

A Study of Obstetric Referral Cases to Tertiary Care Center in Rural Setting of Mahasamund, Chhattisgarh

Neha Thakur¹ , Lalitha Priya Nekkanti²

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ABSTRACT

Background: An effective referral system is key to access timely emergency obstetric care in order to prevent maternal and perinatal mortality. The criticality of referrals makes it necessary to understand its pattern at the health system level. This study was conducted with an objective to document the patterns, primary reasons of obstetric case referral and the maternal and perinatal outcome of the referred cases in Government Medical College, Mahasamund in rural Chhattisgarh. As a systematic monitoring of referrals majorly helps to identify current gaps and timeliness of referral in providing essential obstetric care.

Methods: The study is based on the health records and details on referral forms from referral center and peripheral health facilities. This follow-up study was conducted in between July 2022 and June 2023 (12 months). All referred patients for obstetrics indications above 20 weeks and patients with postpartum indications were included. Descriptive statistics were used to analyze demographic details, referral patterns, reasons of referrals, referral communication and documentation, time and mode of transfer and delivery outcomes.

Results: According to our study, out of a total of 5,962 delivered patients, 1,281 (20.5%) cases were referred patients. Maximum cases, i.e., 567 (44.2%) were in the age-group of 24–29 years. The major reasons for referring patient were hypertensive disorders of pregnancy (11.2%), previous cesarean section (9.8%), and PPH (9.5%). There were six maternal deaths (0.5%) and discharge rate was 96.2%.

Conclusion: The present study showed that illiteracy and ignorance of female regarding healthcare requirements and poor infrastructure came out to be a major contributor of poor pregnancy outcome. Timely referral is crucial for a satisfactory maternal and fetal outcome. To reduce the number of unnecessary referrals and to reduce burden on tertiary care hospitals, healthcare workers should be trained in essential and emergency obstetric care which will help in reducing morbidity and mortality.

Keywords: Adverse maternal outcome, Cesarean section, Emergency obstetric and neonatal care, High-risk pregnancy, ICU admission, Near-miss case, Maternal mortality rate, Normal labor, Postpartum hemorrhage management, Primary healthcare worker, Vertical referral cases.

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INTRODUCTION

In India, 22% of the population belong to women of reproductive age-group (15–45 years) who are high-risk group due to pregnancy and childbearing.¹ As most of the women can encounter several health-related problems and complications during pregnancy which even lead to death.²

In India, Public health facilities provide different levels of emergency obstetric care (EmOC) services. The primary health centers (PHC) offer services for uncomplicated childbirth and referral complex cases. The community health centers (CHCs) and subdistrict hospitals (SDHs) provide specialized services and serve as first referral units (FRUs) for EmOC, while tertiary care centers (district hospitals and medical colleges) are tasked with managing intricate cases and referrals from FRU.³

The government has implemented the referral system to enhance service delivery at the tertiary level, alleviate the burden on tertiary healthcare facilities, optimize the use of healthcare resources, reinforce peripheral infrastructure, elevate teaching standards and encourage research initiatives.^{4,5}

This study was conducted in Government Medical College, Mahasamund which is the only tertiary center in the district of Mahasamund covering 3902 square kilometers consisting of 1,178 villages with approximately 14 lakh population. This hospital was previously a district hospital in Mahasamund district which was recently converted into to a tertiary center which was working

^{1,2}Department of Obstetrics and Gynaecology, Government Medical College, Mahasamund, Chhattisgarh, India

Corresponding Author: Neha Thakur, Department of Obstetrics and Gynaecology, Government Medical College, Mahasamund, Chhattisgarh, India, Phone: +91 8085559897, e-mail: neha051988@gmail.com

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in collaboration with district hospital. Thereby conducting approximately 5,000–6,000 deliveries per annum and accepting all emergency referrals from different health facilities surrounding Mahasamund which includes 5 CHCs, 30 PHCs, 22 subcenters, 5 urban health facility centers, and many private hospitals.

The current study was conducted with the following goals and objectives:

- To examine the main causes for referral to our hospital.
- To analyze maternal outcomes, neonatal results, and postpartum complications for the mother.

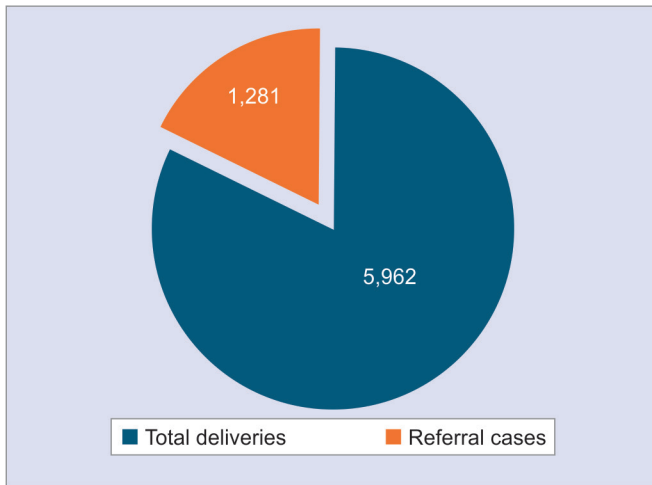


Fig. 1: Pie diagram depicts 21.48% referral cases of total cases

- To evaluate the strengths and weaknesses of referral services to prevent complications for both the mother and the baby.

METHODS

The current study was a prospective observational study conducted on patients referred from various health facilities to the government medical college, Mahasamund, Obstetrics and Gynecology Department, over a 1-year period from July 2022 to June 2023.

Inclusion Criteria

- All antenatal and intranatal patients referred to our tertiary care institute with a gestational age surpassing 20 weeks.
- Cases involving postpartum complications.

Exclusion Criteria

- Referred cases with gestation less than 20 weeks.
- Gynecological referrals.

Detailed sociodemographic profiles, obstetric histories, referral information (including place, duration of stay, and management at the referral center), and transportation details were collected through comprehensive interviews with patients or attendants. A thorough clinical examination was conducted, and findings were documented in a pro forma. Maternal outcomes, such as mode of delivery, operative interventions, conservative management, and postpartum complications, were recorded. Fetal outcomes were noted, including the condition, the need for neonatal intensive care unit (NICU) admission, stillbirths, and early neonatal deaths. Maternal outcomes were further assessed in terms of mortality, the necessity for blood transfusions, and postpartum complications.

Data were compiled from health records, referral letters, and hospital registers. Analysis was performed using Microsoft Office Excel 2013, and the results were presented as percentages.

RESULTS

The study conducted over a 1-year period included 1,281 referred cases meeting the inclusion criteria out of a total of 5,962 delivered patients, indicating that 20.5% of cases were referred to the tertiary care center from surrounding health facilities (Fig. 1).

In the study, the age distribution of referred patients revealed that the majority, 44.2%, were in the 24–29 years age-group, while

Table 1: Sociodemographic factors of referral patients

Total cases	Total no. of cases (n = 1,281)	Percentage (%)
Age in years		
18–23	553	43.2
24–29	567	44.2
>30	161	12.6
Educational status		
Illiterate	410	32
Primary	559	43.6
Secondary	240	18.8
College and above	72	5.6
Socioeconomic status		
APL	113	8.8
BPL	1168	91.2
Birth order		
Primigravida	638	49.8
Multigravida	543	42.4
Grand multigravida	100	7.8

Table 2: Distribution of cases according to institution from where referred

Institutions from where referred	No. of cases	Percentage (%)
Community health center	912	71.2
Primary health center	275	21.4
Subcenter	77	6.07
Private hospital and clinic	17	1.33

43.2% belonged to the 18–23 years age-group, highlighting a prevalence of pregnancies in this age range possibly due to early marriages. A notable percentage (12.6%) involved patients aged 30 years and above (Table 1).

Educational status analysis indicated that a significant portion of the cases had limited education, with 32% being illiterate and 43.6% having only primary education. Furthermore, the majority of cases were below the poverty line, accounting for 91.2%. In terms of gravidity, 49.8% were primigravida, 42.4% were multigravida, and 7.8% were grand multipara (Table 1).

The primary sources of referral were CHCs, contributing 71.2% of cases, followed by PHCs at 21.4%, subcenters at 6.07%, and a minimal 1.33% from private hospitals and clinics (Table 2).

Regarding transportation, the study revealed that the majority of cases utilized government ambulances (82.6%). Communication about referrals to the receiving center was lacking in 91.4% of cases, and documentation on referral papers was incomplete in 44.5% of instances (Tables 3 and 4).

Analysis of the timing of referrals and duration of stay at the referral facility indicated roughly equal distribution between 8 a.m. and 8 p.m. (48.2%) and 8 p.m.–8 a.m. (51.2%). Most referred patients (36.9%) had a 6–12 hour stay at the referral center, while 10.8% stayed >24 hours in the first referral unit (Table 5).

Delivery outcomes of referred cases included 57.9% vaginal deliveries, 36.7% cesarean sections, 3.6% assisted vaginal deliveries, and 1.2% VBAC. Exploratory laparotomy with repair of rupture

Table 3: Distribution of cases according to mode of transportation

Transportation	No. of cases (n = 1,281)	Percentage (%)
108	1,058	82.6
102	152	11.8
Private vehicle	71	5.6
Referral communication by phone	110	8.6
No communication	1171	91.4

Table 4: Distribution of cases according to documentation details on referral letter

Documentation details on referral letter	No. of cases (n = 1,281)	Percentage (%)
>75% documentation	238	18.6
50–75% documentation	473	36.9
<50% documentation	570	44.5

Table 5: Distribution of cases according to timing of referral and duration of hospital stay at referral center

Timing of referral	Total (n = 1,281)	Percentage (%)
8 a.m.–8 p.m.	617	48.2
8 p.m.–8 a.m.	664	51.8
<i>Duration of hospital stay at referral facility</i>		
<6 hours	288	22.5
>6–12 hours	473	36.9
12–18 hours	182	14.2
>24 hours	138	10.8
Duration not mentioned	200	15.6

uterus was required in 7 cases, and 2 cases underwent cesarean hysterectomy (Table 6).

Neonatal outcomes indicated 96.7% live births, 0.6% stillbirths, 1.2% neonatal deaths, and 1.5% intrauterine fetal deaths. Additionally, 32.3% of neonates had low birth weight, and 6.8% required immediate resuscitation and NICU admission due to preterm births or fetal distress during intra-partum periods.

Maternal outcomes revealed that 96.2% of referral cases were discharged, 38 patients absconded, and there were six maternal mortalities. Four patients were transferred to other specialties for further management (Table 7).

The obstetric causes of referral were multifaceted, with common reasons including hypertensive disorders of pregnancy (11.2%), previous cesarean section (9.8%), fetal distress (6.8%), PROM (6%), nonprogress of labor (5.4%), preterm birth (4.3%), and oligohydramnios (4.1%). In 8.2% of cases, no obvious cause was mentioned for referral. Out of the total referred cases, 228 were referred with postpartum complications, with PPH (9.5%) being the major cause for referral (Table 8).

Table 9 illustrates various causes of maternal morbidities, with anemia being the most common cause in 242 cases, followed by postpartum hemorrhage (PPH) in 84 cases, necessitating blood transfusion in 316 cases. Table 10 indicated that out of 6 maternal mortalities, 50% were due to PPH as a direct cause.

Table 6: Distribution of cases according to deliver and neonatal outcomes

Delivery outcomes	Total (n = 1,281)	Percentage (%)
Vaginal	742	57.9
Assisted vaginal delivery	46	3.6
VBAC	15	1.2
LSCS	469	36.7
Exploratory laparotomy with repair of rupture uterus	07	0.5
Cesarean hysterectomy	02	0.1
<i>Neonatal outcomes</i>		
Live birth	1,239	96.7
Intrauterine fetal death (IUFD)	19	1.5
Neonatal deaths	15	1.2
Stillbirth	08	0.6
Baby weight >2.5 kg	867	67.7
Baby weight <2.5 kg	414	32.3
Needed neonatal resuscitation	87	6.8

Table 7: Distribution of cases according to maternal outcomes

Maternal outcome	Total cases (n = 1,281)	Percentage (%)
Discharge	1,233	96.2
Shift to other specialty	04	0.4
Died in the facility	06	0.5
Lost follow-up/absconded	38	2.9

Table 8: Distribution of cases according to indication for referral

Indication for referral	Total (n = 1,281)	Percentage (%)
<i>Antenatal/intranatal</i>		
Hypertensive disorder of pregnancy	143	11.2
Previous CS	126	9.8
APH	21	1.6
Obstructed labor	28	2.2
Nonprogress of labor	68	5.4
Prolonged labor	47	3.6
Fetal distress	88	6.8
Anemia	46	3.7
Malpresentation	37	2.9
CPD	23	1.8
PROM	76	6
Intrauterine fetal death	19	1.5
Postterm	46	3.6
Hand prolapsed	06	0.5
Twin	26	2
Preterm	56	4.3
IUGR	27	2.1
Abnormal presentation	12	0.9

(Contd...)

Table 8: (Contd...)

Indication for referral	Total (n = 1,281)	Percentage (%)
Oligohydramnios	53	4.1
No obvious cause mentioned	105	8.2
Postpartum complications		
PPH	122	9.5
Retained placenta	67	5.2
Scar site infection/burst abdomen	28	2.2
Sepsis	04	0.3
Postpartum eclampsia	07	0.6

Table 9: Distribution of cases according to postpartum morbidity

Postpartum morbidity	Frequency (n)
Anemia	242
Postpartum eclampsia	08
DIC/Coagulopathy	06
Atonic PPH	52
Traumatic PPH	32
UTI	05
Prolonged catheterization	03
Need for blood transfusion	316

Table 10: Distribution of cases according to causes for maternal deaths

Causes for maternal death	Frequency (n)
Postpartum hemorrhagic shock with multiorgan failure	02
Secondary PPH with DIC and shock	01
CVA with DIC	01
APH associated with DIC and shock	01
Obstructed labor	01
Total	06

DISCUSSION

The study encompassed 1,281 cases of obstetric referrals over a 1-year period from June 2022 to July 2023. The research aimed to address the unpredictability of obstetric complications, recognizing the potential fatality if timely and appropriate treatment is not administered. An efficient referral system is crucial for facilitating the prompt transfer of patients, especially in cases of obstetric emergencies. Limited studies in India have comprehensively analyzed the functioning and quality of referral systems.⁶⁻¹⁴

During the specified period, out of 5,962 total deliveries, 21.48% constituted referred cases, as depicted in Figure 1. This referral rate is higher than reported in other studies, such as Gupta et al., which showed a 15.37% obstetric referral rate.¹⁵ Similarly, Sable and Patankar, Pandya and Patel in PHCs of Gujarat, and Sharma in Indore (2007) reported referral rates of 17.83, 15.2, and 14.02%, respectively.¹⁶⁻¹⁸ A study in a secondary health facility in Haryana reported a referral rate of 31.7%, indicating a higher proportion of cases referred from secondary-level health facilities.⁶

In this study, the majority of patients fell within the age-group of 18–30 years (87.4%), similar to findings by Gupta et al. and Jakhar

et al. Patel et al.¹⁷ reported that 64% of referred cases belonged to the age-group of 21–30 years. Devineni and Sodumu reported that 73% of referred cases were in this age-group, almost comparable to our study.⁷ The prevalence of cases in this age-group is attributed to the trend of early marriages and illiteracy in the population, leading to a higher number of pregnancies in this age range.

Regarding gravidity, 49.8% were primigravida, and 55.34% were multigravida in this study, consistent with findings by Gupta et al. and Chauhan et al.^{10,15} Education-wise, the majority were illiterate (32%) or had only primary education (43.6%), underscoring the critical role of education in healthcare utilization. This aligns with the findings of Jakhar and Choudhary where the majority were either poorly literate (47.24%) or illiterate (34.52%).⁵ The data align with the findings of Devineni and Sodumu, indicating that 40% of the referred cases in their study were illiterate.⁷ Thaker et al. reported 34.7% of cases as illiterate in the unregistered group in their research, while Sharma observed that 77% of referred cases were illiterate, with only 6% having attained education beyond secondary level.^{8,18} These patterns highlight a lack of awareness regarding the utilization of medical facilities.

A significant portion of the cases (91.2%) belonged below the poverty line, emphasizing the impact of educational and socioeconomic status on maternal health. Community Health Centers from rural areas constituted most referrals (71.2%). Research conducted by Jakhar et al. revealed that most cases were referred from CHCs at 51.7%, followed by District Hospitals (22.68%), PHCs at 10.94%, subcenters at 2.66%, and only 0.88% from private hospitals and clinics.⁵ In a study by Sable and Patankar, 15.79% were referred from PHCs, 42.37% from District Hospitals, 34.74% from referral hospitals, and 2.63% from Employee's State Insurance (ESI) hospitals.¹⁶ Panchal and Patel reported that 61% of referrals came from PHCs and CHCs, while 33% were from private hospitals.⁹ The primary reasons for referral included the unavailability of obstetricians, anesthetists, pediatricians, and a lack of facilities for procedures like cesarean sections, blood bank services, and trained staff, contributing to the burden on tertiary care centers.^{6,13,19}

Documentation in referral papers revealed that 36.9% had 50–75% completion, and 18.6% had >75% completion. Notably, a higher percentage of referral sheets with >75% completion came from secondary health facilities. The documentation was often filled out by staff nurses, and the common cause mentioned was for further management. Incomplete documentation, especially regarding treatment at the referral center, may pose challenges in managing patients effectively. Most of referral letter was filled on standard forms of national health mission level 2/level 1 health facility booklet (69%) but remaining referral letters includes printed facility adapted versions or prescription forms (26%) and about 5% patients don't have any referral letter.

In incomplete referral paper, the missing data are mostly regarding treatment given at referral Center which will lead to difficulty in managing the patient as one is not sure what had already been done for the patient. Even in many referral papers, treatment was incompletely mentioned like magnesium sulfate/oxytocin (in forms of dosage, starting time, and route). Most common treatment mentioned on referral paper was intravenous fluids and antibiotics.

Duration of stay at first referral center is one of the important factors for effective obstetric and perinatal outcomes because according to our data, cases who had stayed >24 hours (10.8%) have poor neonatal outcomes when compared with cases with

less duration of stay. Cases which have delay referred as prolonged labor/nonprogress of labor with long trail of labor, thereby leading to increase in maternal and perinatal morbidity. The percentage for delay in referral (>6 hours) is about 77% which is almost comparable with Gupta et al. (76%) of cases reached within 8 hours of referral, with only 5.58% experiencing delayed referrals, defined as taking more than 12 hours to reach the designated healthcare facility and in Jakhar et al., 40.2% were delayed referrals.^{5,15} Major causes for delay in referral were delays in transportation, delays in decision making by health center or relatives.

In our study, about 36.7% underwent cesarean and 57.9% delivered vaginally. Approximately, 3.6% underwent assisted vaginal delivery and 1.2% underwent VBAC. Cesarean rate was comparatively less than other studies in our study.^{11,12} The cesarean delivery rate in medical colleges and teaching hospitals in India stands at 24.4%.²⁰ Approximately, 96.2% referral patients were discharged from our facility in satisfactory condition.

The outcomes observed in our study demonstrate favorable neonatal outcomes compared with other studies.^{2,21} The study highlights high rates of live births (96.7%), low rates of neonatal deaths (1.2%), stillbirths (0.6%), and NICU admissions (6.8%). The NICU admissions were primarily associated with conditions such as fetal distress, preterm labor pains, obstructed labor, respiratory distress due to meconium aspiration syndrome, birth asphyxia, and neonatal jaundice. In contrast, Rathi et al. reported a higher percentage of live-born babies requiring NICU admission (62.37%) and a perinatal mortality of 28.23%.²

Hypertensive disorders of pregnancy (11.2%) emerged as a major reason for referral in our study, with several other studies.^{11,13-22} Referrals due to previous cesarean sections were 9.8%, lower than the findings in some studies.^{15,19} Postpartum hemorrhage constituted a significant cause for referral, with 9.5% of cases referred for this complication. Other important causes for referral were fetal distress (6.8%), PROM (6%), non-progress of labor (5.4%), preterm (4.3%), and oligohydramnios (4.1%). Data show that in 8.2% of cases, no obvious cause was mentioned for referral. The study raises concerns about the identification and management of high-risk cases and complications at referring health centers. Our findings were contrary to the findings of Patel et al. who documented that most of the referrals were due to obstructed or prolonged labor.¹⁷

Maternal complications necessitating ICU admissions were observed in 348 cases. Anemia (242 cases) and postpartum hemorrhage (84 cases) were the primary causes of maternal morbidity, with 24.6% of patients requiring blood transfusion. Rathi et al. in 2010 reported 42% patients needing blood transfusion.² Goswami and Makhija shows 19.48% needed blood transfusion in their study.¹² These morbidities were attributed to late admission in labor, prolonged duration of ruptured membranes, anemia, infection, exhaustion, dehydration, and the involvement of untrained personnel in the periphery. Addressing these issues could potentially reduce avoidable maternal morbidities.

The study reported six maternal mortalities, with 50% of them attributed to postpartum hemorrhage. Overall, the maternal mortality rate was lower compared with some other studies.^{5,15,18} Gupta et al. noted common causes of mortality, including hypertensive disorders, severe anemia, hemorrhage, sepsis, and medical disorders like malaria and hepatitis.¹⁵ In Sharma's study, the primary causes of maternal deaths were eclampsia, hemorrhagic shock, and congestive cardiac failure (CCF) due to severe anemia.¹⁸ Similarly, in Kaur and Kaur's study, hemorrhage, sepsis,

and eclampsia emerged as the predominant causes of maternal mortality.²³ The need for interventions to prevent maternal deaths is evident, with a focus on addressing complications such as hemorrhage, sepsis, and eclampsia.

The study underscores the importance of accurate and complete health records for strengthening the health information system. Initiatives like digitization of records, periodic record audits, and improved internet connectivity are crucial for linking facilities and supporting effective communication. The findings also emphasize the necessity of reorganizing referral systems, establishing protocols and guidelines aligned with facility capacity, and implementing strict monitoring mechanisms. Community-level interventions, including educational activities to raise awareness and encourage the use of primary care obstetric services, are also recommended.²⁴⁻²⁶

CONCLUSION

The study highlights the potential of effective referral systems in averting maternal mortality and morbidity. It identifies key barriers such as the willingness to access healthcare, accessibility to healthcare facilities, financial stability, knowledge regarding existing antenatal services, timely recognition of high-risk pregnancies, timely decision-making for necessary actions and referral, maternal education, and adequate Execution of Government Measures with Community Involvement. Addressing these barriers is crucial for improving maternal and perinatal outcomes.

The findings emphasize that the referral rates were high in the study areas, underscoring the need for an integrated referral system, more stringent documentation in referral slips, and a formal communication and feedback system between referral units and higher centers. Improving procedures and reinforcing emergency obstetric services are vital elements in elevating overall effectiveness.

A significant number of cases were referred during the intrapartum period due to complications of pregnancy and labor or high-risk factors not foreseen during the antenatal period. Strengthening referring centers through training in essential and emergency obstetric care, as well as upgrading health infrastructure with 24/7 availability of operation theater facilities, anesthetists, pediatricians, and blood bank facilities, is crucial for improving maternal and newborn health outcomes. Addressing these constraints would enhance the capability of secondary-level health facilities to provide EmOC.

The study recommends the development of a standard referral protocol, proper training, and universal adherence to this practice to fill gaps in current referring practices. It also suggests that health education and awareness campaigns by mass media and non-government organizations can contribute to improving the health and social status of women in rural areas.

In terms of clinical significance, the study contributes valuable insights to strengthen referral protocols and addresses the challenges within the healthcare delivery system, particularly at primary and secondary levels. These insights can inform strategies to enhance maternal and perinatal care, ultimately contributing to improved health outcomes for women and newborns.

ORCID

Neha Thakur  <https://orcid.org/0000-0002-7075-4903>

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