**MATERNAL CAESAREAN OUTCOMES FOLLOWING SUBLINGUAL MISOPROSTOL AS AN ADJUCTIVE INTRAOPERATIVE UTEROTONIC.**

**ABSTRACT**

**Aim:** This study was aimed at evaluating the safety of adjunctive sublingual misoprostol in reducing intraoperative blood loss during caesarean section, with the objectives of determine the need for additional intraoperative oxytocic, need for postoperative blood transfusion and the side effect profile of the study medications when adjunctive sublingually administered misoprostol is used in preventing excessive blood loss at caesarean delivery.

**Study design:** It was a randomised controlled trial.

**Place and Duration of Study:** This study was carried out at the Obstetrics and Gynaecology department of the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria, between 1st March and 30th December, 2024.

**Methodology:** One hundred and fifty gravidae at term, were randomised into two trial arms (Misoprostol study arm or the Placebo study arm), having met the inclusion criteria and were scheduled for caesarean section. The misoprostol group received 400-ug of sublingual misoprostol. The control group received two sublingual placebo tablets. Both arms received 30 IU intravenous oxytocin. The outcome measures were the need for extra doses of oxytocic, postoperative blood transfusion and side effect profile of the study medication (nausea, vomiting, fever and shivering). Data was analysed using the Student-t- test and Chi-square test. A *P*-value equals to .05 was analytically considerable.

**Results:** The study showed that adjunctive sublingual 400 ug misoprostol caused a non-statistically significant decrease in the demand for auxiliary doses of intraoperative ecbolic, requirement for blood transfusion. However, shivering was an analytically significant occurrence with the added prostaglandin.

**Conclusion:**Sublingually administered adjunctive misoprostol at a dose of 400 ug at caesarean birth did not considerably decrease the demand for extra doses of ecbolics, and blood transfusion following the surgery, but caused significant shivering.

*Keywords: Caesarean, side effects, misoprostol, oxytocin.*

**1. INTRODUCTION**

Misoprostol use as an adjunct to oxytocin to prevent excessive intraoperative blood loss during abdominal delivery have been studied widely and its use can be associated with outcomes that may be inimical to the particular patient the medication is prescribed to. This unwanted outcomes include; the need for extra dose of oxytocin during surgical birth, the need for intraoperative blood transfusion and side effects of misoprostol.

Extra doses of oxytocin may expose the patient to undesirable effects such water intoxication, palpitation, abnormal cardiac rhythm, nausea and vomiting, chest pain (Pakniat & Khezri, 2015). Other side effects also include headaches, respiratory distress, hypotension, and hypertension (Widmer et al., 2018; Zeng et al., 1951).If the dosage of misoprostol co-administered with oxytocin is right, the dose of oxytocin needed to bring about effective haemorrhage control at caesarean sections will be reduced. Thus, in essence the patient is less likely to have the side effects of oxytocin.

It is well known that blood loss is inevitable during surgical birth, and it can subsequently lead to postpartum haemorrhage and its consequences. In the tropics because of the elevated environmental temperatures affecting oxytocin potency, misoprostol may be added to the oxytocic regimen used at abdominal delivery to reduce blood loss especially for women with risk factors for primary postpartum haemorrhage. If haemorrhage is curtailed postpartum haemorrhage’s consequences are avoided. These consequences are related to transmission of blood borne infections and blood transfusion reaction. In other words, adequate dosage of misoprostol adjunctively administered may decrease the need for blood transfusion.

Adjunctive misoprostol as an uterotonic is associated with side effects (Sood & Sanjay, 2012). These side effects are dose related. Several dosage of misoprostol have been tried in a bid to reduced blood loss at caesarean section, and smaller doses of misoprostol have been argued to have reduced side effects such as shivering, fever, nausea and vomiting (Sood & Sanjay, 2012; Agarwal & Thakar, 2022). Using an appropriate dose of the prostaglandin will not only effectively limit haemorrhage at abdominal delivery but will have lesser and tolerable side effect.

This study was aimed at evaluating the safety of adjunctive sublingual misoprostol in reducing intraoperative blood loss during caesarean section, with objectives of determining the need for additional intraoperative oxytocic, need for postoperative blood transfusion and the side effect profile of the study medications (nausea, vomiting, fever and shivering).

**2. METHODOLOGY**

**2.1 Study site**

This study was carried out at the Obstetrics and Gynaecology department of the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria.). The study was from 1st March to 30th December, 2024.

**2.2** **Study design**

Randomised controlled trial (superiority design

**2.3 Inclusion criteria**

The inclusion criteriawere pregnant women at term (37+0 weeks to 41+6 weeks gestational age) for elective or non-elective caesarean sections and risk factor for primary postpartum haemorrhage.

**2.4 Exclusion criteria**

This included those with: caesarean sections for dire emergencies (umbilical cord prolapse, suspected fetal distress and active antepartum haemorrhage), and caesarean section done under general anaesthesia. Gravid women with previous caesarean deliveries or other uterine surgeries, allergy to misoprostol use, known history of hepatic, renal and haematological disorders, fever (temperature ≥ 37.50c), pre-operative anaemia (pre-operative haematocrit level < 30 %) and eclampsia were excluded from the trial.

**2.5 Sample Size and Randomisation**

A sample size of 152 was gotten using the formula for randomised controlled trial (superiority design) and taken into consideration an attrition rate of 10%. The study participants were consecutively recruitedfrom the labour ward and antenatal clinics after their consent. The random allocation of the participants was done using the WIN PEPI software.

**2.6 Data collection**

The research team comprised of the researcher, and ten research assistants. The caesarean sections was performed by at least a second year senior registrar following standard lower uterine segment technique to avoid the bias of surgical skill.

At point of opening the parietal peritoneum at caesarean section, the anaesthetic nurse sublingually administered two tablets to the study participants, 400 ug misoprostol tablets to the misoprostol study arm or two placebo tablets (which contained a starch base) to the placebo study arm. The anaesthetist in charge of the surgery administered to all study participants, at the time of the clamping of the umbilical cord, 10 IU of intravenous bolus of oxytocin followed by an infusion of 20 IU of oxytocin in 500 ml of normal saline at a rate of twenty drops per minute to which ran over eight hours. The oxytocin ampoules used in the study were of the same brand and batch. The misoprostol tablets and placebo (containing starch base) tablets was produced in indistinguishable forms.

The outcome measures were the need for extra doses of oxytocic, postoperative blood transfusion and side effect profile of the study medication (nausea, vomiting, fever and shivering).

**2.7 Assessment of the need for additional intraoperative oxytocic**

After administering the study medications, the uterus was palpated for adequate uterine contraction after 10 minutes period. If the uterus was not tonically contracted as confirmed by the chief surgeon, an extra dose of 10 IU of oxytocin was given intravenously. A repeat of another 10 IU of intravenous oxytocin bolus was given after 10 minutes if there was still uterine atony. Intramuscular ergometrine at a dose of 0.5 mg was used as a secondary uterotonic agent, where there were no contraindications, after 10 minutes of administering the second additional 10 IU of intravenous oxytocin bolus.

In a bid to reduce the limitation brought about by the subjective assessment of the occurrence of uterine atony by the lead surgeon; the assistant surgeon and the perioperative nurse also palpated the uterus intra-operatively, and in concordance with the lead surgeon, confirmed the presence of uterine atony. Study participants who developed primary postpartum haemorrhage were treated using the standard management protocol for primary postpartum haemorrhage.

**2.8 Assessment of the need for post-operative blood transfusion**

The demand for transfusing blood was met when a study’s participant lost up to and above 1 litre of blood during the surgical delivery or she had a 48-hours postoperative packed cell volume < 24 % or had a 48-hours packed cell volume ≥ 24 %, but < 30 % with symptoms of anaemia (such as dizziness, fainting spells or persistent headaches).

**2.9 Assessment of the occurrence of side effects**

After the study intervention had been administered until four hours post-caesarean section, the investigator and or research assistants asked the study participants at one-hourly interval if they had experienced nausea, shivering or have vomited. A stat dose of intramuscular 600 mg paracetamol was administered to the study participants that developed shivering. In other to assess the body temperature, an axillary mercury-in-glass thermometer was placed in the study participant’s axilla for three minutes by the investigator or research assistants. The axillary temperature was taken hourly from the end of surgery till 4-hours post-caesarean section. An axillary temperature of ≥ 37.50c was taken as pyrexia (Odinaka et al., 2016).

The axillary temperature was recorded in a temperature observation chart for a 4-hour postoperative observation period. A stat dose of intramuscular 600 mg paracetamol was administered to the study participants who developed fever.

**2.10 Data Analysis**

All data extracted were subjected to statistical analysis using the IBM SPSS version 25.0. Categorical variables were summarized in frequencies and proportions and presented in figures and tables. Continuous variables were summarized in mean/standard deviations. The intention-to-treat (ITT) principle of analyzing randomized controlled trials (RCT) was deployed in analyzing the data from the study. Chi-square test and t-test were used as appropriate. A *P-*value = .05 was considered statistically significant.

**3. RESULTS**

One hundred and ninety-eight pregnant women were screened for the trial, out of which 152 pregnant women (76.8 %) who met the eligibility criteria were recruited into the trial. Equal number of them (76) were allocated randomly to both the Misoprostol study arm (Study arm “A”) and the Placebo arm (Study arm “B”).

**3.1 DEMOGRAPHIC/ MATERNAL CHARACTERISTICS OF PARTICIPANTS**

As depicted in Table 1, about three out of every ten participants were in the 30 - 34 years or the 35 -39 years age range, (31.6%) and (32.9 %) respectively. The 25 - 29 years age range, and then the 20 - 24 years age range, had the next highest number of study participants, (18.4 %) and (10.5 %), respectively. The proportion of participants in the greater than 40 years age range formed the least of the total number of participants (6.6 %). The mean ages for all the study participants was 32.59 ± 5.97. There was no analytically appreciable difference on comparing the study groups in terms of their age (*P* = .69).

Nulliparous patients formed the bulk of all study participants (46.1 %), this translated to a little under five participants out of every ten participants. The multiparous category for the participants’ parity had the second highest number of participants (33.6 %) followed by the primiparous category (15.1 %). About 5.3 % of the study participants were grandmultiparous. There was no analytical considerable dissimilarity between both trial arms as regards the participants’ parity (*P* = .80).

Just under two-fifth of the study participants were 37 weeks pregnant (36.8 %), and about one-third of the participants were 38 weeks gestational age (30.3%). About 11.2 % of the women were post-date (41 weeks pregnant). Thirty-nine and forty weekers constituted a low number of the participants, 9.9 % and 11.8 %, respectively. As regards the participants’ gestational ages, there was no numerical appreciable dissimilarity between the prostaglandin E 1 and the placebo study arms (*P* = .97).

**Table 1: Demographic/maternal characteristics of participants**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Characteristics** | **Total****N = 152 (%)** | **Study Groups** | **Test Statistics****(*P*-Value)** |
|  | **Sublingual Misoprostol****N = 76 (%)** | **Sublingual Placebo****N = 76 (%)** |
|  | **Age group** |  |  |  |  |
|  | 20 -24 years | 16 (10.5) | 7 (9.2) | 9 (11.8) | 2.20 (.69) |
|  | 25 - 29 years | 28 (18.4) | 13 (17.1) | 15 (19.7) |
|  | 30 - 34 years | 48 (31.6) | 28 (36.8) | 20 (26.3) |  |
|  | 35 - 39 years | 50 (32.9) | 24 (31.6) | 26 (34.2) |  |
|  | > 40 years | 10 (6.6) | 4 (5.3) | 6 (7.9) |  |
|  |  **Age in years – Mean ± SD** | 32.59 ± 5.97 | 32.22± 5.28 | 32.17 ± 5.77 |  |
|  |  |  |  |  |  |
|  | **Parity** |  |  |  |  |
|  | Nulliparous | 70 (46.1) | 36 (47.4) | 34 (44.7) | 0.96 (.80) |
|  | Primiparous | 23 (15.1) | 10 (13.2) | 13 (17.1) |
|  | Multiparous | 51 (33.6) | 25 (32.9) | 26 (34.2) |  |
|  | Grandmultiparous | 8 (5.3) | 5 (6.6) | 3 (3.9) |  |
|  | **Parity – Median (Range)** | 1.0 (1.0 – 4.0) | 1 (1.0 – 4.0)  | 1 (1.0 – 4.0) |  |
|  |  |  |  |  |  |
|  | **Gestational Age** |  |  |  |  |
|  | 37 weeks | 56 (36.8) | 27 (35.5) | 29 (38.2) | 0.50 (.97) |
|  | 38 weeks | 46 (30.3) | 22 (28.9) | 24 (31.6) |
|  | 39 weeks | 15 (9.9) | 8 (10.5) | 7 (9.2) |  |
|  | 40 weeks | 18 (11.8) | 10 (13.2) | 8 (10.5) |  |
|  | 41 weeks | 17 (11.2) | 9 (11.8) | 8 (10.5) |  |
|  | **Gestational Age in weeks \_ Mean ± SD** | 38.3 ± 1.36 | 38.3 ± 1.36 | 38.3 ± 1.36 |  |

**3.2 THE NEED FOR ADDITIONAL OXYTOCIC AND BLOOD TRANSFUSION**

Table 2 demonstrates the requirement for extra doses of intraoperative oxytocic and the exigency for postoperative administration of blood following abdominal delivery between the study groups. In terms of the need for additional intraoperative oxytocic, the sublingual misoprostol study arm had a lesser need to receive more oxytocics during caesarean birth than in the sublingual placebo study arm (11.8% vs 19.7 %), respectively, but this was not analytically considerable (*P* = .18). The requirement for blood infusion postoperatively, was not analytically dissimilar between the trial arms, (*P* = .78).

**Table 2: The need for additional oxytocic and blood transfusion**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Characteristics** | **Total****N = 152 (%)** | **Study Groups** | **Test Statistics****(*P* -Value)** |
|  | **Sublingual Misoprostol****N = 76 (%)** | **Sublingual Placebo****N = 76 (%)** |
|  | **Need For Additional Intraoperative Oxytocic** |  |  |
|  | Yes  | 24 (15.8) | 9 (11.8) | 15 (19.7) | 1.78 (.18) |
|  | No  | 128 (84.2) | 67 (88.2) | 61 (80.3) |
|  |  |  |  |  |  |
|  | **Need for Post-Operative Blood Transfusion** |  |  |
|  | Yes  | 15 (9.9) | 7 (9.2) | 8 (10.5) | 0.07 (.78) |
|  | No  | 137 (90.1) | 69 (90.8) | 68 (89.5) |

**3.3 SIDE EFFECT PROFILE OF THE STUDY MEDICATIONS**

Table 3 shows the side effect of the study medication in the sublingual prostaglandin E1 and sublingual inactive groups. All cases of shivering were seen in the misoprostol group (88.2 %) and this was analytically considerable, (*P* = .00). The occurrence of fever, nausea and vomiting were similar between both study groups.

**Table 3: Side effect profile of the study medications**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Characteristics** | **Total****N = 152 (%)** | **Study Groups** | **Test Statistics****(*P* - Value)** |
|  | **Sublingual Misoprostol****N = 76 (%)** | **Sublingual Placebo****N = 76 (%)** |
|  | **Shivering** |  |  |  |  |
|  | Yes  | 67 (44.1) | 67 (88.2) | 0 (0.0) | 119.81 (.00\*) |
|  | No  | 85 (55.9) | 9 (11.8) | 76 (100.0) |
|  |  |  |  |  |  |
|  | **Fever** |  |  |  |  |
|  | Yes  | 5 (3.3) | 2 (2.6) | 3 (3.9) | .20 (.64) |
|  | No  | 147 (96.7) | 74 (97.4) | 73 (96.1) |
|  |  |  |  |  |  |
|  | **Nausea** |  |  |  |  |
|  | Yes  | 11 (7.2) | 6 (7.9) | 5 (6.6) | .98 (.74) |
|  | No  | 141 (92.8) | 70 (92.1) | 71 (93.4) |
|  |  |  |  |  |  |
|  | **Vomiting** |  |  |  |  |
|  | Yes  | 6 (3.9) | 5 (6.6) | 1 (1.3) | .77 (.96) |
|  | No  | 146 (96.1) | 71 (93.4) | 75 (98.7) |

\*Statistically significant

**DISCUSSION**

The dose of prostaglandin E1 in lowering bleeding at surgical delivery is important (Sweed et al., 2019),if given in high doses then, the misoprostol side effect(s) are expected. These side effects can be really discomforting for the parturient, sometimes life threatening (uterine rupture), and troubling for the obstetric team. Nonetheless, too little administered dose of misoprostol may make the uterotonic effect of the drug non-existent when trying to curtail blood loss at surgical births (Sweed et al., 2019).

A majority of the participants in this research were of low parity. This finding is in keeping with that of other studies (Akpan et al., 2021; Nayak et al., 2017; Karya et al., 2021; Kumari et al., 2016). A possible reason may be that, in the locality where this study was done, the nulliparous and primiparous women, unlike the multiparae, tend to book for antenatal care. There is a common belief, and from primary researcher’s observations, that multiparous women in Southern Nigeria, especially grandmultiparous women, feel “experienced” concerning the events of pregnancy and labour.

Therefore, they do not make themselves available for hospitalised care. Contraception may also play a role in this present work having low parity participants.

The need to keep family size small due to economic hardship and lifestyle modernization (especially in more advanced countries than Nigeria), may cause women to seek modern methods of preventing conception or illegally abortions.

The mean gestational age for the abdominal deliveries in this study (38.3 ±1.36 weeks) is similar to those of other studies (Ugwu et al., 2014; Sallam & Shady, 2018). Also, Maged et al., 2019; Afkham et al., 2022 and Sitaula et al., 2016, had gravid women with similar gestational ages participate in their study.A good number of women would enter into labour after 38 weeks gestation, so elective caesarean sections are usually planned for 38 weeks in most hospitals in Nigeria. However, this finding differed from a study by Akpan et al., 2021, which had a mean gestational age of 31.6 ± 4.3 at delivery. Akpan et al., 2021 study involved women with placenta praevia. Consequently, it is expected that many of the women did not get to term, since early warning bleeds, which may be torrentially, usually occur around 32 to 34 weeks gestational age (Wagner, 2013).

As regards the demand for additional intra-surgical ecbolics on either the oxytocin alone or the misoprostol-oxytocin arms, it was noticed that in the works of Ugwu et al., 2014; Sood et al., 2012; and Agarwal & Thakar, 2022 as well as Sallam & Shady, 2018and Mohamed & Mohammed, 2021, the exigency for more oxytocics was higher on both arms of their studies than in this present work. This occurrence may be due to the fact that only the lead operator determined the need for extra doses of ecbolics. This is an assessment bias. This present study reduced this bias by having the perioperative nurse and assistant surgeon palpate the uterus for its tonicity. So, in essence, a consensus with the primary surgeon was met before extra doses of uterotonics was administered. Therefore, intra-observer error/ judgment as regards assessing uterine tone was reduced.

In addition, Agarwal & Thakar, 2022and Sallam & Shady, 2018 studies estimated blood loss using an approximation formula and visual assessment, respectively. These would have exaggerated the quantity of haemorrhage, leading to the use of a higher dose of oxytocic used in their study

Interestingly, the request for extra dose of ecbolics was lower in Kumari et al., 2016 trial when put side by side with this present work. This is so because in the former study 200 ug of rectal misoprostol was used as against 400 ug of sublingual misoprostol used in this present trial.

The exigency for supplementary dose of ecbolics intraoperatively was analytically similar between the adjunctive misoprostol arm and the oxytocin alone arm of this study, although the participants in the prostaglandin arm required lesser doses of extra uterotonic. In other researches, more doses of oxytocin were given to parturients in the standard arm than in the experimental arm, and this was statistically considerable.(Sood & Sanjay, 2012; Agarwal & Thakar 2022; Ugwu et al.,2014; Sallam & Shady, 2018) This discrepancy as seen between this present work and that of other works could be explained by the determination of the need for extra dose of oxytocin in this present work, by not only the lead surgeon but by also the assistant surgeon and theatre scrub nurse. All three personnel at the surgery, in agreement, would say a uterus is atonic or not. As a result, error in judgment by the primary surgeon in stating that a uterus was atonic and needing more ecbolic is minimised. It is known that assessment of the presence of uterine atony is subjective.

The exigency for transfusing blood on both study groups of this present trial is low when compared to Sallam & Shady, 2018 study, because the blood loss was more at surgery in the latter study.

This discrepancy could be traced to the use of visual assessment of haemorrhage in the Sallam & Shady, 2018 study. The reverse was the case when this current study was compared with Ugwu et al., 2014 study,where lesser amount of blood loss on both arms of their trial caused a lower demand for postoperative blood administration.

Sood & Sanjay, 2012 trial which compared 400 ug sublingual misoprostol-20 IU oxytocin combination to 20 IU of oxytocin alone, had similar amount of intraoperative blood loss with this current work, but the requirement for blood administration was lower. This is explained by the use of other indications for blood administration, other than intraoperative blood loss greater than one litre, in this present research. Other indications as stated in this current study were postoperative packed cell volume level less than 24 %, packed cell volume greater than or equals to 24 %, but less than 30 % in the presence of anaemia symptoms.

There was no appreciable dissimilarity in the requirement for blood administration after surgery between both investigative arms of this study, but the misoprostol arm had a lesser need for postoperative blood transfusion. This result is similar to those of Ugwu et al., 2014 and Sood & Sanjay, 2012, but incongruous with the findings of Agarwal & Thakar, 2022; and Nayak et al., 2017studies. The Nayak et al., 2017 study did show that misoprostol group had lesser demand for blood transfusion and it was analytically considerable. The disparity between Nayak et al., 2017 work and that of this present trial may be due to the fact that in Nayak et al., 2017 work, the amount of caesarean blood loss was quantified up to 2-hours post-surgery. This extra- two hours of blood loss assessment was added to the intraoperative haemorrhage. In this present study, the quantity of blood loss was assessed only during the surgery. In the Agarwal & Thakar, 2022 study, intraoperative blood loss may have been overestimated because of the use of Bourke and Smith formula.

It stands to reason that the more the amount of haemorrhage at caesarean delivery, the higher the need for blood transfusion.

As regards the side effect profile of the study medications, in this present study, there were more cases of shivering (88.2 %) in the misoprostol-oxytocin combination group than that in Sood & Sanjay, 2012 (21.1 %), Rekha & Latha, 2014 (24 %), Agarwal & Thakar, 2022 (62.3 %), and Sallam & Shady, 2018 (37.8 %) trials. The possible explanation may be that the adverse effects were assessed up to 4-hours after surgery in this present study. Thus, within this period more women would have been observed to develop side effects such as shivering than in other studies. Another reason may be the employment of 1-hourly assessment for shivering in the participants of this present work. This offered timely observation and documentation of the occurrence of shivering in this research. Also, the misoprostol-oxytocin arm in this current work had a higher number of shivering cases than noticed in Karya et al., 2021 (7 %) and Kumari et al., 2016 (9 %) works. This disparity may be due to the administration of misoprostol via the rectal route in the latter studies. It obvious from this research and the above studies that shivering tend to feature more with sublingual administration of misoprostol than rectal misoprostol. This may be due to the closeness of the sublingual route to the thermoregulatory centres of the brain, unlike the rectal route. The incidence of nausea and vomiting may be generally low and of similar incidence whichever the route, sublingual or rectal, because misoprostol overall has a protective effect on the gastrointestinal system.

The oral, buccal, and sublingual routes of misoprostol administration are associated with more and severe untoward effect of the drug than the rectal and vaginal routes. Women have been found to experience more fever and shivering on taking sublingual prostaglandin E1.

There was no case of fever in this present study, unlike in the investigative arm of the following studies (Kumari et al., 2016; Sallam & Shady, 2018; Rekha& Latha, 2014). This difference again can be said to result from a 4-hour observation period after surgery in this current research. The other studies had a longer period of observation. Therefore, pyrexia appears to occur after 4-hours of misoprostol administration.

This study demonstrated that shivering as an adverse effect of misoprostol occurred only in the misoprostol-oxytocin arm of the trial than in the oxytocin alone arm. This was the same finding as was seen in Rekha & Latha, 2014. Other studies (Kumari et al., 2016; Sallam & Shady, 2018; Mohamed & Mohammed, 2021) showed that shivering also occurred in the oxytocin alone arm of their research. This disparity between this finding in these studies and that of this present work may be due to the larger sample sizes in the former.

 Nonetheless, fever, nausea and vomiting occurrences were similar between both study groups in the current research. This same finding was reported by Sood & Sanjay, 2012 and Rekha & Latha, 2014 (with the exception of the occurrence of fever).

**CONCLUSION**

Sublingually administered adjunctive misoprostol at a dose of 400 ug to intravenous oxytocin at caesarean birth did not considerably decrease the demand for extra doses of ecbolics, and blood transfusion following the surgery, but caused significant shivering.

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