Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(5), 3195-3205 | ISSN:2251-6727

"Comparison of the Efficacy, Safety, And Hemodynamic Effect of Iv Carbetocin Versus Iv Oxytocin for the Prevention of Primary Postpartum Hemorrhage (PPH); A Leading Cause of Maternal Mortality During Cesarean Section"

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(Received: 27 September 2025 Revised: 05 October 2025 Accepted: 14 October 2025)

KEYWORDS

Postpartum hemorrhage, Postpartum depression, oxytocin, carbetocin, EPDS scale

ABSTRACT:

BACKGROUND: - Postpartum hemorrhage is defined as blood loss above 500 mL after a vaginal birth or 1000 mL after a cesarean delivery according to the International Classification of Diseases (ICD-10). Postpartum depression (PPD) is a mood condition that can affect women after giving birth. Although PPH and PPD are separate disorders, there may be a relationship between them. Major depressive symptoms appear after giving birth, which affects many women globally, with prevalence rates of between 10% and 25%.

AIM: The study aims to compare the efficacy, safety, and hemodynamic effects of IV Carbetocin over IV oxytocin to prevent primary postpartum hemorrhage (PPH) during cesarean section.

METHOD: A total of N=126 Patients were divided into two groups. Group 1(n=63) patients were administered Oxytocin 10 IU STAT, and group 2 (n=63) patients were administered Carbetocin 100 mcg. The drugs' safety and efficacy were evaluated, and postpartum depression levels were studied using the EPDS scale.

RESULT:- The study was carried out over 6 months on 126 patients. The patients were evaluated, and a significant difference was seen in terms of (<0.001**), BP (0.014**), and postpartum depressive symptoms.

CONCLUSION: In conclusion, we found that carbetocin is more effective and safer than oxytocin, suggesting that it may be the better choice for avoiding blood loss. Fewer postpartum depressive symptoms were observed in the carbetocin group compared to the oxytocin group.

Journal of Chemical Health Risks

www.jchr.org

JCHR (2025) 15(5), 3195-3205 | ISSN:2251-6727

INTRODUCTION

Maternal health is a cornerstone of public health, encompassing the well-being of women during pregnancy, childbirth, and the postpartum period. Safe motherhood initiatives emphasize the importance of access to high-quality medical care and timely interventions that ensure favorable maternal and neonatal outcomes. Despite global efforts, **postpartum hemorrhage (PPH)** continues to be one of the **leading causes of maternal mortality and morbidity**, particularly in low- and middle-income countries. **[1]**

Definition and Clinical Significance of PPH

According to the **World Health Organization (WHO)** and **ICD-10 criteria**, postpartum hemorrhage is defined as blood loss of **more than 500 mL after vaginal delivery** or **more than 1000 mL after cesarean section**. In severe cases, this blood loss can escalate rapidly, resulting in **hypovolemic shock**, **multi-organ failure**, **coagulopathy**, and potentially **maternal death**. Moreover, the psychological aftermath of such obstetric emergencies has been linked with **postpartum depression (PPD)** and **maternal anxiety disorders**, further impacting maternal-infant bonding and long-term family well-being. **[2]**

Cesarean Delivery and PPH Risk

The rate of cesarean deliveries has significantly increased globally over the past few decades. While cesarean sections are often necessary to manage complicated deliveries, they are **associated with a higher incidence of PPH** compared to vaginal births. One of the principal causes of PPH post-cesarean is **uterine atony**, where the uterus fails to contract adequately, leading to continued bleeding from the placental bed. At full term, uterine blood flow can reach up to **600 mL per minute**, magnifying the risk of fatal haemorrhage if not controlled immediately. **[3]**

Uterotonic Agents: Oxytocin as First-Line

Oxytocin, a naturally occurring peptide hormone produced by the hypothalamus and secreted by the posterior pituitary, is the first-line uterotonic agent recommended by WHO for both the **induction of labor** and **prevention of PPH**. It acts on oxytocin receptors in the myometrium to induce rhythmic uterine contractions and promote hemostasis. However, oxytocin has a **short half-life (4–10 minutes)**, which often necessitates **repeated dosing or continuous infusion** during and after delivery. Additionally, oxytocin administration may cause **transient hypotension**, **tachycardia**, **headache**, **nausea**, and **hyponatremia**, limiting its tolerability in some patients. **[4]**

Carbetocin: A Long-Acting Alternative

To address these limitations, **Carbetocin**—a long-acting synthetic analog of oxytocin—was developed. It shares the same mechanism of action as oxytocin but offers a significantly **longer half-life (~40 minutes)**, enabling effective **single-dose administration**. Carbetocin is also more **resistant to enzymatic degradation**, allowing it to maintain sustained uterine contraction without the need for an infusion pump. Several studies have reported **superior efficacy of carbetocin** in reducing the need for additional uterotonics, **minimizing blood loss**, and improving **hemodynamic stability**, particularly in **caesarean sections**. Its favourable side-effect profile further supports its adoption in modern obstetric practice. **[5]**

Postpartum Depression (PPD) and Its Association with PPH

Apart from physical complications, the postpartum period is also associated with significant **mental health challenges**, including **postpartum depression (PPD)**. Affecting approximately **10–25% of postpartum women**, PPD is characterized by persistent sadness, anxiety, feelings of worthlessness, and changes in sleep or appetite. It not only impairs the mother's quality of life but also affects **infant development**, including cognitive, emotional, and behavioural outcomes. Research indicates that **obstetric complications such as PPH** may act as **risk factors for PPD**, likely due to the traumatic experience, anaemia, hormonal imbalance, and psychosocial stress following a difficult birth. **[6]**

EPDS as a Screening Tool

To facilitate early detection, the **Edinburgh Postnatal Depression Scale (EPDS)** is widely used in both clinical and research settings. It comprises **10 self-report questions**, each scored on a scale of 0–3, yielding a total score ranging from **0 to 30**. A cut-off score of **13 or higher** suggests possible depression and the need for further evaluation or intervention. The EPDS is validated

Journal of Chemical Health Risks
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JCHR (2025) 15(5), 3195-3205 | ISSN:2251-6727

across multiple languages and is considered reliable in diverse cultural settings.

Rationale of the Study

Given the global burden of PPH and the psychosocial implications of PPD, this study is designed to offer a **comparative evaluation of the efficacy and safety** of IV **carbetocin versus oxytocin** in preventing primary PPH during caesarean delivery. The study also aims to examine the **hemodynamic profiles** of both agents and to assess their **impact on postpartum emotional health** using the EPDS scale. **[7]**

Significance of the Study

By integrating **clinical effectiveness** with **maternal psychological outcomes**, this research aims to provide **comprehensive insights** into optimizing obstetric protocols. It underscores the importance of not only controlling haemorrhage efficiently but also preserving the **mental health and holistic well-being** of new mothers. The findings are expected to assist clinicians in choosing the most effective uterotonic agent and encourage the inclusion of **mental health screening** as a routine component of postpartum care. **[8]**

MATERIAL AND METHOD

Study Design

This was a prospective, hospital-based, comparative observational study conducted over six months at the Jaipur National University Institute for Medical Sciences and Research Centre (JNUIMSRC), Jaipur, Rajasthan, India. The primary aim was to assess and compare the efficacy, safety, and hemodynamic impact of intravenous (IV) Carbetocin (100 µg) and IV Oxytocin (10 IU) in preventing primary postpartum hemorrhage (PPH) following cesarean section (C-section). Additionally, the study aimed to explore the relationship between the use of these uterotonic agents and the development of postpartum depression (PPD) using a validated screening tool, the Edinburgh Postnatal Depression Scale (EPDS). The study was conducted under the ethical principles outlined in the Declaration of Helsinki.

Study Population and Drug Allocation

A total of 126 pregnant women who were admitted for cesarean delivery were enrolled in the study based on inclusion and exclusion criteria. Participants were equally and randomly divided into two groups using a computer-generated randomization schedule.

- The grouping and treatment protocol were as follows:

Group	Drug Administered	Dosage	Route of Administration
Group 1	Oxytocin	10 IU (International Units)	Intravenous (Single dose)
Group 2	Carbetocin	100 µg (Micrograms)	Intravenous (Single dose)

Inclusion and exclusion criteria

Inclusion Criteria	**Exclusion Criteria**
• Age ≥18 years.	• Known hypersensitivity or allergy to oxytocin or carbetocin.
• Term pregnancy (Gestational age >36 weeks).	• Presence of psychiatric illness or diagnosed psychological disorders.
• Undergoing elective or emergency lower-segment cesarean section (LSCS).	• Comorbidities such as placenta previa, abruptio placentae, coagulopathy, cardiac, renal, or hepatic disease.
• Singleton or multiple gestation.	• Refusal to give consent or withdraw at any stage of the study.
• Willingness to participate with written informed consent.	• Presence of coagulopathy or significant cardiac, renal, or hepatic disease.

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Outcome Measures

- Primary Outcomes:
  - Quantitative blood loss assessed by the number of surgical gauze pieces used.
  - Hemoglobin (Hb%) change pre- and post-operatively.
- Secondary Outcomes:
  - Hemodynamic parameters (BP changes).
  - Adverse drug effects (nausea, headache, itching, etc.).
  - Postpartum depression assessed using EPDS.

Measurement Tools and Procedure

Estimation of blood loss was done based on gauze count. Hemoglobin was measured preoperatively and 24 hours postoperatively. The EPDS scale, consisting of 10 items with scores ranging from 0 to 3, was used. A total score ≥13 was considered indicative of probable depression.

Statistical Analysis

Data were analyzed using IBM SPSS version 27. Descriptive statistics included mean, standard deviation, and percentages. Normality was assessed using the Shapiro-Wilk test. Independent sample t-test and Mann–Whitney U test were applied for group comparisons. A p-value <0.05 was considered statistically significant.

Summary of Tools Used

Parameter	Tool/Method Used
Blood Loss	Gauze count-based estimation
Hemoglobin	Automated hematology analyzer
Depression Screening	EPDS Questionnaire
Hemodynamic Assessment	Systolic & Diastolic BP
Statistical Software	SPSS v27 (IBM Corp.)

EPDS questionnaire scoring method and calculation of blood loss

• The study compared the safety, efficacy, and hemodynamic effects of IV carbetocin over IV oxytocin by measuring parameters like Hb% and blood loss.

• Blood losses were calculated by counting the number of gauge pieces.

• The EPDS scale consists of 10 questions related to postpartum depression and measures the score as follows:

• The score ranges between 0-3 for each question, so that the minimum score can be 0, and the maximum score can be 30. Responses were recorded according to the seriousness of symptoms. Mothers scoring above 12 or 13 are likely to be suffering

from depression. Mothers scoring less than 12 are unlikely to be suffering from postpartum depression.

• Data were analysed by SPSS and the level of significance (less than or equal to 5%) (P<0.05) and CI (95%).

SELECTION CRITERIA OF PATIENTS

INCLUSION CRITERIA

Willing to participate in the study and had given consent

1. All pregnancies (Singleton or multiple gestation).
2. 2. Gestational age>36 weeks (full-term pregnancy).
3. 3. Age >18 years
4. 4. Only Caesarean Delivery

EXCLUSION CRITERIA

1. Allergic or hypersensitivity to carbetocin or oxytocin

2. Patient with a psychiatric condition.

3. Patient with Comorbid Conditions like Placenta previa, placenta abruption, coagulation defects, known cases of cardiac, renal, liver diseases, etc.

4. Not willing to participate in the study

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Study procedure

Demographic data were collected for each patient. The study was approved by the institutional ethics committee of Jaipur Institute for Medical Sciences and Research Centre, Jaipur. The study was explained to the patients through an information sheet, and their consent was obtained. The safety and efficacy of the drugs were evaluated, and postpartum depression levels were studied using the EPDS scale. According to postpartum depressive symptoms, scores were given for each question total scores were calculated based on their respective answers.

Statistical analysis

Data were compiled and entered in SPSS V 27(IBM Corp). Data distribution patterns were evaluated by the Shapiro-Wilk test. Descriptive statistics such as percentage, mean, and SD were used for descriptive analysis. Based on data distribution, Mann Mann-Whitney U test, the Independent sample t-test was applied to compare the means between the groups. P value <0.05 was considered statistically significant.

RESULTS

Table 1: Age categorization of patients into age groups.

Groups	No. of Patients (N=126)	Percentage (%)
11-20	12	9.52
21-30	89	70.63
31-40	25	19.84

Patients were categorized into ages 11-20, 21-3,0, and 31-40. The majority of patients fall between the age groups 21-30[89(70.63%)], followed by 31-40[25(19.84%)]

Table 2: Categorization of subjects based on their diet.

S.no.	Diet	Total (126)	Percentage (%)
1	Veg	67	53%
2	Non-Veg	59	47%

Out of 126 patients, a more significant number of patients were vegetarians [67(53%)] than non-vegetarians (47%).

Table 3: Categorization of subjects based on Gravida

GRAVIDA	Total (126)		Percentage (%)
1.	Primi Gravida	16	12.69%
2.	Second Gravida	62	49.20%
3.	Third Gravida	31	24.60%
4.	Multi Gravida	17	13.49%
Total	126		100 %

Patients were categorized into four gravida, which are mentioned in Table no,3. Most of the patients falls in second gravida [62(49.20%)] followed by third gravida [31(24.60%)]

Table 4: Categorization of patients based on parity.

S. NO.	Parity	Total (N=126)	Percentage (%)
1.	ONE	68	53.96
2.	TWO	50	39.68
3.	>TWO	8	6.34

Table no. 4 parity among the patients. Majority of patients falls in P1 [68(53.96%)], Followed by P2 [50(39.68) %].

Table 5: Comparison of means of both groups according to the drop in Hb level

GROUP 1(OXYTOCIN) n=63		GROUP 2 (CARBETOCIN) n=63		
MEAN ± SD		MEAN ± SD		P VALUE*
PRE-OP	POST-OP	PRE-OP	POST-OP	<0.001**
11.17±1.33	9.23±0.80	11.16±1.23	10.4	

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In a sample size of 126, it was found that out of these patients, their average pre-op Hb was found to be 11.17±1.33 and 11.16±1.23 for oxytocin (63) and carbetocin (63) respectively, and obtained P value was 0.072, and their average post-op Hb was found to be 9.23±0.80 and 10.47±1.31 for oxytocin (63) and carbetocin (63) respectively and obtained P value was 0.043.

Table 6: Categorization of subjects based on Hypertension grading as per CTCAE (V.5)

	Systolic / Diastolic	**No. of patients N= 126**	**Percentage%**
Non-Hypertensive	<119/<79	31	24.60
Grade 1	120-139/80-89	77	61.11
Grade 2	140-159/90-99	16	12.69
Grade 3	>160-100	2	1.58

Based on CTCAE guidelines, patients were divided into three grades, of which a greater number of patients had grade 1 hypertension [77(61.11%)].

Table 7: Comparison of means of blood loss based on the number of gaugThey were used in both Group 1 and Group 2

Variables	**No of Gauge**				**Group 1(Oxytocin)(mean±SD) (n=63)**	**Group 2(Carbetocin) (mean±SD) (n=63)**	**P VALUE***
Gauge used	3	4	5	6	4.93±0.87	4.03±0.94	<0.001**
Oxytocin Administered Patient	5	11	30	17			
Carbetocin Administered Patients	21	25	11	6			

The means of oxytocin and carbetocin groups were 4.93±0.87 and 4.03±0.94, respectively (<0.001). By the way, it was observed that in group 1, around 500 ml of blood loss was observed, as in group 2, approximately. 400 ml of blood loss was seen during the cesarean delivery. It concludes that more blood loss was seen in group 1 compared to group 2. These results show that patients administered carbetocin had better efficacy in preventing blood loss than group 1.

Table 8: Side Effects Observed in Oxytocin & Carbetocin Administered Patients

S no.	**Side Effects**	**Oxytocin (n=63)**	**Carbetocin (n=63)**	**Total no. of side effects in both groups (%)**
1.	Nausea	14	8	22(17.46)

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2.	Headache	8	4	12(9.52)
3.	Itching	4	3	7(5.55)
		Total (26)	Total (15)	41 out of 126(32.5%)

In a sample Size of 126, it was found that out of these patients who administered oxytocin (63), nausea was observed in 14 patients, headache was observed in 8 patients, and itching was observed in 4 patients. Whereas in carbetocin (63) administered patients, nausea was observed in 8 patients, and headache was observed in 4 patients. It was concluded that out of 63 patients administered oxytocin, side effects were noted in 26 patients, but in carbetocin-administered administered, only 15 patients were observed with side effects out of 63.

Table 9: Comparison of average B.P. in the arbetocin and Oxytocin group

	Oxytocin(n=63)	**Carbetocin(n=63)**	**P Value***
Systolic at Before	127.07±13.16	128.22±11.44	0.014**
Systolic at the time of delivery	121.55±19.81	127.49±12.64	
Diastolic at Before	77.80±11.29	78.22±8.28	0.023**
Diastolic at the time of delivery	77.76±9.79	76.12±10.09	

In a sample size of 126, it was found that out of these patients administered with oxytocin (63), their average systolic B.P. before delivery was 127.07 ± 13.16 mm Hg. Their average systolic B.P. at the time of delivery was 121.55 ± 19.81mm Hg. Their average diastolic B.P. before delivery was 77.80 ± 11.29mm Hg, and their average diastolic B.P. at the time of delivery was 77.76 ±9.79 mmHg.

In the patients who were administered carbetocin (63), their average systolic B.P. before delivery was 127.49 ±12.64 mmHg, and the average systolic B.P. at the time of delivery was 128.22 ± 11.44 mmHg. Their average diastolic B.P. before delivery was 76.12 ±10.09 mmHg, and their average diastolic B.P. at the time of delivery was 78.22 ± 8.28 mmHg.

Table 10: Comparison of Post-Partum Depressive Symptoms Observed in Oxytocin & Carbetocin Administered Patients According to EPDS Scale.

S.no.	**Depression level**	**Mean Score of Oxytocin**	**Oxytocin**	**Mean Score of Carbetocin**	**Carbetocin**	**The total No. Of Patients in both**
S1.	Probable Depression (>13)	10.42±4.36	40	8.07±3.77	12	52
2.	Possible Depression (10-12)		21		11	32
3.	Normal (0-9)		26		16	42
						Total (126)

In a sample size of 126, it was found that out of these patients who were administered oxytocin (63), the depression level was found as follows:

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The patients with probable depression (>13) were found to be in 24 patients, the patients with Possible Depression (10-12) were found to be in 16 patients and the patients with Normal level (0-9) were found to be in 23 patients. And in case of carbetocin patients with probable depression (>13) were found to be in 10 patients, the patients with Possible Depression (10-12) were found to be in 11 patients and the patients with Normal level (0-9) were found to be in 42 patients. So, from here, it can be concluded that the patients who were administered carbetocin were found to have fewer postpartum depressive symptoms as compared to oxytocin-administered patients.

Table 11: Comparison based on the cost-utility of both drugs based on the use of another uterotonic agent.

S.no.	Cost-utility Parameter	Oxytocin	Carbetocin
1.	QALY	10.42± 4.36	8.07±3.77
2.	Total Cost	63.50±52.46	311.53±38.65

As per QALYS comparison using the EPDS scale, using carbetocin and oxytocin administered patients, their mean value for carbetocin was found to be 8.07±3.77. Oxytocin was found to be 10.42±4.36. The total cost of patient usage based on medicine and carbetocin cost is more than oxytocin. Still, with oxytocin, other uterotonic drugs (misoprostol, carbeprostol, ergometrine) were administered, so it was clearly shown that individual carbetocin has higher efficacy but is costlier than oxytocin.

DISCUSSION

Blood loss of 500 mL or more after a vaginal birth or 1000 mL after a cesarean delivery is considered postpartum hemorrhage. New guidelines for postpartum hemorrhage define it as 1000 mL of accretive bloody loss or more blood loss associated with hypovolemia symptoms, regardless of delivery method. One of the many factors that may lead to postpartum depression (PPD), a mood disorder that some women may experience after giving birth, is postpartum hemorrhage (PPH). Although PPD and PPH are distinct conditions, a connection between the two is not out of the question. Many women throughout the world have Postpartum Depression, which is characterized by major depressive symptoms that emerge after giving birth. The prevalence rates of this condition range from 10% to 25%. Our study at Jaipur National University Institute for Medical Sciences and Research included 126 individuals; 63 of those patients received oxytocin, while the other 63 received carbetocin. We used the EPDS scale to measure depression levels and conducted observations to determine if intravenous oxytocin was safer and more effective than intravenous carbetocin in preventing primary PPH. Depending on the patients' replies, we also scored their quality of life (postpartum depression symptoms).

Elective cesarean sections in patients at risk for primary postpartum hemorrhage have been the subject of few comparative studies comparing carbetocin and oxytocin. The purpose of this research is to find out how these medications affect hemodynamics and whether or not they can stop postpartum bleeding. There is a continuing discussion on whether a uterotonic drug is best for prophylactic usage, and the current literature should give definitive answers.

The majority of participants in the carbetocin and oxytocin groups experienced year aging, respectively, in this research. According to Table 1, the average age of the carbetocin group was 25.20±5.43 years, whereas the average age of the oxytocin group was 25.90±5.83 years.

When dietary habits were taken into account, 67 patients (or 53.17 percent) out of 126 were vegetarians, whereas 59 patients (or 46.82 percent) were not. When analyzing a sample size of 126 patients based on their obstetric history, we found that out of 63 patients who received oxytocin, at least 8 had primi gravida, and up to 31 had second gravida. Similarly, out of 63 patients who received carbetocin, the following were the obstetric history categories: For the first trimester, at least eight patients are required, and for the second trimester, no more than thirty-one.

This study found no statistically significant variation in the effectiveness of using oxytocin and carbetocin in patients who have a history of pregnancy. Patient outcomes may be improved by applying the study's findings to the management of postpartum hemorrhage in patients with an obstetric history.

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Based on the observations made regarding the patients' parity, it was found that out of 63 patients who had an obstetric history (gravida), 36 had one parity and 3 had more than two. Similarly, out of 63 patients who had an obstetric history (carbetocin administered), 32 had one parity and 5 had more than two. Liu C.*.al*. **[9]** states that 1-2 patients can have parity at most.

When the patient's hemoglobin level dropped after receiving oxytocin and carbetocin, this is the answer that was discussed in light of the data on the usage of the gauge during patient observation based on blood loss. On average, 5–6 gauges were used by each patient in the oxytocin group. In this group, 500 to 600 cc of blood was lost on average. Patients in the carbetocin group often used three or four tiny gauges. On average, this group lost 300–400 milliliters of blood. Compared to the carbetocin group, the oxytocin group used a wider variety of gauges, and the same results were obtained as per a study conducted by

Dansereau et al.**[10]** Regarding the management of uterine atony, this study also found that uterotonic drugs are needed more often in the oxytocin group compared to the carbetocin group.

During the pre-and post-operative hemoglobin levels, the patient was found to have an average of 11.17±1.33 and 11.16±1.23 with oxytocin and carbetocin, respectively, with a p-value of 0.072. In contrast, the post-operative hemoglobin levels were 9.23±0.80 and 10.47±1.31, with oxytocin and carbetocin, respectively, and a p-value of 0.043, indicating a significant difference. The post-operative P value was 0.01 (essential). Patients who received carbetocin had much lower declines in hemoglobin levels before and after surgery compared to those who used oxytocin, which contradicts our data ($p < 0.01$). According to Ali GÜRSOY et al **[11]**, the same results were also observed.

In a trial involving 126 participants, researchers looked at side effects to determine whether the medication was more effective: 63 individuals given oxytocin had 26 negative effects, whereas only 15 patients given carbetocin had side effects. The incidence rate of nausea and vomiting was 42% in the oxytocin group compared to 23% in the carbetocin group, when comparing the two groups' adverse effects. The same conclusion was given by Prior studies by Mohamed M. El Behery et.al.**[13]** claims that oxytocin's side effect rate is greater than carbetocin's. It may be concluded that carbetocin is safer than oxytocin based on our findings and previous studies.

To make educated judgments on the drug choice for their patients, doctors should compare the side effects of oxytocin and carbetocin. According to the research, the frequency of adverse effects was greater with oxytocin than with carbetocin. The results of this study have practical implications for informing patients about drug choices in clinical practice.

From a total of 126 individuals, we determined that 24.60 percent were not hypertensive, 61.11 percent had grade 1 hypertension, and 12.69 percent had grade 2 hypertensions when we used hypertensive criteria for classification. On the other hand, grade 3 hypertensions was seen in 1.58% (2 individuals).

In a study involving 126 patients, the depressive symptoms that followed the administration of carbetocin and oxytocin were evaluated. Out of 63 patients given oxytocin, 24 were determined to have probable depression (>13), while 10 patients given carbetocin were found to have probable depression (>13). Patients given carbetocin exhibited fewer postpartum depression symptoms than those given oxytocin, according to the results of this study. While there is some evidence between oxytocin and postpartum depression, this is the first study to evaluate the effects of carbetocin with oxytocin on postpartum depression symptoms. The results of this study have important implications for the health of mothers and infants since they provide light on the possibility that carbetocin administration might alleviate postpartum depression symptoms.

Based on the average blood pressure readings taken before and after surgery by the patients in the carbetocin and oxytocin groups, it appears that oxytocin has a more beneficial effect on systolic blood pressure, as the average dropped from 127.07 mm Hg before delivery to 121.55 mm Hg afterward.

Despite this, diastolic blood pressure was quite constant during the pregnancy and the postpartum period, dropping slightly from 77.81 mm Hg to 77.76 mm Hg. Systolic and diastolic blood pressures were higher in carbetocin-administered patients after birth compared to pre-delivery values. After giving birth, the average systolic blood pressure rose from 127.49 to 128.22 mm Hg. Before birth, the average diastolic blood pressure

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was 75.69 mm Hg; after delivery, it rose to 78.22 mm Hg.

We agree that the carbetocin group had a great hemodynamic profile with largely unchanged systolic and diastolic blood pressures at the start of the operation, and we also found that the oxytocin group had lower blood pressure levels in nearly every study group following drug administration. Based on these findings, carbetocin appears to have a hemodynamic safety profile that is satisfactory; the same findings were concluded by Moertl *et al*. **[12].**

The results show that oxytocin causes a more noticeable drop in blood pressure and hemodynamic rebound compared to carbetocin. The purpose of our research was to compare carbetocin with oxytocin to avoid primary PPH in patients receiving treatment at a tertiary care hospital.

Health center. We selected the patients after they met all the inclusion and exclusion criteria.

In this study, we aimed to determine if oxytocin or carbetocin might effectively and safely prevent primary PPH at a tertiary care teaching hospital. Our goal was to compare the two groups of patients given oxytocin and carbetocin using a variety of criteria. In addition to attempting to determine postpartum depression using the EPDS scale, we sought to learn which medication was more effective and safer in avoiding PPH. We used SPSS to do statistical analyses after compiling our data in an Excel spreadsheet. Using Rao's soft sample size calculator and Statistics V27.0, we validated that the independent sample t-test and the Whitney U test were used to gather the data.

M. M. El Behery et al. **[13]** found that a comparison of carbetocin and oxytocin in preventing postpartum hemorrhage in women having an emergency cesarean section was conducted by MM El Behery et *al*. The purpose of this study was to examine the safety and effectiveness of two intravenous bolus doses of carbetocin and oxytocin in preventing postpartum hemorrhage (PPH) in patients having cesarean sections. A straightforward sampling strategy was used to pick a sample size of 180 for their investigation. This study used a sample size of 126.

CONCLUSION

This study aims to compare the efficacy, safety, and hemodynamic effects of IV carbetocin versus IV oxytocin for the prevention of primary postpartum hemorrhage (PPH) during cesarean section in a tertiary care hospital. Following the satisfaction of the inclusion and exclusion criteria, the patient was chosen. The objective of this study is to determine which of the two drugs, IV carbetocin or IV oxytocin, is more effective and safer in preventing PPH during cesarean section. As per the literature survey, existing knowledge suggests PPH is a leading cause of maternal mortality and that oxytocin is the standard drug used for preventing PPH during a cesarean section. The topic is important because PPH is a major concern for maternal health, and finding a more effective and safer drug for its prevention can significantly reduce maternal mortality rates. The study is significant because it provides new data on the efficacy and safety of IV carbetocin compared to IV oxytocin in preventing PPH during cesarean section. The findings of this study have important implications for the clinical practice of obstetricians and gynecologists, as they provide new information on the choice of drug for preventing PPH during cesarean section. The study has limitations, and the findings should be interpreted with caution.

From our research study, it was concluded that carbetocin is safer and more efficacious than oxytocin and can be the preferred drug over oxytocin in terms of preventing blood loss and side effects. It was found to have fewer depressive symptoms as compared to oxytocin-administered patients.

REFERENCES

1. Dobiesz VA, Robinson DW. Rosen's emergency medicine: concepts and clinical practice. In: Walls RM, Hockberger R, Gausche-Hill M, editors. Philadelphia. Elsevier; 2017.
2. MacGregor C, Plunkett B, Adams M, Silver R. Discontinuation of oxytocin in the second stage of labor and its association with postpartum hemorrhage. Am J Perinatol 2024;41(8):1050–4.
3. Pacagnella RC, Souza JP, Durocher J, Perel P, Blum J, Winikoff B, et al. Correction: A systematic review of the relationship between

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JCHR (2025) 15(5), 3195-3205 | ISSN:2251-6727

blood loss and clinical signs. PLoS One. 2013;8(6).

4. Practice Bulletin no. 183: Postpartum hemorrhage: Postpartum hemorrhage. Obstet Gynecol. 2017;130(4): e168–86.
5. Magon N, Kalra S. The orgasmic history of oxytocin: Love, lust, and labor. Indian J Endocrinol Metab [Internet]. 2011;15 Suppl 3(7): S156-61.
6. Chard T, Boyd NR, Forsling ML, McNeilly AS, Landon J. The development of a radioimmunoassay for oxytocin: the extraction of oxytocin from plasma, and its measurement during parturition in human and goat blood. J Endocrinal. 1970;48(2):223– 34.
7. Uvnäs-Moberg K, Ekström-Bergström A, Berg M, Buckley S, Pajalic Z, Hadjigeorgiou E, et al. Maternal plasma levels of oxytocin during physiological childbirth - a systematic review with implications for uterine contractions and central actions of oxytocin. BMC Pregnancy Childbirth. 2019;19(1):285.
8. Chard T, Boyd N, Forsling M. The development of a radioimmunoassay for oxytocin: the extraction of oxytocin from plasma, and its measurement during parturition in human and goat blood. J Endocrinol1970; 48:223–34.
9. Liu C, Butwick A, Sand A, Wikström A-K, Snowden JM, Stephansson O. The association between postpartum hemorrhage and postpartum depression: A Swedish national register based study. PLoS One. 2021;16(8):e0255938.
10. Dansereau J, Joshi AK, Helewa ME, Doran TA, Lange IR, Luther ER, et al. Double-blind comparison of carbetocin versus oxytocin in prevention of uterine atony after cesarean section. Am J Obstet Gynecol . 1999;180(3):670–6.
11. Gürsoy A, İlter E, Çelik A, Haliloğlu Peker B, Şerifsoy TE, Atasayan K, et al. Carbetocin versus oxytocin for prevention of postpartum hemorrhage in cesarean section. J Clin Obstet Gynecol . 2021;31(1):20–7.
12. Moertl MG, Friedrich S, Kraschl J, Wadsack C, Lang U, Schlembach D. Haemodynamic effects of carbetocin and oxytocin given as intravenous bolus on women undergoing cesarean delivery: a randomized trial. BJOG. 2011; 118:1349–56
13. El Behery MM, El Sayed GA, El Hameed AAA, Soliman BS, Abdelsalam WA, Bahaa A. Carbetocin versus oxytocin for prevention of postpartum hemorrhage in obese nulliparous women undergoing emergency cesarean delivery. J Matern Fetal Neonatal Med. 2016;29(8):1257–60.