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Original Research Article

Emergency Obstetric Referral Patterns: A Pilot Study from a North Indian Tertiary Care Centre

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Abstract:

Background: Maternal morbidity and mortality remain significant challenges in low- and middle-income countries, with obstetric emergencies contributing substantially to adverse outcomes. Referral systems play a critical role in ensuring timely access to comprehensive obstetric care; however, delays and inadequate stabilization at peripheral centres often compromise outcomes.

Aim: To audit emergency obstetric referrals received at a tertiary care centre in North India and evaluate their demographic profile, referral sources, indications, management, and outcomes.

Methods: This retrospective observational study was conducted over one year in the Maternal and Child Health (MCH) wing of Shri Kalyan Government Medical College, Sikar, Rajasthan. Data from 100 consecutively referred obstetric patients were collected from hospital records, including demographic details, source and mode of referral, indications, time delays, management provided, and maternal and neonatal outcomes. Data were analyzed using SPSS version 23.0, applying descriptive statistics and Chi-square tests, with $p < 0.05$ considered significant.

Results: The majority of referrals (62%) were in the age group of 21–25 years, with 71% from rural areas. Most patients were referred from community health centres (68%), primarily for hypertensive disorders (28%), obstructed/prolonged labour (22%), and antepartum hemorrhage(16%). The mean referral-to-arrival time was 3.2 hours, with delays >4 hours in 27% of cases. Nearly half (46%) required cesarean section, and 29% needed blood transfusions. Maternal morbidity occurred in 22% of cases, with maternal mortality in 4%. Perinatal outcomes included 78% live births, 14% stillbirths, and 8% early neonatal deaths.

Conclusion: Emergency obstetric referrals constituted a high-risk group, with hypertensive disorders and obstructed labour being the leading causes. Referral delays and inadequate stabilization contributed to adverse maternal and neonatal outcomes.

Recommendations: Strengthening antenatal screening, improving the capacity of primary and secondary healthcare facilities, ensuring timely referrals with stabilization, and enhancing transport infrastructure are critical to improving maternal and perinatal outcomes in resource-limited settings.

Keywords: Obstetric Referral, Maternal Outcome, Perinatal Mortality, Tertiary Care, Emergency Obstetrics.

Introduction

Maternal health continues to be a global priority, with obstetric emergencies remaining a major contributor to maternal morbidity and mortality, particularly in low- and middle-income countries. According to the (WHO), approximately 295,000 maternal deaths occurred worldwide in 2017, with South Asia contributing significantly to this burden [1]. Although India has made substantial progress in reducing maternal mortality, with the Maternal Mortality Ratio (MMR) declining to 97 per 100,000 live births in 2018–2020 [2], preventable causes such as hemorrhage, hypertensive disorders, and sepsis continue to account for the majority of deaths [3].

Referral systems are an essential component of maternal healthcare, designed to ensure that women with high-risk pregnancies or obstetric complications receive timely and appropriate care at higher centres. However, gaps in the referral chain—such as delays in recognition, lack of stabilization before transfer, inadequate transport, and poor communication—often compromise outcomes [4]. These challenges are especially pronounced in rural India, where peripheral health

facilities frequently lack infrastructure, skilled personnel, and emergency obstetric care services [5].

Emergency obstetric referrals not only reflect the burden of high-risk pregnancies in the community but also serve as indicators of the effectiveness of peripheral health services. Studies have shown that inappropriate or delayed referrals lead to adverse maternal and neonatal outcomes, including preventable deaths [6]. A recent multicentric review from India highlighted that nearly 40–50% of obstetric referrals could be avoided if adequate care were provided at primary or secondary levels [7]. Moreover, many women are referred in critical conditions, requiring operative interventions and blood transfusions on arrival at tertiary centres [8].

In Rajasthan, one of the high-focus states under the National Health Mission (NHM), maternal health indicators continue to lag behind the national average [9]. Rural-urban disparities, inadequate antenatal care, and delayed decision-making at lower-level facilities contribute to poor maternal and perinatal outcomes. Given these challenges, it becomes imperative to audit the patterns, indications, and outcomes of obstetric referrals to identify gaps and propose strategies for strengthening the referral system.

The present study was undertaken as a retrospective audit of 100 emergency obstetric referrals admitted to the (MCH) wing of Shri Kalyan Government Medical College, Sikar, Rajasthan. The objectives were to evaluate the demographic profile, indications, referral sources, management provided, and maternal and neonatal outcomes. By analyzing these factors, the study aims to generate insights that can guide improvements in referral protocols and maternal healthcare delivery in similar settings.

Methodology

Study Design: This was a retrospective observational study.

Study Setting: The study was carried out in the (MCH) wing of Shri Kalyan Government Medical College, Sikar, Rajasthan. The institution serves as a tertiary care centre catering to both rural and urban populations in the region.

Study Duration: The study covered a period of one year, during which data of emergency obstetric referrals admitted to the hospital were retrieved and analyzed.

Participants: A total of 100 patients who were referred to the MCH wing of the institute for emergency obstetric care during the study period were included in the analysis.

Inclusion Criteria: All women referred to the MCH wing for emergency obstetric indications such as antepartum hemorrhage, eclampsia, obstructed labour, prolonged labour, postpartum hemorrhage, and other obstetric complications during the study period were included.

Exclusion Criteria: Patients referred for non-obstetric medical or surgical emergencies, cases with incomplete records, and those who left against medical advice before definitive management were excluded from the study.

Bias: To minimize selection bias, all consecutive cases meeting the inclusion criteria during the study period were included. Information bias was reduced by cross-verifying data from referral slips, admission records, and case sheets.

Data Collection: Data were collected retrospectively from hospital records, including referral slips, admission registers, patient case sheets, and discharge summaries. The collected information included demographic details, source of referral, reason for referral, time of referral, management received, and maternal outcome.

Procedure

All eligible referral cases were identified from hospital registers. Relevant data were extracted using a predesigned proforma to ensure uniformity and completeness. Each case was reviewed to determine the nature of the referral, appropriateness, and outcome.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using (SPSS) version 23.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the data. Chi-square test was applied to assess associations between categorical variables, and a p-value of <0.05 was considered statistically significant.

Results

Out of 100 referred patients, the majority (62%) belonged to the age group of 21–25 years, followed by 26–30 years (24%), while only 4% were below 20 years. The mean age of patients was 24.8 ± 4.1 years. Most referrals (71%) were from rural areas, while 29% were from urban regions.

Table 1: Demographic Characteristics of Patients (n = 100)

Variable	Frequency (n)	Percentage (%)
Age group (years)		
< 20	4	4.0
21–25	62	62.0
26–30	24	24.0
> 30	10	10.0

Residence		
Rural	71	71.0
Urban	29	29.0

The majority of referrals were young women (21–25 years) from rural backgrounds, indicating limited access to primary obstetric care in peripheral areas.

Source and Mode of Referral: Most patients (68%) were referred from Community Health Centres (CHCs), followed by Primary Health Centres (PHCs) (20%), and private hospitals (12%). Regarding transportation, government ambulance services were used in 74% of cases, while 26% reached via private transport.

Table 2: Source and Mode of Referral

Variable	**Frequency (n)**	**Percentage (%)**
Source of Referral		
PHC	20	20.0
CHC	68	68.0
Private hospital	12	12.0
Mode of Transport		
Government ambulance	74	74.0
Private transport	26	26.0

The majority were referred from CHCs, highlighting the critical role of secondary-level health centres in triaging high-risk obstetric cases.

Indications for Referral: The most common indication for referral was hypertensive disorders of pregnancy (28%), followed by obstructed/prolonged labour (22%), antepartum hemorrhage (16%), postpartum hemorrhage (12%), severe anemia (10%), sepsis (6%), and other obstetric complications (6%).

Table 3: Indications for Referral

Indication	**Frequency (n)**	**Percentage (%)**
Previous LSCS	30	30.0
Obstructed/Prolonged labour	22	22.0
Severe anemia (Hb<7 g/dl)	18	18.0
Hypertensive disorders	20	20.0
Antepartum hemorrhage (APH)	14	14.0
Postpartum hemorrhage (PPH)	8	8.0
Sepsis	5	5.0
Others (malpresentation, etc.)	3	3.0
Total	**100**	**100**

The most common indication for referral was previous LSCS (30%, n=30), which was higher than obstructed/prolonged labour (22%, n=22). Severe anemia (Hb<7 g/dl) was also a major reason (18%, n=18), reflecting the ongoing burden of maternal anemia. Hypertensive disorders accounted for 20%, while hemorrhagic causes (APH 14%, PPH 8%) and others made up the rest.

This indicates a shift in referral patterns, with previous LSCS and severe anemia surpassing obstructed labour, suggesting that antenatal risk factors are increasingly important in obstetric referrals.

Time Taken for Referral and Delay: The mean time from referral decision to hospital arrival was 3.2 ± 1.4 hours. Delays (>4 hours) were observed in 27% of cases, mainly due to lack of transport availability and poor road connectivity.

Management and Interventions: Of the referred cases, cesarean section was performed in 46%, instrumental vaginal delivery in 18%, and spontaneous vaginal delivery in 32%. Blood transfusion was required in 29% of cases, and 8% required admission to the (ICU).

Table 4: Management of Referred Cases

Intervention	**Frequency (n)**	**Percentage (%)**
Cesarean section	46	46.0
Assisted vaginal delivery	18	18.0
Spontaneous vaginal delivery	32	32.0
Conservative/medical management	4	4.0

Almost half of the referrals required operative intervention, reflecting the high-risk nature of referred cases.

Maternal and Neonatal Outcomes: Maternal mortality was reported in 4 cases (4%), mainly due to obstetric hemorrhage and eclampsia. Morbidity (e.g., sepsis, prolonged ICU stay, anemia requiring >3 units transfusion) was recorded in 22% of patients. Perinatal outcomes revealed 78 live births (78%), 14 stillbirths (14%), and 8 early neonatal deaths (8%).

Table 5: Maternal and Perinatal Outcomes

Outcome	Frequency (n)	Percentage (%)
Maternal Outcome		
Survived without morbidity	74	74.0
Survived with morbidity	22	22.0
Maternal death	4	4.0
Perinatal Outcome		
Live births	78	78.0
Stillbirths	14	14.0
Early neonatal deaths	8	8.0

While most mothers survived, maternal and perinatal mortality highlight the need for strengthening referral systems and timely interventions

Discussion

The present audit analyzed 100 cases of emergency obstetric referrals over one year at the MCH wing of Shri Kalyan Government Medical College, Sikar. The majority of women referred were young (21–25 years), with a mean age of 24.8 years, and most belonged to rural areas. This demographic pattern reflects the early age of marriage and conception in rural North India and highlights the dependency of rural populations on tertiary centres for managing high-risk obstetric conditions.

The analysis of referral sources revealed that (CHCs) contributed the largest proportion (68%) of referrals, followed by primary health centres and private hospitals. This suggests that CHCs play a pivotal role in triaging obstetric emergencies, but also indicates possible limitations in their capacity to provide definitive care. Transportation by government ambulances was the main mode of referral, yet delays exceeding four hours occurred in more than a quarter of cases, underlining systemic gaps in timely patient transfer.

Hypertensive disorders of pregnancy and obstructed or prolonged labour emerged as the leading indications for referral, together accounting for nearly half of all cases. This pattern indicates deficiencies in early detection and management at peripheral levels, where timely initiation of treatment could potentially reduce complications. The high proportion of cases referred with hemorrhage and anemia also points toward inadequate antenatal risk identification and emergency preparedness in lower-level facilities.

Interventions at the tertiary centre reflected the critical nature of referrals, with nearly half requiring cesarean section and one-third undergoing spontaneous vaginal delivery. Blood transfusions and ICU admissions were common, demonstrating that many patients arrived in compromised clinical condition and required advanced care.

Maternal outcomes were concerning, with 4% maternal mortality and 22% morbidity. The main causes of death were obstetric hemorrhage and eclampsia, both preventable with timely interventions. Neonatal outcomes were also poor, with stillbirths and early neonatal deaths comprising 22% of all perinatal outcomes. These findings strongly suggest that referral delays and inadequate stabilization at lower facilities contributed significantly to adverse maternal and perinatal outcomes.

In summary, the audit highlights that while the referral system provides a critical link in managing obstetric emergencies, there are significant shortcomings in timeliness, preparedness, and quality of care at peripheral health facilities. Strengthening antenatal risk screening, improving emergency obstetric care at CHCs and PHCs, and ensuring prompt transport could substantially improve maternal and neonatal outcomes.

Recent studies on emergency obstetric referral patterns in India and South Asia highlight persistent challenges and emerging solutions. Delays in emergency obstetric care remain a leading cause of maternal morbidity and mortality, largely due to lack of timely decision-making, inadequate transportation, and systemic inefficiencies [10]. Inappropriate and unnecessary referrals from lower-level health facilities have been reported, which overburden tertiary care centers and reflect insufficient training and diagnostic capacity at peripheral levels [11].

Geographical inequities and transport barriers often outweigh clinical needs in determining referral

patterns, particularly in rural and underserved areas, thereby limiting equitable access to emergency obstetric care [12]. Introduction of structured referral protocols, along with improved inter-facility communication, has shown to significantly improve maternal and neonatal outcomes, suggesting that systematization of referral pathways is critical [13]. Further analysis across South Asia has confirmed that the most common delays occur at the community decision-making and transport stages, reinforcing the importance of community awareness, ambulance access, and district-level preparedness [14].

Studies focusing on referral audits also reveal that nearly half of referrals are avoidable with better management at the primary care level, pointing to gaps in workforce training and essential obstetric skills [15]. Moreover, facility-based studies have found that referral documentation is often inadequate or missing, hindering continuity of care and appropriate case management at receiving facilities [16]. Research on integration of digital health and telemedicine in referral systems shows promise, particularly in reducing avoidable referrals and enabling early triage through virtual consultations [17]. Finally, large-scale public health reviews emphasize that strengthening referral systems is a key determinant of achieving maternal mortality reduction targets in India, with multipronged approaches including training, transport, communication, and accountability mechanisms [18]. Overall, evidence since 2018 consistently indicates that weak referral pathways, poor transport, and inappropriate referrals undermine maternal health outcomes, while structured protocols, digital interventions, and improved training offer pathways for improvement.

Conclusion

This audit revealed that most emergency obstetric referrals were young rural women, primarily for hypertensive disorders and obstructed labour. Significant delays in referral and inadequate stabilization at peripheral centres contributed to maternal and perinatal morbidity and mortality. Strengthening primary and secondary care services, timely recognition of complications, and efficient transport systems are essential to improve outcomes in obstetric emergencies.

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