</b>						
Yes	10 (7.1)	7 (10.0)	3 (4.3)	1.72	1	0.326
No	130 (92.9)	63 (90.0)	67 (95.7)			
<b>Abruptio placenta</b>						
Yes	7 (5.0)	4 (5.7)	3 (4.3)	0.15	1	1.000
No	133 (95.0)	66 (94.3)	67 (95.7)			
<b>History of PPH</b>						
Yes	6 (4.3)	1 (1.4)	5 (7.1)	2.79	1	0.095
No	134 (95.7)	69 (98.6)	65 (92.9)			
<b>Use of MgSO4 (Pre-eclampsia)</b>						
Yes	37 (26.4)	17 (24.3)	20 (28.6)	0.33	1	0.565
No	103 (73.6)	53 (75.3)	50 (71.4)			
<b>General Anaesthesia</b>						
Yes	7 (5.0)	3 (4.3)	4 (5.7)	0.15	1	0.698
No	133 (95.0)	67 (95.7)	66 (94.3)			
<b>Previous uterine Surgery</b>						
Yes	44 (31.4)	18 (25.7)	26 (37.1)	2.12	1	0.145
No	96 (68.6)	52 (74.3)	44 (62.9)			
<b>Maternal Age &gt; 35 years</b>						
Yes	51 (36.4)	26 (37.1)	25 (35.7)	0.03	1	0.861
No	89 (63.6)	44 (62.9)	45 (64.3)			

## 5.6 INTRA- AND POST-OPERATIVE FEATURES IN THE STUDY GROUPS (TABLE 5)

Table 5 shows that the primary outcome measure of this study, 24 hours post-operative blood loss per vaginam for the Misoprostol group and the Oxytocin infusion group were  $106.8 \pm 48.6$

ml vs  $131.7 \pm 161.44$  ml, respectively,  $p = 0.839$ . Thus, there was no statistically significant difference in the 24 hours post-operative estimated blood loss per vaginam between both study groups.

In this study, Misoprostol and Oxytocin infusion study groups were similar in requirements for additional oxytotic intraoperative (22.9% vs 14.3%,  $p = 0.192$ ) and 24-hour post-operative (0.0 % vs 2.9 %,  $p = 0.154$ ).

Regarding the need for blood transfusion in the first 24 hours post-Caesarean section, only one participant in the study required blood transfusion due to primary postpartum haemorrhage from uterine atony and she belonged to the Oxytocin infusion arm of the trial, this was also not statistically significant. (0.0 % Misoprostol group vs 1.4 % Oxytocin infusion group,  $p = 0.316$ ). There were no statistical differences observed between the Misoprostol and Oxytocin infusion study groups with regards to 24-hours post-operative hematocrit level ( $30.3\% \pm 5.8\%$  vs  $31.7\% \pm 3.7\%$ ,  $p = 0.182$  ).

**Table 5: Intra- and post-operative features in the study groups**

Characteristics	Total N = 140 (%)	Misoprostol group N = 70 (%)	Oxytocin infusion group N = 70 (%)	Test of Significance	df	pValue
<b>Additional intra-operative Oxytotic</b>						
Yes	26 (18.6)	16 (22.9)	10 (14.3)	1.70 <sup>a</sup>	1	0.192
No	114 (81.4)	54 (77.1)	60 (85.7)			
<b>Additional Post-Operative Oxytotic</b>						
Yes	2 (1.4)	0 (0.0)	2 (2.9)	2.03 <sup>a</sup>	1	0.154
No	138 (98.6)	70 (100.0)	68 (97.1)			
<b>Need for blood transfusion due to uterine atony</b>						
Uterine atony	1 (0.7)	0 (0.0)	1 (1.4)	1.01 <sup>a</sup>	1	0.316

No atony	139 (99.3)	70 (100.0)	69 (98.6)			
<b>Need for blood transfusion due to other indications</b>						
Adhesion	9 (6.4)	2 (2.9)	7 (10.0)	9.25 <sup>a</sup>	2	0.010
Low PCV	10 (7.1)	9 (12.9)	1 (1.4)			
No	121 (85.7)	58 (82.9)	62 (88.6)			
<b>24-hour post-operative haematocrit</b>						
Mean ± SD	30.9 ± 4.8	30.3 ± 5.8	31.7 ± 3.7	-1.75 <sup>b</sup>	138	0.182
<b>Estimated blood loss per vaginam (EBL in ml)</b>						
Mean ± SD	119.3 ± 119.5	106.8 ± 48.6	131.7 ± 161.4	0.204 <sup>b</sup>	138	0.839

<sup>a</sup> Test of significance is Chi-square test, <sup>b</sup> Test of significance is t-Test.

## 5.7 SIDE EFFECTS OF STUDY MEDICATIONS AMONG PARTICIPANTS IN THE STUDY ARMS (TABLE 6)

Table 6 shows a significantly higher proportion of shivering and fever in the Misoprostol trial arm than in the Oxytocin arm (55.7% vs 5.7%; p- 0.001) and (38.6% vs 10.0%; p- 0.001) respectively. Also noted was an increased incidence of nausea amongst the Oxytocin infusion group compared to the Misoprostol group (4.3% vs 0.0%). However, this was not statistically significant (p = 0.080). There was no case of vomiting in this study.

**Table 6: Side effects of study medications among participants in the study groups**

Characteristics	Total N = 140 (%)	Misoprostol group N = 70 (%)	Oxytocin infusion group N = 70 (%)	Test of Significance	Df	pValue
<b>Shivering</b>						
Yes	43 (30.7)	39 (55.7)	4 (5.7)	41.1 <sup>a</sup>	1	0.001**
No	97 (69.3)	31 (44.3)	66 (94.3)			
<b>Nausea</b>						
Yes	3 (2.1)	0 (0.0)	3 (4.3)	3.06 <sup>a</sup>	1	0.080**
No	137 (97.9)	70 (100.0)	67 (95.7)			
<b>Fever</b>						
Yes	34 (24.3)	27 (38.6)	7 (10.0)	15.54 <sup>a</sup>	1	0.001*
No	106 (75.7)	43 (61.4)	63 (90.0)			
<b>Temperature in °C among those with Fever</b>						
<b>Mean ± SD</b>	37.9 ± 0.3	37.9 ± 0.3	37.8 ± 0.1	0.48	32	0.638

\*Statistical significance; <sup>a</sup>\*\*Chi-square reported is the Fisher's exact Chi-square

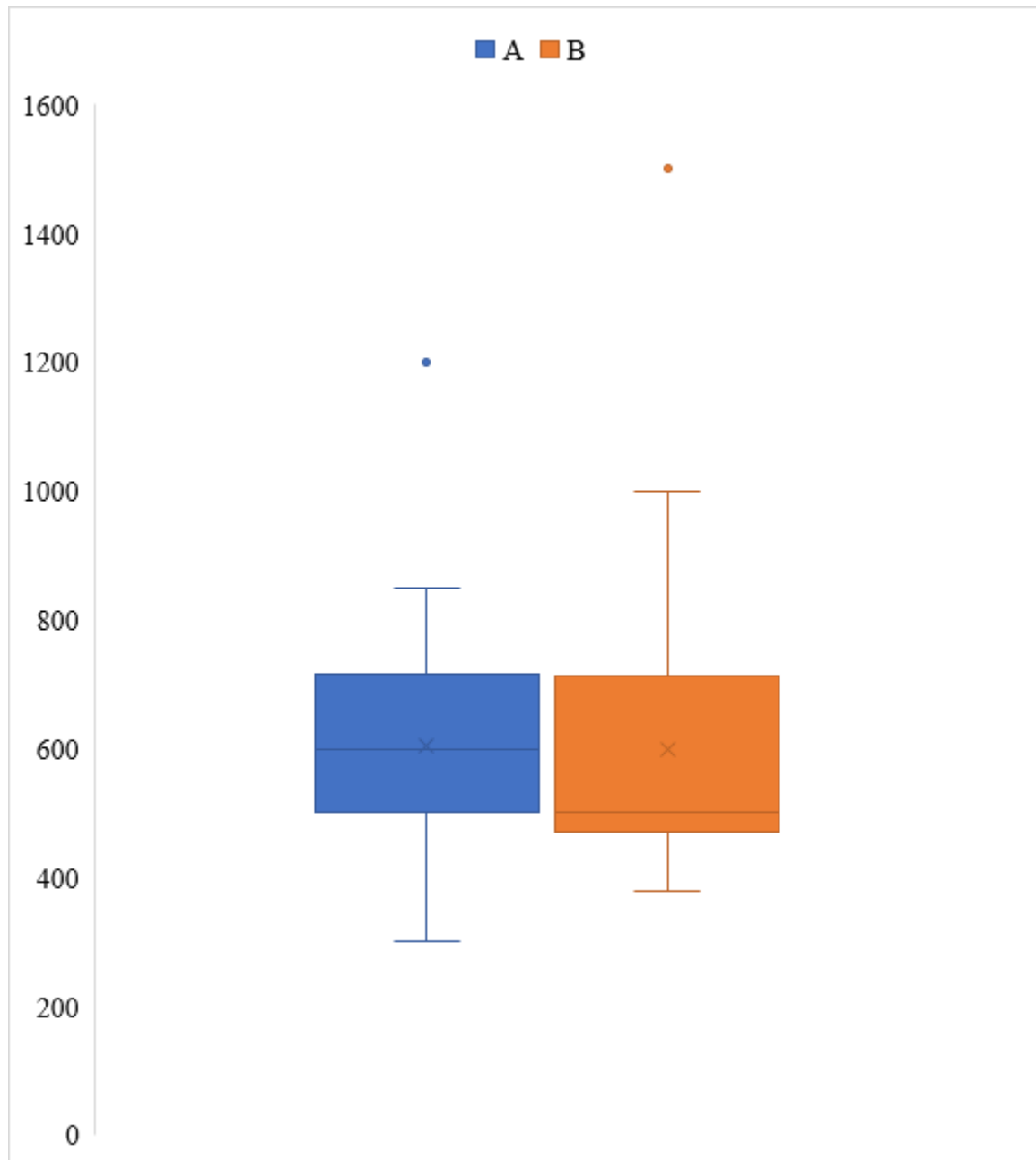


Figure 1: Box and whisker showing estimated blood loss at surgery in the participants of the study. A = Misoprostol study group, B = Oxytocin infusion study group

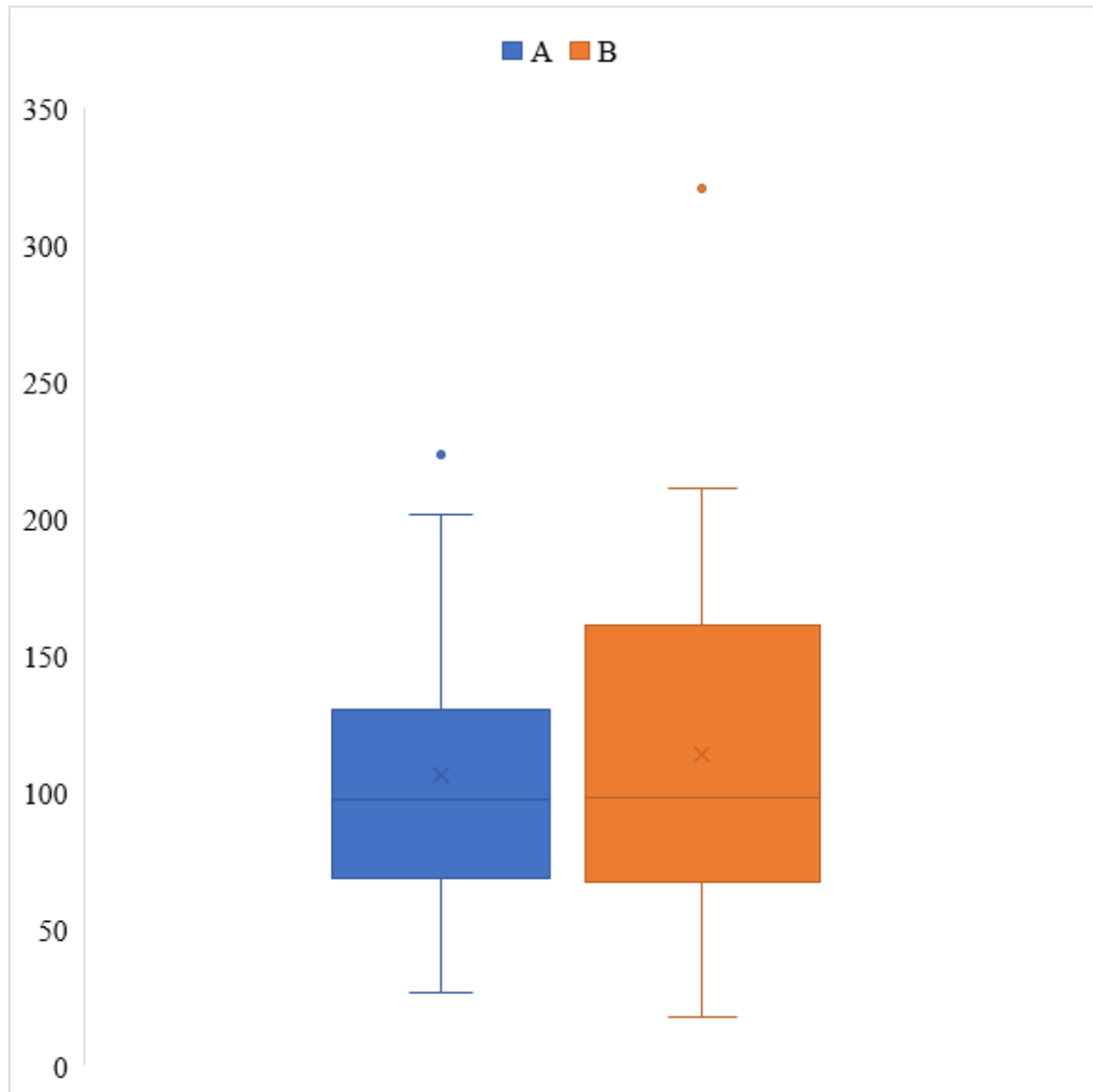


Figure 2: Box and whiskers showing estimated blood loss per vaginam in the first 24 hours post-surgery in the participants of the study. A = Misoprostol study group, B = Oxytocin infusion study group.

## DISCUSSION

Oxytocin use as uterotonic agent in the prevention of primary postpartum hemorrhage has been in Obstetric practice for decades. However, Oxytocin with its challenges of storage in tropical climates and consequent reduction in efficacy cannot still be discarded because of these difficulties with its use. Oxytocin still compares favorably with other uterotonic agents. In this

study, it was found that the new drug, misoprostol was not statistically significant to Oxytocin in the prevention of primary post-partum hemorrhage after Caesarean section. The result of this study were similar to studies done in Asia and Nigeria where misoprostol was not statistically significant to Oxytocin in the prevention of post-partum hemorrhage.<sup>11, 12</sup> This brings to fore the non-inferior design status of this study, meaning the new drug, misoprostol on trial is not more efficacious than oxytocin that has been used conventionally in the prevention of primary post-partum hemorrhage in the past.

However, our findings from this study were at variance from two other studies on same subject done in Asia on the comparison of the efficacy of rectal misoprostol and intravenous oxytocin in the prevention of post-partum hemorrhage after Caesarean section.<sup>13, 14</sup> This disparity may have been due to the higher dose of rectally administered misoprostol of 800 ug used in both studies by the authors.<sup>13, 14</sup> In these studies, misoprostol was found to reduce 24-hours post-Caesarean section blood loss per vaginam effectively than oxytocin infusion.<sup>13, 14</sup> This observation points towards a possible benefit of administering a higher dose of rectal misoprostol of 800 ug as against 600 ug used in our study in preventing postpartum hemorrhage after Caesarean section.

In this study, in the build up to the t-test of significance, we also examine some confounding variables that could be risk factors to post-partum hemorrhage like: Prolonged labor, Augmentation of labor, Induction of labor, Grandmultiparity, Polyhydramnios, Placenta previa,, Placental Abruption Previous history of post-partum hemorrhage, Use of magnesium sulphate Previous uterine surgery, maternal age greater than 35 years, but none of the afore mentioned indications for Caesarean section as risk factors for primary post-partum hemorrhage tested statistically significant. In this same study, when we tested the need for additional blood transfusion after administration of either misoprostol or Oxytocin in both arms of the study, the presence of adhesion intraoperative tested statistically significant for the need of an additional blood transfusion. What this results shows is that in future research on this same topic, presence of intraoperative adhesions is a compounding variable to prevention of primary post-partum hemorrhage using rectal misoprostol versus oxytocin as uterotonics and as such should be excluded from the study.



## **CONCLUSION**

In this study, Misoprostol was non-statistically significant to Oxytocin in the prevention of primary post-partum hemorrhage following Caesarian delivery. This may afford Obstetricians alternative choices of misoprostol and Oxytocin to choose from. Secondly in low income countries, Nigeria, Misoprostol may be a choice in terms of cost effectiveness to Oxytocin.

## **LIMITATIONS AND STRENGTHS OF THE STUDY.**

Misoprostol, the alternate drug on trial, was administered rectally, concomitant fecal matter in the rectum could interfere with bioavailability. This may be a subject of further research.

The strength of the study is that the alternate drug on trial, misoprostol has been shown to have some efficacy in preventing Post-partum hemorrhage and therefore the arm of the study that received this drug cannot be said to be receiving a placebo or less effective drug.

Another strength of the study is that it was a double-blind randomized control study and confounding variables were put to statistically significance test before administration. All eliminating bias.

## **REFERENCES.**

1. Maternal Mortality – WHO [World} Health Organization Available @:  
<https://www.who.int>> Detail
2. UNICEF data: Sub-Saharan Africa and maternal healths, Available@:  
<https://data.unicef.org>topic>> mate...

3. Lancaster L, Barnes RFW., Correla M, Luis E, Booveventura I, Silva P, von Dryalsky A. Maternal death and postpartum hemorrhage in sub-Saharan Africa-A Pilot study in metropolitan Mozambic. Res PractThrombHaemost. 2020 Mar 9; 4(3): 402 – 412. Doi : 10.1002/rth2.12311. PMID: 32211574, PMICD: PMC7086466. Format: NLM. Date accessed: 23-4-2022. Available @: <https://pubmed.ncbi.nlm.nih.gov>>..
4. El Refaey, H, Rodeck C. Post-Partum hemorrhage: definition, medical and surgical management. A time for change. British Medical Bulletin, 2003; 67 (1): 205-217. Available @: <https://doi.org/10.1.1093/bmb/1dg016>
5. de Vires EL, van Tetering AAC, HoutMB,Derijks LLJ. Ssseguya SP, Mamagembe I et al. Storage conditions of Oxytocin in a tropical climate in low income country. Obstetric Anesthesia Digest 2021; 41(4): 4-177. Doi: 10.109// 01.aoa.000796,97024.ea
6. The pharmacology of Oxytocin. Available @ <https://www.rxlist.com>pitocin-drug> Date assessed:30-4-2022.
7. Institute of Obstetricians and – Gynaecologists, Royal college of Physicians of Ireland. Clinical Practice Guideline. Oxytocin to accelerate or induce labor. Institute of Obstetricians and Gynaecologists. Royal College of Physicians of Ireland and the Clinical Strategy and Programmes Division, Health Service Executive. Guideline 36. April 2019.
8. Watkinson G, Hopkins A, Akbar FA. The therapeutic efficacy of misoprostol in peptic ulcer disease. Postgrad Med J. 1988; 64Suppl 1:60-77. PMID3138682. Format: NLM Cited by 67. Available @: <https://pubmed.ncbi.nlm.nih.gov>>... Date assessed: 02-05-2022.
9. Allen R, O'Brien BM. Uses of Misoprostol in Obstetrics and Gynaecology. Rev Obstet Gynecol.2009 Summer; 2(3);159-168. PMCID: PMC2760893 PMID: 19826573 Available @: <https://www.ncbi.nlm.nih.gov>pme> Date assessed: 02-05-2022. Cited by222.
10. Dipak M, SantayniS. ArjitD, Sumit KD. Oxytocin infusion versus rectal misoprostol in the prevention of primary post- partum hemorrhage in mothers with severe preeclampsia undergoing Caesarean section at a periiphraleral college hospital. IJBR,2018; 9(8): 287-292. Doi <https://Doi.org/10.4739/ijbr> Date assessed: 15-5-2022.

11. Adanikin A, Orji E, Adanikan PO, Olaniyan O. Comparative study of rectal misoprostol to oxytocin infusion in preventing postpartum haemorrhage after Caesarean section. NJ OG 1, 2013 8(2).
12. Chaudhary P, Banerjee GB, Mandala A. Rectally administered misoprostol versus intravenous Oxytocin infusion during Caesarean section delivery to reduce intra and post – operative blood loss. Int J Gynecol Obstet, 2010; 109 (1): 25- 29,
13. . Chaudhary P, Mandi S, Mazundar A. Rectally administered misoprostol as an alternative to intravenous Oxytocin infusion after Caesarean delivery. J Obstet Gynaecol Res 2015; 4(16):995. Available @: <https://pubmed.ncbi.nlm.nih.gov>>... Date assessed:19-5-2022.  
Cited by 23;