DOI: https://doi.org/10.54393/pjhs.v7i3.3675

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 7, Issue 03 (March 2026)

Original Article

OPEN ACCESS

Comparison of Intravenous Bolus with Infusion Regimen of Oxytocin in Patients Undergoing Elective Cesarean Delivery

Sara Sabir[1*], Munazzah Bashir[2], Umaira Maqsood[3], Shumaila Ashfaq[1], Hafiz Faheem Asghar[4] , Attiya Rashid[5] and Fatima Umber[6]

[1]Department of Anesthesia, Islam Medical College, Sialkot, Pakistan
[2]Department of Obstetrics and Gynecology, Muhammad Islam Medical College, Gujranwala, Pakistan
[3]Department of Obstetrics and Gynecology, Islam Medical College, Sialkot, Pakistan
[4]Department of Anesthesia, Muhammad Islam Medical College, Gujranwala, Pakistan
[5]Department of Obstetrics and Gynecology, University College of Medicine and Dentistry, The University of Lahore, Lahore, Pakistan
[6]Department of Obstetrics and Gynecology, Royal College of Physicians of Ireland, Ireland

ARTICLE INFO

Keywords:
Oxytocin, Intravenous Bolus, Continuous Infusion, Cesarean Delivery, Postpartum Hemorrhage, Uterine Tone, Hemodynamic Stability, Hypotension, Tachycardia, Maternal Outcomes

How to Cite:
Sabir, S., Bashir, M., Maqsood, U., Ashfaq, S., Asghar, H. F., Rashid, A., & Umber, F. (2026). Comparison of Intravenous Bolus with Infusion Regimen of Oxytocin in Patients Undergoing Elective Cesarean Delivery: Intravenous Bolus with Infusion Regimen of Oxytocin and Elective Cesarean Delivery. Pakistan Journal of Health Sciences, 7(3), 131-136. https://doi.org/10.54393/pjhs.v7i3.3675

***Corresponding Author:**
Sara Sabir
Department of Anesthesia, Islam Medical College, Sialkot, Pakistan
sara.92816@gmail.com

Received Date: 3rd December, 2025
Revised Date: 19th January, 2026
Acceptance Date: 11th February, 2026
Published Date: 31st March, 2026

ABSTRACT

Postpartum hemorrhage is one of the leading causes of maternal mortality, and its rate of occurrence increases with the increase in the rates of cesarean section. The main prophylaxis is oxytocin, although the best way to administer it (intravenous bolus or continuous infusion) is the most effective and safe. **Objectives:** To compare the effectiveness and safety of intravenous bolus with the infusion regimen of oxytocin in patients undergoing elective cesarean delivery. **Methods:** The quasi-experimental study compared intravenous oxytocin bolus versus continuous infusion for the prevention of postpartum hemorrhage in women undergoing elective cesarean section. Ninety term pregnant women (ASA I–II) were allocated to receive either a 3 IU IV bolus followed by infusion or a 10 IU continuous infusion. The primary outcome was postpartum hemorrhage, while secondary outcomes included uterine tone, additional uterotonic requirement, hemodynamic stability, and maternal side effects. Data were analyzed using SPSS version 26.0, with $p<0.05$ considered statistically significant. **Results:** The incidence of postpartum hemorrhage was similar in the bolus (4.4%) and infusion (2.2%) groups ($p=0.78$), with no significant difference in uterine atony or mean blood loss, indicating comparable uterotonic efficacy. However, hypotension and tachycardia were significantly more frequent in the bolus group ($p=0.02$ and $p=0.03$, respectively). **Conclusions:** Intravenous oxytocin bolus and infusion are equally effective in preventing postpartum hemorrhage and maintaining uterine tone during elective cesarean section; however, continuous infusion offers superior maternal hemodynamic stability with significantly lower rates of hypotension and tachycardia, making it the safer regimen.

INTRODUCTION

Oxytocin is the most widely used uterotonic agent during cesarean delivery to promote uterine contraction and reduce the risk of postpartum hemorrhage (PPH), a major contributor to maternal morbidity worldwide [1]. Although oxytocin is routinely administered following delivery of the fetus, the optimal intravenous regimen remains controversial. Rapid bolus administration has been associated with adverse maternal hemodynamic effects such as hypotension and tachycardia, whereas continuous infusion may provide comparable uterotonic efficacy with improved cardiovascular stability [2]. Good uterotonic agents are thus critical towards containing too much blood

DOI: https://doi.org/10.54393/pjhs.v7i3.3675

loss during and after cesarean section [3]. Oxytocin is among these, and it is well known as the first pharmacological support to induce uterine contraction and reduce hemorrhage [4]. The preoperative use of it is also common in the cases of cesarean section to improve the tone and limit the occurrence of postpartum bleeding [5]. Nevertheless, the best protocol to administer oxytocin is one that compares the effects of intravenous bolus to that of the continuous infusion method, where the clinical research is still underway to establish which one is the most effective and least side effects [6, 7]. Such practice variability reveals a gap in existing knowledge about the best oxytocin dosing approaches, especially when considering the heterogeneity of research that is mainly done on low-risk patients [8]. Although it is widely used, the hemodynamic effects of oxytocin, e.g., hypotension, require careful consideration of the methods of its administration [9]. The decision between intravenous bolus and the continuous infusion regimen of oxytocin has a direct impact on the pharmacokinetic characteristics of oxytocin and its consequent uterine response, which impacts the rate of oxytocin response and the duration of uterine contractions [10]. Although oxytocin is the standard option when it comes to use of this hormone to prevent undue bleeding in the uterus during cesarean delivery, a significant percentage of women, between 10-40 percent, still need to receive further uterotonic medication, either methylergometrine or 15-methyl prostaglandin F2a, to curb uterine atony [11]. Newer synthetic uterotonics have since been developed, which prove to be potentially beneficial in minimizing the necessity of further uterotonic medication and blood transfusion over oxytocin in low-risk patients [4, 12]. However, oxytocin is the first-line prophylaxis drug used to prevent postpartum bleeding, although there are still controversies on the recommended dosage and rate of administration [13]. This is especially vital considering that refractory uterine atony, despite the prevalence of oxytocin, remains a challenge, and additional research on administration procedures is still required [14]. In particular, Sheehan et al. demonstrated that an oxytocin bolus combined with infusion reduced the need for additional uterotonics without increasing postpartum hemorrhage compared with bolus alone [15]. Similarly, Nagai et al. reported that protocolized oxytocin infusion during elective cesarean delivery maintained uterine tone with fewer hemodynamic disturbances and reduced supplemental uterotonic requirements. Based on these findings, the chosen regimens in our study were designed to balance uterotonic effectiveness with maternal safety [1]. Thus, the work is of essential importance to comprehensively assess and compare the various ways of administration of oxytocin.

However, with all the current evidence on oxytocin, the safety profiles between intravenous bolus and continuous infusion regimens during elective cesarean sections are not well compared in terms of their effects on maternal hemodynamic stability. Oxytocin is an effective agent in inducing uterine contraction; however, its use by rapid IV bolus may result in severe hypotension and tachycardia, which is a potentially avoidable risk factor of cardiovascular stability in the mother during and post-cesarean section. The study aimed at reducing the risk of poor uterine response and will benefit the establishment of evidence-based optimal protocols of oxytocin administration to improve maternal outcome by exploring the efficacy and safety of intravenous bolus regimen versus continuous infusion of oxytocin in women undergoing elective cesarean delivery.

METHODS

A quasi-experimental study was conducted in the Department of Obstetrics and Gynecology, Islam Medical and Dental College, Sialkot, Pakistan, which took place over a September 2024 to March 2025 period of time after getting ethical approval (900/IMC/ERC/000103). It aimed at comparing the effectiveness of intravenous bolus with continuous infusion regimen of oxytocin in the prevention of postpartum bleeding and maintenance of uterine tone among women undergoing elective cesarean delivery. Maternal hemodynamic stability and maternal side effect profiles were also put in focus with regard to each regimen. All the participants gave written informed consent before enrolling. The experiment was in accordance with the Helsinki Declaration. The sample size was calculated by the mean amount of blood loss of the intravenous slow bolus 5 IU of oxytocin group (840.65 ± 397.56 mL) and the group with 5 IU oxytocin bolus and an infusion (547.51 ± 222.15) by taking 80 percent of the statistical power, the 5 percent of error, and the dropout rate as 10 percent, and the total amount of 90 participants was obtained [16]. The sample of the research consisted of women (18-40 years old) with singleton pregnancies (37 to 40 weeks gestational) who chose the elective cesarean section and had normal pre-pregnancy body mass index (18.5 to 24.9 kg/m2) with ASA physical status I or II. The exclusion criteria included multiple pregnancies, emergent delivery, underlying medical factors (e.g., diabetes, hypertension, cardiac disease), oxytocin contraindications, a history of cesarean delivery, placenta previa/abruption, use of interfering drugs, or labor induction/augmentation. Oxytocin administration was initiated immediately after umbilical cord clamping and before placental delivery in both study groups. Group A (bolus regimen) received 3 IU oxytocin intravenously as a slow bolus over 1–2 minutes immediately after cord clamping, followed by an infusion of 80 mL Ringer

DOI: https://doi.org/10.54393/pjhs.v7i3.3675

Lactate without additional oxytocin. Group B (infusion regimen) received 10 IU oxytocin diluted in 80 mL Ringer Lactate, administered as a continuous intravenous infusion at a rate of 1 IU/min (8 mL/min), starting immediately after cord clamping and continued until the full volume was infused. Uterine tone was assessed after placental delivery and at predefined time intervals. Baseline vital signs, hemoglobin/hematocrit levels, and IV access were included in preoperative assessment. Ringer's Lactate 500-1000 mL preloading was administered to the patients, and prophylaxis antibiotics. Standardized spinal anesthesia (0.5% hyperbaric bupivacaine and intrathecal fentanyl) was used along with the use of supplemental oxygen. Constant hemodynamic observation was done. Its major effect was postpartum hemorrhage (blood loss of greater than 1000 mL or blood transfusion). The secondary outcomes were uterine tone (4-point scale during placenta delivery, 5, and 15 minutes after childbirth), the necessity of receiving extra uterotonics, and side effects (nausea, vomiting, hypotension, tachycardia). A quantitative method of measuring blood loss was performed through a calibrated drape and sponge weight.

All the data were recorded on a structured proforma. Statistical analysis was done in SPSS v26.0, where the independent t-tests were used, or Mann-Whitney U tests were used when the variable is continuous, and Chi-square or Fisher exact tests were used when the variable is categorical, because p-value less than 0.05 was considered statistically significant.

RESULTS

The participants were separated into 90 women in the bolus (n=45) and infusion (n=45) groups. The baseline traits (age, BMI, parity, and gestational age) were similar in groups, and no statistically significant differences were found (p>0.05) (Table 1).

Table 1: Demographic Characteristics of Participants

Characteristic	Bolus Group (n=45)	Infusion Group (n=45)	Total (n=90)	p-value
Age				
18-25	11 (24.4%)	10 (22.2%)	21 (23.3%)	0.61
26-35	27 (60.0%)	28 (62.2%)	55 (61.1%)	
36-40	7 (15.6%)	7 (15.6%)	14 (15.6%)	
Normal BMI				
18.5-24.9	40 (88.9%)	39 (86.7%)	79 (87.8%)	0.78
Others				
Primiparous	20 (44.4%)	22 (48.9%)	42 (46.7%)	0.54
Multiparous	25 (55.6%)	23 (51.1%)	48 (53.3%)	
Gestational Age				
37-38 Weeks	13 (28.9%)	15 (33.3%)	28 (31.1%)	0.48
39-40 Weeks	32 (71.1%)	30 (66.7%)	62 (68.9%)	

The incidence of postpartum hemorrhage (PPH) was 4.4% in the bolus group and 2.2% in the infusion group (p=0.78), indicating no significant difference in PPH prevention. Uterine atony, defined as a tone score of ≤2, was observed in 3 patients (6.7%) in the infusion group compared to 3 patients (6.7%) in the bolus group (p=0.82), also showing no significant difference in maintaining uterine tone. The need for additional uterotonics was slightly higher in the bolus group (5 patients, 11.1%) compared to the infusion group (4 patients, 8.9%), but again, the difference was not statistically significant (p=0.65) (Table 2).

Table 2: Comparison of Maternal Outcomes among Study Groups

Characteristic	Bolus Group (n=45)	Infusion Group (n=45)	p-value
Postpartum Hemorrhage	2 (4.4%)	1 (2.2%)	0.78
Uterine Atony	3 (6.7%)	3 (6.7%)	0.82
Need for Additional Uterotonics	5 (11.1%)	4 (8.9%)	0.65
Mean Blood Loss (mL) (SD)	545 ± 145	525 ± 138	0.32

The mean blood loss was 545 ± 145 mL in the bolus group and 525 ± 138 mL in the infusion group, showing no significant difference (p=0.32). However, in contrast to the similar efficacy in PPH prevention and uterine tone, a statistically significant difference was observed in hemodynamic side effects. Hypotension was significantly more frequent in the bolus group (22.2%) compared to the infusion group (2.2%) (p=0.02). Likewise, there was a great prevalence of tachycardia in the bolus group (20.0%) compared to the infusion group (4.4%) (p=0.03). Side effects like nausea and vomiting were similar in groups (p>0.05). These findings indicate that both IV bolus and infusion regimens of oxytocin have similar effects in the prevention of PPH and preserving uterine tone in elective Cesarean delivery, although the IV infusion regimen has a distinct benefit when it comes to maternal hemodynamic stability, which undoubtedly lowers the rate of hypotension and tachycardia (Table 3).

Table 3: Comparison of Side Effects among Study Groups

Side Effect	Bolus Group, (n=45)	Infusion Group, (n=45)	p-value
Nausea	4 (8.9%)	2 (4.4%)	0.35
Vomiting	2 (4.4%)	0 (0%)	0.15
Hypotension	10 (22.2%)	1 (2.2%)	0.02*
Tachycardia	9 (20.0%)	2 (4.4%)	0.03*

* p-value < 0.05, indicating statistical significance

DISCUSSION

The similar effectiveness of the bolus and infusion groups in the primary outcomes, including the incidence of PPH, uterine atony, and mean blood loss, concurs with the results of other studies. Our study's estimate of mean blood loss is also in line with the average blood loss that was published previously about elective cesarean deliveries using prophylactic oxytocin [3]. As an example, a meta-analysis and systematic review of carbetocin and oxytocin in high-risk women reported that various regimens of

DOI: https://doi.org/10.54393/pjhs.v7i3.3675

oxytocin could have a similar effect in preventing PPH [6]. Research that compared three uterotonic methods used in PPH prevention when performing cesarean section also implied that different interventions might yield similar results in terms of blood loss [13]. These findings are in line with the current study, which argues that both bolus and infusion interventions can be successful in achieving myometrial stimulation to prevent excessive blood loss since the outcomes of both methods were low PPH rates and comparable uterine atony rates [11]. Therefore, although various administration techniques are used, the result on the uterotonic effect on managing any blood loss may be the same, given that the best protocols are applied. Although this efficacy was also found in the uterotonic effect, our study found a statistically significant benefit of the continuous infusion regimen in maternal hemodynamic stability. The bolus-only group had significantly more cases of hypotension and tachycardia as opposed to the infusion group. This effect is not surprising according to the principles of pharmacodynamics: an abrupt increase in the concentration of oxytocin caused by a rapid injection of an oxytocin bolus may result in dose-related vasodilatory actions and consequent baroreceptor excitation, which eventually result in hypotension and reflex tachycardia [9]. Conversely, a low-level infusion over a period of time suppresses such peaks, promoting homeostasis in the cardiovascular system without diminishing uterotonic potency [10]. These hemodynamic benefits of infusion schedules have been noted in the literature, and some studies suggest infusion regimens as opposed to boluses to reduce incidences of adverse cardiovascular events [8]. The lack of notable disparities between our groups in such gastrointestinal side effects as nausea and vomiting further implies similar overall tolerability to the hemodynamic effect. Our results provide credence to the growing body of evidence that oxytocin in the form of a bolus is adequate to achieve uterotonic efficacy, but an infusion approach provides a vital hemodynamic safety margin, and this makes it a better choice in elective cesarean operation, especially to prevent complications involving maternal cardiovascular reactions [1]. This difference in safety profile is especially important because refractory uterine atony is still a problem despite the popularity of oxytocin administration, which requires caution regarding the guidelines of use [14]. The variability of the research, especially in relation to different amounts of dose needed in case of elective and intrapartum cesarean section, again evidences the need to formulate the best administration procedures [8]. The noted hemodynamic stability difference could possibly be explained by the pharmacokinetics of oxytocin, whereby a continuous infusion compared to a bolus dose provides a more stable plasma concentration, which cushions the sudden cardiovascular changes caused by bolus dosing [17]. Moreover, constant release infusion prevents transient surges in oxytocin level, which can cause acute effects, e.g., reflex tachycardia, which is frequently observed after bolus delivery [18]. The findings of the present study are consistent with previously reported hemodynamic effects of oxytocin administration during cesarean delivery under neuraxial anesthesia. Archer et al. demonstrated that intravenous oxytocin, particularly when administered as a bolus, produces significant cardiovascular changes, including hypotension and tachycardia, attributable to its vasodilatory properties and rapid onset of action [19, 20].

Nevertheless, the exact processes of action of oxytocin on the cardiovascular system, especially the interactions between direct vasodilation and reflex, are yet to be clarified. Future studies ought to examine the best dosing and routes of oxytocin and its analogues to ensure they maximize the uterotonic effects and minimize adverse cardiovascular effects during the conduct of elective cesarean section. These studies would be improved by sound methodologies such as randomized controlled trials that could be done with sufficient power to identify clinically significant differences in maternal and neonatal outcomes.

CONCLUSIONS

This study demonstrated that both intravenous bolus and continuous infusion regimens of oxytocin are equally effective in preventing postpartum hemorrhage and maintaining adequate uterine tone during elective cesarean delivery. However, continuous intravenous infusion was associated with significantly better maternal hemodynamic stability, with lower incidences of hypotension and tachycardia compared with bolus administration, while other adverse effects were comparable between groups. These findings suggest that oxytocin administered as a continuous infusion offers a safer hemodynamic profile and may be the preferred regimen in women undergoing elective cesarean section.

Authors' Contribution

Conceptualization: SS
Methodology: SS, UM, SA
Formal analysis: UM, AR
Writing and Drafting: MB, SA, HFA
Review and Editing: SS, MB, UM, SA, HFA, AR, FU

All authors approved the final manuscript and take responsibility for the integrity of the work.

DOI: https://doi.org/10.54393/pjhs.v7i3.3675

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

REFERENCES

[1] Nagai A, Shiko Y, Noguchi S, Ikeda Y, Kawasaki Y, Mazda Y. Protocolized Oxytocin Infusion for Elective Cesarean Delivery: A Retrospective Before-and-After Study. Journal of Anesthesia. 2024 Aug; 38(4): 425-33. doi: 10.1007/s00540-024-03329-1.

[2] Boonstra L, Carvalho JC, Turner W, Downey K, Ye XY, Thomas J *et al.* Maintenance Infusion Rate of Oxytocin After Initial 1-IU Bolus for Elective Cesarean Delivery: A Dose-Finding Study. Canadian Journal of Anesthesia/Journal canadien d'anesthésie. 2024 Oct; 71(10): 1363-71. doi: 10.1007/s12630-024-02828-9.

[3] Chaudhuri P, Banerjee GB, Mandal A. Rectally Administered Misoprostol Versus Intravenous Oxytocin Infusion During Cesarean Delivery to Reduce Intraoperative and Postoperative Blood Loss. International Journal of Gynecology and Obstetrics. 2010 Apr; 109(1): 25-9. doi: 10.1016/j.ijgo.2009.11.009.

[4] Zagrodnik E, Ziętek M, Machałowski T, Dołęgowska B, Szczuko M. Carbetocin Is More Effective in Stabilizing Hemodynamic Parameters Compared to Oxytocin During Cesarean Section. Biomedicines. 2025 Mar; 13(3): 685. doi: 10.3390/biomedicines13030685.

[5] Brzozowska M, Lisiecki D, Kowalska-Koprek U, Karowicz-Bilińska A. Comparison of Carbetocin and Oxytocin Effectiveness for Prevention of Postpartum Hemorrhage After Caesarean Delivery. Ginekologia Polska. 2015; 86(2). doi: 10.17772/gp/1996.

[6] El-Goly NA, Maged AM, Kamal WM, Hosny O, Turki D, Helmy NM. Carbetocin versus Oxytocin in Prevention of Postpartum Hemorrhage After Cesarean Delivery in High-Risk Women. A Systematic Review and Meta-Analysis. Archives of Gynecology and Obstetrics. 2025 Apr: 1-9. doi: 10.1007/s00404-025-08014-6.

[7] Gabr AA. Pre-Incisional Oxytocin Infusion in Elective Cesarean Section Delivery, Maternal and Neonatal Outcome. The Egyptian Journal of Fertility and Sterility. 2023 May; 27(3): 22-33. doi: 10.21608/egyfs.2023.303254.

[8] Heesen M, Carvalho B, Carvalho JC, Duvekot JJ, Dyer RA, Lucas DN *et al.* International Consensus Statement on the Use of Uterotonic Agents During Caesarean Section. Anesthesia. 2019 Oct; 74(10): 1305-19. doi: 10.1111/anae.14757.

[9] Kureshi FR, Gupta S, Rajani B, Patel U, Patel MR. Efficacy of Phenylephrine in Preventing Hemodynamic Responses of Oxytocin During Caesarean Section Under Spinal Anesthesia: A Randomized Comparative Study. International Journal of Medical Anesthesiology. 2025 Jan; 8(1): 20. doi: 10.33545/26643766.2025.v8.i1a.541.

[10] El Tahan MR, Warda OM, Rashad A, Yasseen AM, Ramzy EA, Ahmady MS *et al.* Effects of Preoperative Sublingual Misoprostol on Uterine Tone During Isoflurane Anesthesia for Cesarean Section. Revista Brasileira de Anestesiologia. 2012; 62: 630-5. doi: 10.1590/S0034-70942012000500003.

[11] Akpan UB, Ugwuoke O, Ekpo E, Omoronyia E, Ekabua J, Ekabua Sr J. Effectiveness of Combined Preoperative Sublingual Misoprostol and Intravenous Tranexamic Acid on Intraoperative Blood Loss During Elective Caesarean Section: A Randomised, Blinded, Placebo-Controlled Trial. Cureus. 2023 Jun; 15(6). doi: 10.7759/cureus.41041.

[12] Goel V, Karya U, Rani A, Dayal M, Goel Sr V. Hemodynamic and Uterotonic Effects of Carbetocin Versus Oxytocin in a Cesarean Section with a High Risk of Postpartum Hemorrhage. Cureus. 2025 May; 17(5). doi: 10.7759/cureus.83504.

[13] Çetin Ç, Dural HR, Özcan P, Tanoğlu FB, Kütük MS, Pasin Ö *et al.* The Efficacy of Three Regimes of Uterotonic Agents for Prevention of Postpartum Blood Loss at Undergoing Cesarean Section: A Prospective Randomized Clinical Trial. Ginekologia Polska. 2023; 94(9): 741-7. doi: 10.5603/gpl.93374.

[14] Balki M and Wong CA. Refractory Uterine Atony: Still A Problem After All These Years. International Journal of Obstetric Anesthesia. 2021 Nov; 48: 103207. doi: 10.1016/j.ijoa.2021.103207.

[15] Sheehan SR, Montgomery AA, Carey M, McAuliffe FM, Eogan M, Gleeson R *et al.* Oxytocin Bolus versus Oxytocin Bolus and Infusion for Control of Blood Loss at Elective Caesarean Section: Double Blind, Placebo Controlled, Randomized Trial. British Medical Journal. 2011 Aug; 343. doi: 10.1136/bmj.d4661.

[16] M Mahmoud M, El-Garhey I, A El-Boghdady A. A Comparative Study Between Oxytocin Intravenous Bolus Versus Oxytocin Intravenous Bolus and Infusion for Control of Blood Loss at Elective Cesarean Section. Al-Azhar Medical Journal. 2021 Jan; 50(1): 419-32. doi: 10.21608/amj.2021.139734.

[17] Hasanin A, Habib S, Abdelwahab Y, Elsayad M, Mostafa M, Zayed M *et al.* Variable Versus Fixed-Rate Infusion of Phenylephrine During Cesarean Delivery: A Randomized Controlled Trial. BioMed Central Anesthesiology. 2019 Nov; 19(1): 197. doi: 10.1186/s

DOI: https://doi.org/10.54393/pjhs.v7i3.3675

12871-019-0879-3.

[18] Albazee E, Soliman A, Albakri K, Elbanna M, Moussa NA, Faragalla HM. Efficacy and Safety of Rectal Misoprostol Versus Intravenous Oxytocin on Reducing Blood Loss in Cesarean Section: A PRISMA-Compliant Systematic Review and Meta-Analysis of Randomized Clinical Trials. Turkish Journal of Obstetrics and Gynecology. 2023 Jun; 20(2): 142-53. doi: 10.4274/tjod.galenos.2023.15098.

[19] Ravichandrane B, Subramaniam R, Muthiah T, Talawar P, Ramadurai R. Comparison of Prophylactic Infusion of Phenylephrine Versus Norepinephrine for the Prevention of Post Spinal Hypotension in Parturients Undergoing Elective Caesarean Section-A Randomized, Double-Blinded, Non-Inferiority Trial. Turkish Journal of Anesthesiology and Reanimation. 2023 Jun; 51(3): 213. doi: 10.4274/TJAR.2022.22909.

[20] Archer TL, Knape K, Liles D, Wheeler AS, Carter B. The Hemodynamics of Oxytocin and Other Vasoactive Agents During Neuraxial Anesthesia for Cesarean Delivery: Findings in Six Cases. International Journal of Obstetric Anesthesia. 2008 Jul; 17(3): 247-54. doi: 10.1016/j.ijoa.2008.03.003.