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EFFICIENCY OF MISOPROSTOL IN THE MANAGEMENT OF POSTPARTUM HEMORRHAGE

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Abstract

Globally, postpartum hemorrhage (PPH) continues to be a major cause of maternal morbidity and death, especially in low- and middle-income nations. Because of its availability, stability, and convenience of administration, misoprostol, an analogue of prostaglandin E1, is being utilized more frequently as a substitute uterotonic medication.Objective: To assess the effectiveness of misoprostol in the management of postpartum hemorrhage.Methods: This longitudinal study was conducted over six months in the Department of Obstetrics and Gynecology at a tertiary care hospital in Larkana, Pakistan. Using non-probability sampling, 164 women between the ages of 18 and 45 who had primary PPH as a result of uterine atony within 24 hours of delivery were included. Patients who needed emergency surgery, had coagulation problems, genital tract damage, or retained placental fragments were not included. In addition to usual care, misoprostol (600–800 mcg orally/sublingually or 800 mcg rectally) was given. Controlling bleeding with uterine contraction and stabilizing hemodynamics within two hours without requiring significant extra measures was considered effective. Results: The mean age of participants was 29.7 ± 5.5 years, and mean gestational age was 34.2 ± 3.3 weeks. Primigravida accounted for 45%, multigravida 41.4%, and grand-multigravida 13.4% of cases. Misoprostol was effective in 153 (93.2%) patients, while 11 (6.7%) showed inadequate response. Conclusion: For the treatment of postpartum bleeding, misoprostol is a very practical and successful alternative, especially in settings with low resources. Its role as a crucial uterotonic drug in lowering maternal morbidity and mortality is supported by its high success rate and advantageous pharmacological profile.

INTRODUCTION

The primary cause of maternal death globally is still postpartum hemorrhage (PPH), which is defined as blood loss of ≥500 mL following vaginal delivery or ≥1000 mL following cesarean section.1 With an estimated 14 million cases and over 70,000 maternal deaths per year, PPH is responsible for more than 20% of all maternal deaths worldwide, according to the World Health Organization (WHO). Low- and middle-income countries (LMICs) have a disproportionately greater burden, especially in South Asia and sub-Saharan Africa, where over 80% of PPH-related deaths take place.2 About 1–10% of deliveries worldwide are complicated by PPH, which continues to be a significant cause of severe maternal morbidity, such as anemia, the need for blood transfusions, and the requirement for emergency surgical procedures. Maternal hemorrhage still impedes the achievement of the Sustainable Development Goals, which aim to lower maternal mortality, despite improvements in obstetric treatment.3,4

PPH is a significant factor in avoidable maternal mortality in Pakistan, where maternal health indicators are still below ideal levels. According to studies, PPH accounts for over 25% of maternal deaths in Pakistan, which is a reflection of delayed access to emergency care and expert obstetric care.5 Delays in referrals, a lack of blood transfusion facilities, and insufficient uterotonic agent availability in outlying healthcare settings are other contributing reasons.6

Uterine atony is the most frequent cause of PPH, and prompt uterotonic medication delivery is the cornerstone of treatment.7 Although oxytocin is regarded as the first-line treatment, its usage is restricted in many low-resource settings because it requires parenteral administration, cold chain storage, and qualified medical staff. Misoprostol and other alternative uterotonics are becoming more popular as a result of this restriction.8

Misoprostol, a prostaglandin E1 analogue, is well known for its many benefits, which make it especially appropriate for usage in resource-constrained environments like Pakistan. These benefits include cheap cost, thermal stability, ease of administration (oral, sublingual, rectal), and widespread availability.9 Its efficacy in managing and preventing PPH has been shown by recent research conducted in Pakistan. Misoprostol's effectiveness as an alternate uterotonic was supported by a quasi-experimental study carried out in Karachi (2021), which found that it was comparable to oxytocin in lowering hemoglobin drop and blood loss.7

Similar to this, a randomized controlled trial carried out in Peshawar between 2020 and 2022 revealed that the misoprostol group had a lower frequency of PPH (4%) than the oxytocin group (24%), indicating improved efficacy in certain clinical conditions.9 When used either alone or as an adjuvant medication, it has been shown in other Pakistani clinical studies to improve maternal outcomes and reduce problems.10

Misoprostol is also effective in treating PPH, according to international research, especially in situations when injectable uterotonics are not easily accessible. Misoprostol is suggested by WHO guidelines as a substitute uterotonic for PPH treatment and prevention in low-resource settings. However, contradictory results regarding its ideal use have resulted from variations in dosing schedules, administration routes, and research methodologies.

Further assessment through carefully planned clinical trials is crucial given the high prevalence of PPH in Pakistan and the useful benefits of misoprostol. Thus, the purpose of this study was to evaluate the effectiveness of misoprostol in the treatment of postpartum hemorrhage. This interventional investigation can offer important practical proof of its viability and efficacy in regional clinical settings.

Methodology:

This study was a longitudinal study conducted over a period of six months in the Obstetrics and Gynecology Department of a tertiary care hospital in Larkana, Pakistan. This setting caters to a large volume of obstetric patients and manages both routine deliveries and obstetric emergencies, including postpartum hemorrhage. After taking the written informed consent, a total of 164 women aged 18–45 years who developed primary postpartum hemorrhage due to uterine atony were

within 24 hours of delivery, either following vaginal or cesarean section were included via non-probability sampling technique. Hemodynamically stable patients or those stabilized after initial resuscitation were eligible for inclusion. Patients with known hypersensitivity to misoprostol, those with PPH due to retained placental fragments, genital tract trauma, or coagulation disorders, and those requiring immediate surgical intervention at presentation were excluded from the study. Additionally, patients with severe medical comorbidities such as significant cardiac disease and those refusing consent were excluded.

OPENEPI calculator was used to calculate the sample size by taking the prevalence of PPH in women managed through misoprostol i.e. 4%, margin of error=3%, confidence interval=95%, then minimum required sample size was 164.

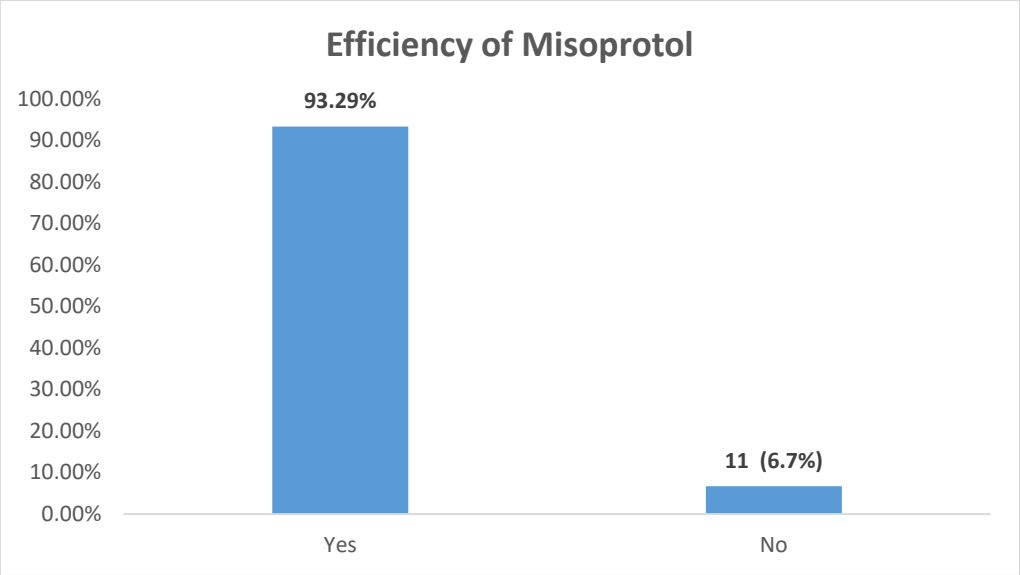
All participants received misoprostol as per the institutional and WHO-recommended protocol for PPH management, with a dose of 800 micrograms administered rectally or 600–800 micrograms given sublingually or orally depending on clinical judgment and institutional practice. This was administered immediately after the diagnosis of PPH along with standard management, including uterine massage, intravenous fluids, and additional uterotonic agents if required. Efficiency of misoprostol was defined as control of postpartum hemorrhage with adequate uterine contraction and stabilization of bleeding within 2 hours of administration without requirement of major additional interventions or surgery. Data was analyzed analyzed using SPSS version 26. Quantitative variables were expressed as mean and standard deviation, while categorical variables were presented as frequencies and percentages. Confidentiality of patient information was strictly maintained. All patients received standard obstetric care irrespective of study participation, and no intervention was withheld at any stage.

Results:

A total of 164 patients were enrolled in the study. The mean age of the participants was 29.7 ± 5.5 years, while the mean gestational age was 34.2 ± 3.3 weeks. In terms of parity, 45% (n=74) were primigravida, 41.4% (n=68) were multigravida, and 13.4% (n=22) were grand-multigravida. A prior history of postpartum hemorrhage was observed in 6.7% (n=11) of cases, whereas 10.9% (n=18) reported a history of abortion, as shown in table#1. As illustrated in Figure 1, misoprostol demonstrated effectiveness in the management of postpartum hemorrhage in 153 (93.2%) of patients, while 11 (6.7%) did not respond adequately to the treatment.

Table 1: ***Baseline Data of the Patients (n=164)***

Baseline data	**(mean + sd)/n(%)**
Age (Years)	29.7 + 5.5
Gestational Age (weeks)	34.2 + 3.3
Parity	
Primigravida	74 (45%)
Multigravida	68 (41.4%)
Grand-multigravida	22 (13.4%)
H/o of PPH	11 (6.7%)
H/o abortion	18 (10.9%)



Figure#1: Efficiency of misoprostol in the management of the Postpartum Hemorrhage

Discussion

The current study evaluated misoprostol's efficacy in treating postpartum hemorrhage (PPH) at a Karachi tertiary care facility. Misoprostol showed a high overall efficacy of 93.2%, with only 6.7% of cases showing failure. These results demonstrate its potent uterotonic impact and therapeutic utility in emergency obstetric treatment, especially in locations with limited resources.

Our study's effectiveness is in line with international guidelines. When oxytocin is unavailable or impractical, the World Health Organization (WHO) suggests misoprostol as a substitute uterotonic for the treatment of PPH, especially in low-resource settings with limited cold chain maintenance and qualified staff.11 This makes it especially relevant in countries like Pakistan, where access to injectable uterotonics is inconsistent at peripheral healthcare facilities.

These conclusions are strongly supported by evidence from around the world. Misoprostol is useful in preventing severe PPH and lowering postpartum blood loss, especially in situations where oxytocin is not easily accessible, according to Hofmeyr et al.12 Sublingual misoprostol is an effective uterotonic drug because it dramatically lowers the incidence of severe PPH when compared to a placebo, according to a major randomized experiment by Blum et al.13

Misoprostol is useful in lowering blood loss following delivery, according to a Cochrane systematic review, albeit it might be marginally less effective than oxytocin in settings with adequate resources.14. Similarly, Mousa and Alfirevic came to the conclusion that misoprostol is a useful substitute for injectable uterotonics in situations when oxytocin is still the first-line treatment.15

Similar findings to the current study have been reported in a number of South Asian investigations. Misoprostol administered in the community dramatically lowers the risk of PPH in low-resource settings, especially among rural populations, as shown by Stanton et al.16 Community trials in Bangladesh and India have demonstrated a decrease in severe PPH rates when misoprostol is taken therapeutically or preventively.17,18

The results of this study are also corroborated by evidence from Pakistan. Misoprostol's efficacy in tertiary care settings was confirmed by a study carried out in Karachi, which found that it was similar to oxytocin in lowering postpartum blood loss and hemoglobin decline.19Strong uterotonic efficacy in local clinical practice was also demonstrated by a randomized controlled trial from Peshawar that found considerably decreased PPH rates in the misoprostol group compared to oxytocin (4% vs. 24%).20 Another Pakistani study found that using misoprostol as first-line treatment

improved maternal outcomes and decreased the need for additional uterotonics.21

The early delivery of misoprostol upon PPH diagnosis, in conjunction with routine uterotonic and supportive interventions, may be responsible for the high success rate seen in this study. As an analog of prostaglandin E1, misoprostol causes uterine smooth muscle contraction, which quickly reduces blood loss.22

A small percentage of patients, 6.7%, did not respond well to treatment, nevertheless. Grand multiparity, a prior history of PPH, or significant uterine atony—all recognized risk factors for uterotonic failure—may account for this. Similar results have been documented in other investigations where refractory cases required additional uterotonics or surgical intervention.23

Misoprostol response variability has also been shown in the literature as a result of variations in dosage, administration method, and intervention timing. According to Tang et al., misoprostol's pharmacokinetics differ greatly based on the route (oral, sublingual, or rectal), which may have an impact on clinical efficacy.24. Additionally, Winikoff et al. found that sublingual administration results in quicker peak plasma levels and may be more successful in treating acute PPH.25

Overall, the results of this study confirm that misoprostol is a practicable, safe, affordable, and effective uterotonic medication for the treatment of PPH in environments with low resources, such as Pakistan. It is especially well-suited for emergency obstetric care at both primary and tertiary healthcare levels due to its stability at room temperature, simplicity of administration, and accessibility.

Conclusion

With a high success rate of 93.2% in the current trial, misoprostol is a useful and efficient uterotonic medication for the treatment of postpartum hemorrhage. It is especially appropriate for usage in low-resource environments like Pakistan due to its wide availability, affordability, thermal stability, and ease of administration. A small proportion of treatment failures was observed, which may be associated with underlying risk factors such as high parity and a history of postpartum hemorrhage. Overall, misoprostol serves as a valuable alternative and adjunct to conventional uterotonics and can contribute significantly to reducing maternal morbidity and mortality associated with postpartum hemorrhage.

Conflict of Interest: Nil
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