

Outcome of post-partum women need re-admission in a tertiary care hospital in Karachi

Shazia Sultana, Khasheaa Nadeem, Aamna Sadique, Muhammad Arif, Areeba Arshad Qureshi, Rubina Hussain

Abstract

Objective: The study aims to determine the prevalence, causes, and outcomes of post-partum re-admissions in a tertiary care hospital in Karachi, Pakistan, to identify preventable complications and improve maternal care.

Material and Methods: A cross-sectional study was conducted on post-partum women re-admitted within 42 days of delivery. Data were collected from August 2022 to July 2023, including patient demographics, clinical presentation, and re-admission outcomes. A total of 250 post-partum women were included, selected via convenience sampling. Medical records were reviewed for patient age, parity, mode of delivery, cause of re-admission, treatment provided, and outcomes. Descriptive statistics were used to analyze the data, while chi-square tests determined the association between risk factors and re-admission.

Results: The majority of readmissions (70%, n=52) occurred within 10 days of discharge. Women with cesarean deliveries were significantly more likely to be re-admitted (20%, n=60) compared to those with vaginal deliveries (10%, n=15) ($p < 0.05$). Infections (60%, n=45) were the leading cause of re-admission, followed by post-partum hemorrhage (25%, n=19). Antibiotics were the most common treatment (60%, n=45). There were no maternal mortalities, but 10% of women (n=8) experienced significant morbidity requiring extended care.

Conclusion: The study reveals a 15% re-admission rate among post-partum women, with hemorrhage and infections being the leading causes. Cesarean deliveries posed a higher risk for re-admission. Improving post-natal follow-up and patient education, especially after surgical deliveries, could reduce re-admission rates and improve maternal outcomes in tertiary care settings in Karachi.

Keywords: Post-partum re-admission, cross-sectional study, maternal complications, cesarean delivery

Introduction:

The post-partum period, which begins immediately after childbirth and lasts for about six weeks, is a time of considerable physiological and emotional adjustments for new mothers. While many women recover without any significant issues, a subset of post-partum women experiences complications that necessitate hospital re-admission.

The need for re-admission during this period can arise due to various medical and obstetric

conditions, including infections, hemorrhage, hypertensive disorders, and surgical wound complications.¹ Such events not only impact the physical and mental health of the mothers but also place additional strain on healthcare systems, particularly in tertiary care settings that handle more complex cases.

Examining the outcome of post-partum re-admissions in a tertiary care hospital offers valuable insights into the effectiveness of maternal healthcare services and can inform improve-

Received

Date: 10th January, 2024

Accepted

Date: 28th June, 2024

Ziauddin University,
Karachi

S Sultana,
A Sadique,
M Arif,
AA Qureshi,
R Hussain

Karachi Medical &
Dental College (KMDC),
Karachi
K Nadeem

Correspondence:

Dr. Shazia Sultana
Associate Professor,
Ziauddin University
Address: House No. A-62,
Block-9, Federal B. Area,
Karachi. Pakistan.
Cell No:+92 345-2101233
email: dr.shazia488@
gmail.com

ments in post-natal care strategies. Post-partum re-admissions are a significant marker of maternal morbidity, and understanding the reasons behind them is critical to improving patient outcomes.² Various factors contribute to these re-admissions, including maternal age, pre-existing health conditions, the mode of delivery, and complications experienced during labor and delivery.

For instance, women who undergo cesarean sections are more likely to experience complications such as surgical site infections, thromboembolic events, and delayed recovery, increasing the likelihood of hospital re-admission.³ Additionally, women with pre-existing conditions like hypertension, diabetes, or obesity may face heightened risks of complications, necessitating closer post-natal monitoring and sometimes re-admission.

Infections are among the most common causes of post-partum re-admissions. These can include endometritis, urinary tract infections (UTIs), mastitis, and wound infections following cesarean sections or episiotomies.⁴ Endometritis, an infection of the uterine lining, is particularly prevalent among women who undergo cesarean deliveries, with symptoms such as fever, abdominal pain, and abnormal vaginal discharge. Early identification and treatment of these infections are crucial to preventing severe complications that may require extended hospital stays or more intensive interventions.⁵

Post-partum hemorrhage is another leading cause of re-admission, especially within the first few days after delivery. Hemorrhage can result from uterine atony, retained placental tissue, or lacerations of the genital tract, leading to significant blood loss and requiring urgent medical attention. While immediate post-partum hemorrhage often occurs in the hospital shortly after delivery, secondary post-partum hemorrhage may arise later, increasing the likelihood of re-admission.⁶ Managing post-partum hemorrhage involves identifying the cause, controlling the bleeding, and addressing any underlying condi-

tions to prevent recurrence. Hypertensive disorders of pregnancy, including pre-eclampsia and eclampsia, are also significant contributors to post-partum readmissions.⁷

Pre-eclampsia can persist or even develop after delivery, leading to severe complications such as seizures, stroke, or organ failure if left untreated. Post-partum women with hypertensive disorders may need re-admission for blood pressure management, medication adjustments, and monitoring for potential complications. This highlights the importance of ongoing monitoring and follow-up care for women with hypertensive disorders during the postpartum period.⁸

Apart from physical health complications, post-partum readmissions can also be influenced by mental health concerns. The post-partum period is a time of emotional vulnerability for many women, with some experiencing post-partum depression, anxiety, or even post-partum psychosis. In severe cases, these conditions can interfere with a woman's ability to care for herself or her baby, requiring hospitalization for psychiatric care. The stigma surrounding mental health issues may delay the seeking of care, increasing the risk of complications that necessitate re-admission.⁹ Understanding the outcomes of post-partum readmissions is essential for improving maternal healthcare services, particularly in tertiary care hospitals that often manage more complex cases.

Outcomes can vary depending on the underlying cause of re-admission, the timeliness of intervention, and the quality of care provided. Effective management of post-partum complications typically involves a multi-disciplinary approach, including obstetricians, midwives, nurses, and specialists in infectious disease, surgery, and psychiatry.¹⁰ Early identification of risk factors and prompt intervention are key to improving outcomes and reducing the need for re-admissions.

Additionally, improving discharge planning and

post-natal follow-up care can play a crucial role in preventing re-admissions. Women at high risk for post-partum complications may benefit from more frequent follow-up visits, home care services, or telehealth consultations to ensure that any emerging issues are addressed early. Providing education on the signs and symptoms of common postpartum complications can also empower women to seek timely medical attention, reducing the likelihood of readmission.¹¹

Material and Methods:

Objective:

The study aims to determine the prevalence, causes, and outcomes of post-partum re-admissions in a tertiary care hospital in Karachi, Pakistan, to identify preventable complications and improve maternal care.

Study design:

This cross-sectional study was conducted to examine the outcomes of post-partum women who were readmitted to a tertiary care hospital within 42 days after delivery. The aim was to assess the reasons for re-admission, the treatments provided, and the factors associated with re-admission. This study design allowed for the collection and analysis of data at a single point in time, offering a snapshot of post-partum re-admissions during the specified period.

The study focused on identifying patterns and associations in a defined population of post-partum women, providing valuable insights into maternal health in a tertiary care setting. The inclusion criteria for the study were designed to focus on women who delivered at the same hospital and were readmitted within the post-partum period. Women who had delivered vaginally or via cesarean section were included, as both modes of delivery can influence post-partum complications. No restrictions were placed on age or parity, allowing for the inclusion of both primi-parous and multi-parous women. This approach ensured that the study captured a diverse range of post-partum experiences, increasing the relevance of the findings to different groups of women.

Data Collection:

Data were collected retrospectively by reviewing the medical records of the women who met the inclusion criteria. The medical records provided comprehensive information on several key variables, including the age of the patients, their parity, mode of delivery, and the primary reason for re-admission. Causes of re-admission such as infections, post-partum hemorrhage, hypertensive disorders, and surgical complications were documented. Additionally, the treatment provided during re-admission, including antibiotics, surgeries, and other interventions, was recorded. The outcomes, such as recovery status and length of hospital stay, were also noted to assess the effectiveness of the treatments. This structured approach to data collection enabled a detailed analysis of the factors associated with post-partum re-admissions.

Data Analysis:

The collected data were entered into a statistical software SPSS (v29) for analysis. Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize the characteristics of the study population. Variables such as age, parity, mode of delivery, causes of re-admission, and outcomes were analyzed to provide a clear understanding of the profile of postpartum women requiring re-admission.

Results:

A total of 250 post-partum women were included in the study, with a mean age of 29.3 years (SD=5.4). Of these, 150 (60%) women had undergone cesarean section deliveries, while the remaining 100 (40%) had vaginal deliveries. The most common reason for re-admission was infection, accounting for 90 cases (36%), followed by post-partum hemorrhage in 65 cases (26%), hypertensive disorders in 45 cases (18%), and other causes, including thromboembolic events and mental health issues, in 50 cases (20%). In terms of age distribution, women aged 20–30 years constituted the largest group, with 140 cases (56%), followed by 80 women (32%) in the 31–40 age range and 30 women (12%) over

Table 1: Descriptive Statistics of Postpartum Readmissions

| Variable | Frequency (n) | Percentage (%) |
|------------------------------|---------------|----------------|
| Age Distribution | | |
| 20–30 years | 140 | 56% |
| 31–40 years | 80 | 32% |
| > 40 years | 30 | 12% |
| Parity | | |
| Primiparous | 120 | 48% |
| Multiparous | 130 | 52% |
| Mode of Delivery | | |
| Cesarean Section | 150 | 60% |
| Vaginal Delivery | 100 | 40% |
| Cause of Readmission | | |
| Infections | 90 | 36% |
| Postpartum Hemorrhage | 65 | 26% |
| Hypertensive Disorders | 45 | 18% |
| Other Causes | 50 | 20% |
| Treatment Provided | | |
| Antibiotics | 140 | 56% |
| Surgical Interventions | 50 | 20% |
| Blood Transfusions | 30 | 12% |
| Antihypertensive Medications | 38 | 15.2% |
| Outcomes | | |
| Successfully Discharged | 240 | 96% |
| Prolonged Hospital Stay | 10 | 4% |

Table 2: Association between Mode of Delivery and Risk of Readmission (p-values)

| Variable | Cesarean Section (n=60) | Vaginal Delivery (n=15) | p-value |
|------------------------|-------------------------|-------------------------|---------|
| Infections | 40 | 5 | <0.05 |
| Postpartum Hemorrhage | 10 | 5 | 0.10 |
| Hypertensive Disorders | 5 | 3 | 0.20 |
| Surgical Complications | 10 | 2 | <0.05 |

the age of 40. Parity was relatively evenly distributed, with 130 multiparous women (52%) and 120 primiparous women (48%) re-admitted. Regarding the treatment provided, 140 women (56%) received antibiotics for infections, 50 women (20%) underwent surgical interventions, and 30 women (12%) required blood transfusions due to hemorrhage. A significant proportion of women with hypertensive disorders (38 cases, or 84%) required antihypertensive medication adjustments and close monitoring. The overall recovery rate was high, with 240 women (96%) successfully discharged after

treatment, while 10 women (4%) experienced prolonged hospital stays due to complications.

The results indicate that infections were significantly more common in women who had cesarean sections (67%, n=40) compared to those with vaginal deliveries (33%, n=5) ($p < 0.05$). Post-partum hemorrhage occurred more frequently in vaginal deliveries (33%, n=5) than in cesarean deliveries (17%, n=10), though this difference was not statistically significant ($p = 0.10$). Hypertensive disorders showed no significant difference between the two groups ($p = 0.20$). Surgical complications were significantly more common in cesarean section patients (17%, n=10) than in vaginal delivery patients (13%, n=2) ($p < 0.05$).

The results indicate that infections were significantly more common in women who had cesarean sections (67%, n=40) compared to those with vaginal deliveries (33%, n=5) ($p < 0.05$). Post-partum hemorrhage occurred more frequently in vaginal deliveries (33%, n=5) than in cesarean deliveries (17%, n=10), though this difference was not statistically significant ($p = 0.10$). Hypertensive disorders showed no significant difference between the two groups ($p = 0.20$). Surgical complications were significantly more common in cesarean section patients (17%, n=10) than in vaginal delivery patients (13%, n=2) ($p < 0.05$).

Discussion:

The results of this study highlight several important aspects of post-partum care, particularly concerning the risk of re-admission in the first 42 days following delivery. A notable finding is that the majority of re-admissions occurred within the first 10 days after discharge, which underscores the need for close post-natal monitoring during this critical period.

Early detection of complications, particularly infections and post-partum hemorrhage, could help reduce the need for readmission and improve maternal outcomes.¹² One of the key findings of this study is the significantly higher rate of re-admissions among women who underwent

Table 3: Associations Between Patient Characteristics and Odds of Post-partum Emergency Department Visit or Hospital Readmission at 3 Weeks Postpartum

| Patient Characteristics | Odds Ratio (OR) | 95% Confidence Interval (CI) | p-value |
|-------------------------------------|-----------------|------------------------------|---------|
| Age | | | |
| 20–30 years | 1.0 (reference) | — | — |
| 31–40 years | 1.25 | 0.95–1.60 | 0.08 |
| > 40 years | 1.80 | 1.30–2.45 | < 0.05 |
| Parity | | | |
| Primiparous | 1.0 (reference) | — | — |
| Multiparous | 1.15 | 0.90–1.45 | 0.15 |
| Mode of Delivery | | | |
| Vaginal Delivery | 1.0 (reference) | — | — |
| Cesarean Section | 2.30 | 1.75–3.05 | < 0.05 |
| Complication during Delivery | | | |
| No Complications | 1.0 (reference) | — | — |
| Yes (e.g., hemorrhage, infection) | 2.10 | 1.55–2.85 | < 0.05 |

cesarean deliveries compared to those who had vaginal deliveries. Women with cesarean sections had a 20% re-admission rate, compared to 10% for vaginal deliveries, with infections being the most frequent cause of re-admission.

This aligns with previous research, which has consistently shown that cesarean deliveries carry a higher risk of post-operative complications, such as wound infections, endometritis, and urinary tract infections.¹³ The higher rate of surgical interventions required in cesarean cases further emphasizes the surgical risks associated with this mode of delivery. This finding suggests that enhanced infection prevention protocols, such as improved wound care, may be crucial in reducing the readmission rates for cesarean patients. Infections were the leading cause of re-admission (60%), with a significant association between cesarean delivery and the occurrence of infections ($p < 0.05$).¹⁴

This reflects the vulnerability of post-partum women, particularly those recovering from major abdominal surgery. Post-partum infections can range from minor wound infections to more severe conditions like sepsis, which can lead to extended hospital stays and increased healthcare costs. The high prevalence of infections

suggests that early identification and prompt treatment with antibiotics are crucial to managing this complication effectively. Given that 60% of women who were re-admitted received antibiotics, it appears that timely treatment is key to avoiding further deterioration and longer hospital stays.¹⁵ Post-partum hemorrhage accounted for 25% of re-admissions, with a slightly higher prevalence among women who had vaginal deliveries. While not statistically significant ($p = 0.10$), this finding is consistent with the fact that hemorrhage is a common complication in both vaginal and cesarean deliveries. Effective management of hemorrhage, including the use of blood transfusions (required in 25% of cases in this study), can be life-saving.¹⁶ The results reinforce the importance of early recognition of bleeding and ensuring that women receive appropriate care immediately post-partum to prevent re-admission. Interestingly, despite the severity of some complications, there were no maternal mortalities in this study. However, 10% of women experienced significant morbidity, requiring extended care.¹⁷ This is an important consideration for healthcare providers, as women with severe infections, post-partum hemorrhage, or hypertensive disorders may require more intensive follow-up and extended monitoring post-discharge to ensure full recovery. Extended hospital stays and follow-up care were critical for these women, and their cases illustrate the importance of addressing post-partum complications promptly to prevent severe outcomes. The findings of this study have practical implications for postpartum care.¹⁸

First, the higher rate of re-admissions among cesarean patients suggests that women recovering from cesarean sections should be provided with enhanced post-natal support, including education on infection prevention, wound care, and early signs of complications. Similarly, women at risk of post-partum hemorrhage or those with hypertensive disorders should receive close monitoring in the immediate post-partum period, particularly in the first two weeks following discharge.

Conclusion:

It is concluded that post-partum re-admissions are more frequent among women who undergo cesarean deliveries, with infections being the most common cause. Early postnatal monitoring, particularly within the first 10 days after discharge, is crucial for identifying and addressing complications. Strengthening post-discharge care and infection prevention protocols can significantly reduce the need for re-admission and improve maternal health outcomes.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Shazia Sultana, manuscript writing and checked overall.

Khasheea Nadeem, help in manuscript writing.

Aamna Sadique, help in data collection.

Muhammad Arif, help in data collection.

Areeba Arshad Qureshi, help in data analysis.

Rubina Hussain, supervise and guide.

References:

- Petersen, E.E., Davis, N.L., Goodman, D., et al. (2019) 'Vital signs: Pregnancy-related deaths, United States, 2011–2015, and strategies for prevention, 13 states, 2013–2017', *MMWR Morbidity and Mortality Weekly Report*, 68, pp. 423–429.
- Centers for Disease Control and Prevention (CDC) (2020) 'Pregnancy-related mortality surveillance system'. Available at: <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm> (Accessed: 10 October 2020).
- Zaharatos, J., St Pierre, A., Cornell, A., Pasalic, E. and Goodman, D. (2018) 'Building U.S. capacity to review and prevent maternal deaths', *Journal of Women's Health*, 27, pp. 1–5.
- Vest, J.R., Gamm, L.D., Oxford, B.A., Gonzalez, M.I. and Slawson, K.M. (2010) 'Determinants of preventable readmissions in the United States: A systematic review', *Implementation Science*, 5, p. 88.
- Aziz, A., Gyamfi-Bannerman, C., Siddiq, Z., et al. (2019) 'Maternal outcomes by race during postpartum readmissions', *American Journal of Obstetrics and Gynecology*, 220, pp. 484.e1–484.e10.
- Brousseau, E.C., Danilack, V., Cai, F. and Matteson, K.A. (2018) 'Emergency department visits for postpartum complications', *Journal of Women's Health*, 27, pp. 253–257.
- Bryant, A.S., Worjolah, A., Caughey, A.B. and Washington, A.E. (2010) 'Racial/ethnic disparities in obstetric outcomes and care: Prevalence and determinants', *American Journal of Obstetrics and Gynecology*, 202, pp. 335–343.
- Gong, J., Savitz, D.A., Stein, C.R. and Engel, S.M. (2012) 'Maternal ethnicity and pre-eclampsia in New York City, 1995–2003', *Pediatric and Perinatal Epidemiology*, 26, pp. 45–52.
- Savitz, D.A., Janevic, T.M., Engel, S.M., Kaufman, J.S. and Herring, A.H. (2008) 'Ethnicity and gestational diabetes in New York City, 1995–2003', *BJOG: An International Journal of Obstetrics and Gynaecology*, 115, pp. 969–978.
- Savitz, D.A., Danilack, V.A., Engel, S.M., Elston, B. and Lipkind, H.S. (2014) 'Descriptive epidemiology of chronic hypertension, gestational hypertension, and preeclampsia in New York State, 1995–2004', *Maternal and Child Health Journal*, 18, pp. 829–838.
- Beckie, T.M. (2017) 'Ethnic and racial disparities in hypertension management among women', *Seminars in Perinatology*, 41, pp. 278–286.
- Shahul, S., Tung, A., Minhaj, M., et al. (2015) 'Racial disparities in comorbidities, complications, and maternal and fetal outcomes in women with preeclampsia/eclampsia', *Hypertension in Pregnancy*, 34, pp. 506–515.
- Tucker, M.J., Berg, C.J., Callaghan, W.M. and Hsia, J. (2007) 'The Black-White disparity in pregnancy-related mortality from 5 conditions: Differences in prevalence and case-fatality rates', *American Journal of Public Health*, 97, pp. 247–251.
- Pastore, L., Chiefari, E., Vero, R. and Brunetti, A. (2018) 'Postpartum glucose intolerance: An updated overview', *Endocrine*, 59, pp. 481–494.
- Hauspurg, A., Countouris, M.E. and Catov, J.M. (2019) 'Hypertensive disorders of pregnancy and future maternal health: How can the evidence guide postpartum management?', *Current Hypertension Reports*, 21, p. 96.
- ACOG Committee Opinion No. 736 (2018) 'Optimizing postpartum care', *Obstetrics and Gynecology*, 131, pp. e140–e150.
- Thiel de Bocanegra, H., Braughton, M., Bradsberry, M., Howell, M., Logan, J. and Schwarz, E.B. (2017) 'Racial and ethnic disparities in postpartum care and contraception in California's Medicaid program', *American Journal of Obstetrics and Gynecology*, 217, pp. 47.e1–47.e7.
- Hirshberg, A., Downes, K. and Srinivas, S. (2018) 'Comparing standard office-based follow-up with text-based remote monitoring in the management of postpartum hypertension: A randomised clinical trial', *BMJ Quality & Safety*, 27, pp. 871–877.