Original Article

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Fetomaternal Outcome of Referred Obstetric Patients in a Tertiary Centre in North East India: A Cross-sectional Study

Obstetrics and Gynaecology Section

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ABSTRACT

Introduction: Referral of patients has improved fetomaternal outcomes in developing countries like India. Identifying high-risk obstetric cases, severe maternal complications, and promptly referring them to a centre equipped with Basic Emergency Obstetric and Newborn Care (BEmONC) helps reduce morbidity and mortality.

Aim: To examine the clinical profile of referred obstetric patients admitted to a tertiary care centre and analyse the characteristics of admission, referral pattern, level of delay, and their fetomaternal outcomes.

Materials and Methods: A hospital-based observational cross-sectional study was conducted from July 1, 2021, to June 30, 2022, at Assam Medical College and Hospital, Dibrugarh in Assam, India. The study included 700 referred obstetric patients from private and public healthcare settings. Variables such as place of referral, referrer (medical officer/self-referral/staff nurse/specialists), delay in referral, reasons for referral, pregnancy period during referral, diagnosis at admission and referral, availability of proper referral documents, and fetomaternal outcomes such as mode of delivery and gestational age at delivery were assessed. Categorical variables were summarised as proportions and percentages.

Results: Out of the total 18,245 obstetric admissions during the study period, approximately 14,500 patients were referred, accounting for 80% of all admissions. Among the 700 study participants, 616 (88%) referrals were from nearby public sectors. A total of 147 (21%) experienced delay due to transportation. 644 (92%) had referral slips, but only 224 (32%) had proper documentation. A number of 322 (46%) were intrapartum referrals. A total of 350 (50%) were primigravida, while 344 (49%) were multigravida. Apart from these 694 pregnant mothers, six referrals were for babies without any maternal complications or high risk factors. 112 (16%) referrals were for cases of IUGR and oligohydramnios, and 98 (14%) were preterm referrals. A total number of 276 (47%) deliveries were performed via caesarean section. A total of 35 patients were discharged antepartum, and there were nine maternal deaths. Additionally, 148 neonates required ICU admissions, 225 were preterm, and 558 babies were discharged.

Conclusion: Referrals were made for both maternal and foetal causes. The majority of obstetric admissions in our institution were referrals, resulting in an increased delivery rate and a higher trend of caesarean section. The presence of a well-equipped NICU also contributed to the referral pattern.

Keywords: Antepartum, Basic emergency obstetric and newborn care, Caesarean section, Transportation delay

INTRODUCTION

A referral is a process in which a health worker at one level of the health system, having insufficient resources to manage a clinical condition (drugs, equipment, skills), seeks the help of a better or differently resourced facility at the same or higher level to assist in. [World Health Organisation (WHO)] [1]. Pregnancy-related morbidity and mortality are preventable. Appropriate prenatal care promotes maternal and foetal well-being. According to WHO (International disease classification), conditions related to pregnancy, childbirth, and the puerperium account for 10% of general clinical practice and 19% of hospital admissions, while diseases related to the genital system account for 5% [2].

The availability of adequate emergency care for obstetric emergencies is central to achieving the National goal (National Health Mission) of reducing Measles, Mumps, Rubella (MMR) to 100 per 100,000 live births [3]. Achieving 100% institutional delivery is one of the keys to achieving this [4]. With the development of Emergency Obstetric Care (EmOC), the trend of hospitalisation for obstetrics has changed. Now pregnant women are admitted either in labour or prior if they have high-risk pregnancies [4].

Identifying high-risk antenatal cases as early as possible and timely referring them to a centre with appropriate skilled care can significantly improve fetomaternal outcomes. The referral system plays a pivotal role in a developing country like India, where the majority of the population live in rural areas lacking access to essential obstetric services [4].

Timely and prompt intervention of high-risk obstetric cases can significantly reduce fetomaternal morbidity and mortality. Unmet obstetric needs can be better monitored if primary, secondary, and tertiary levels of healthcare are linked through an established communication and transport system. An active referral system ensures a close relationship between every level of healthcare delivery system, i.e., primary, secondary, and tertiary healthcare. It also ensures that the public receives optimal healthcare adjacent to their residence [4].

Assam Medical College and Hospital (AMCH) receives referrals from Primary Health Centres (PHCs) in the Dibrugarh district, tea garden hospitals, neighbouring districts, and from the states of Arunachal Pradesh and Nagaland. Since the district of Dibrugarh does not have a District Hospital (DH) or a civil hospital, which are secondary level healthcare centres, AMCH receives referrals from all primary level centres and tea garden hospitals in the district. Therefore, at times, cases that could be managed at these secondary level centres are also being managed at the tertiary level centre, increasing the patient load in the obstetrics unit of AMCH. This study was undertaken to examine the referral pattern, the delays and challenges in the referral

system, identify different characteristics of obstetric admissions, and assess the fetomaternal outcome.

MATERIALS AND METHODS

A cross-sectional hospital-based observational study was carried out in the Department of Obstetrics and Gynaecology, Assam Medical College and Hospital, Dibrugarh, from July 1, 2021, to June 30, 2022. Institutional Ethics Committee (H) clearance was obtained (No. AMC/EC/PG/5461). The patients were explained in their regional language about the protocol and the objective of the study, and written informed consent was obtained.

Sample size calculation: Considering a 95% confidence interval with a margin of error of 3% and a non-response rate of 10%, and assuming obstetric referrals to account for 82.4% of total obstetric admissions, the sample size for the study was calculated to be 700 [3].

Inclusion criteria: A total of 700 consecutive referred obstetric patients admitted through emergency triage and the Antenatal Out Patient Department (ANOPD) in the Department of Obstetrics and Gynaecology, who gave informed consent, were included in the study.

Exclusion criteria: Referred patients who denied consent to be included in the study and booked patients were also excluded.

Detailed history, complete physical and obstetric examination, and relevant investigations were conducted. The study variables included the place of referral, gestational period at referral, proper documentation at referral, reason for referral, reason for delay, mode of delivery, and NICU admission status.

STATISTICAL ANALYSIS

All the collected data was compiled in a Microsoft Excel Worksheet, and computer-based analysis was performed using the Statistical Product and Service Solutions (SPSS) 20.0 software. The categorical variables were summarised as proportions and percentages.

RESULTS

Out of the total 18,245 obstetric admissions during the study period, approximately 14,500 patients were referred, accounting for 80% of all admissions. A total of 350 (50%) were primigravida, while 344 (49%) were multigravida.

The most common place of referral was the DH with 245 (35%), while private hospitals and clinics were the least common places of referral with 84 (12%) [Table/Fig-1].

Place of referral	Number	Percentages
Primary Health center (PHC)	196	28
Community Health Center (CHC)	175	25
District Hospitals (DH)	245	35
Private hospital and clinics	84	12
Total	700	100

[Table/Fig-1]: Place of referral.

Most of the study participants, 413 (59%), experienced no delay. The most common reason for delay among the study participants was transportation delay, with 147 (21%) [Table/Fig-2].

Reasons for delay	Number	Percentage
Decision making	63	9
Transportation	147	21
Arrangement	77	11
No delay	413	59
Total	700	100

[Table/Fig-2]: Reason for delay.

Most of the study participants were referred during the intrapartum period, accounting for 46% [Table/Fig-3].

Period of pregnancy	Number	Percentages
Antepartum	315	45
Intrapartum	322	46
Postpartum	63	9
Total	700	100

[Table/Fig-3]: Period of pregnancy during referral.

Almost 92% (644) of the participants had referral slips attached, while only 56 (8%) did not have the slips attached. Only 228 (32.6%) of the referral slips had relevant information. The most common reason for referral was IUGR/Oligohydramnios, with 112 (16%), followed by preterm, with 98 (14%) [Table/Fig-4]. Postpartum referrals accounted for 9% of the referral cases. They were referred with various reasons such as postpartum eclampsia, anaemia, or being outside delivered but referred for NICU admission, as NICU is available only in our college in the nearby area. Out of 63 postpartum referrals, 11% (7) were referred for NICU admission. A total of 16% (10) were referred for anaemia, 17% (11) for postpartum eclampsia, and 45% (29) were referred for postpartum haemorrhage. The causes of others were overlapping. LSCS accounted for 47% of the deliveries, which is the major mode of delivery [Table/Fig-5].

Reasons for referral	Number (n=700) (with overlap)	Percentages
Preterm labour	98	14
Previous CS in labour	84	12
Multifoetal gestation	70	10
Hypertensive disorders of pregnancy	63	9
Eclampsia	28	4
Antepartum haemorrhage	56	8
Postpartum haemorrhage	28	4
IUGR/oligohydraminos	112	16
Prelabour rupture of membrane	84	12
Intrauterine foetal death	21	3
Abortions and related	49	7
Foetal distress	57	8.2
Cephalo pelvic disproportion	10	1.4
Obstructed labour	10	1.4
Medical disorders of pregnancy	22	3.1
Severe anaemia	63	9
Ectopic pregnancy	7	1
Postpartum referral	63	9
Ruptured uterus	6	0.8
Sepsis	56	8
Severe systemic infection	49	7

[Table/Fig-4]: Reasons for referral.

Mode of delivery	Number	Percentages
LSCS	204	34.5
LSCS with sterilisation	72	12.1
Caesarean hysterectomy	6	1
Preterm spontaneous vaginal delivery	98	16.6
Term spontaneous vaginal delivery	152	25.6
Low forceps delivery	12	2.0
IUD expulsions	21	3.5
Abortion expulsion	21	3.5
Exploratory laparotomy	7	1.2
Total	593*	100

[Table/Fig-5]: Mode of delivery.
5% (35) of patients were discharged antenatally after admission and treatment whereas 9 had mortality

The majority of the study participants were discharged (686, 98%). Nine patients (1.3%) died, with four deaths due to postpartum haemorrhage, two due to sepsis, two due to eclampsia, and one patient having both eclampsia and postpartum haemorrhage. Five patients (0.7%) were shifted to other specialties for further management, and three were eventually discharged from their respective departments. Two patients died [Table/Fig-6].

Maternal outcome	Number	Percentage
Discharge	686	98
Shifted to other speciality	5	0.7
Maternal mortality	9	1.3
Total	700	100

[Table/Fig-6]: Maternal outcome.

A total of 148 participants (26.5%) required NICU admission [Table/Fig-7]. The common indications for NICU admission were birth asphyxia (11.5%, 17), jaundice (39%, 58), sepsis (10.8%, 16), prematurity (30%, 44), meconium aspiration syndrome (5, 3.3%), cyanotic heart disease (4, 2.7%), and transient tachypnoea of newborn (4, 2.7%).

The total number of neonatal deaths was 47 (7.7%), and 5 (0.8%) were shifted to other specialties [Table/Fig-8].

NICU admission	Number (n=560)	Percentages
Yes	148	26.5
No	412	73.5
Total	560*	100

[Table/Fig-7]: NICU admission.
A total of 560 is taken as total here. 544 were delivered in our hospital, seven babies delivered in other hospitals but were referred for NICU admission and nine babies were sick babies of the postpartum mothers who were referred for some other complications

Neonatal outcomes	Number (n=610)	Percentages
Discharged	558	91.5
Shifted to other speciality	5	0.8
Neonatal death	47	7.7
Total	610*	100

[Table/Fig-8]: Neonatal outcomes.
610* This number includes the number of live births in present study which is 544, seven primary neonatal referral and 59 neonates that are admitted with the mothers who were referred postpartum

DISCUSSION

In the present study, the authors found that most of the referrals were from government hospitals, with only 12% from private clinics. This is similar to studies conducted by Kumari A et al., and Prakash G et al., where most of the referrals were from CHCs and DHs [5,6]. Kumari A et al., showed PHC referrals to be 25.56% and DH referrals to be 33.05%. Prakash G et al., showed CHC referrals to be 30.83% and DH referrals to be 33.05%. However, Jakhar R and Chaudhary A showed that most of the referrals were from CHCs (62.84%) [7]. Jakhar R and Chaudhary A also demonstrated the least number of referrals from private clinics, amounting to only 0.88% [7]. This shows that most of the participants seek medical care from government setups nowadays. Unnecessary referrals can be reduced by training health workers in essential and EmOC, which will also help in reducing morbidity and mortality.

Only 9% of patients were referred in the postpartum period. This is similar to studies conducted by Goswami D and Mahendra G et al., where 11.69% and 8.8% of patients, respectively, were referred postpartum [8,9].

There were no delays in 59% of the population in the present study. Similarly, the studies conducted by Kumari A et al., and Jakhar R and Chaudhary A did not document delays in 47.46% and 59.7% of patients, respectively [5,7]. Delay in transport is the main cause of referral delay, accounting for 21% in present study and 21.5% in Jakhar R and Chaudhary A (2019) [7]. Kumari A et al., reported a delay of 20.06% due to transport [5]. The referred patients in the present study were able to reach the hospitals without any delay due to the 108 MRITYUNJOY services, which have been functional 24/7 in the state of Assam since 2008.

In the present study, the main mode of delivery for referred patients was lower section caesarean section, accounting for 47%. This contrasts with other studies like Dalal S et al., where it was 27.67% [10].

The most common reason for referral in the present study was foetal indication, specifically IUGR and oligohydramnios, which is similar to the findings of Shenoy HT and Mammen KE [11]. The second most common reason was preterm labour, which accounted for 14% in the present study and is consistent with other studies like Prakash G et al., and Shenoy HT and Mammen KE [Table/Fig-9] [5,6,11]. Previous LSCS was also a major cause of referral in almost all the studies mentioned above, indicating an increasing trend in caesarean section rates in the Indian population. Further studies are needed to evaluate the reasons for this trend.

Causes for referral	Percentage in each study			
	Kumari A et al., [5]	Prakash G et al., [6]	Shenoy HT and Mammen KE [11]	Present study
Preterm labour	4.8	20	12	14
Hypertensive disorders of pregnancy	16.74	14.19	8	9
APH	5.58	5.16	7	8
PPH	6	-	5	4
IUGR and oligohydramnios	6.7	3.87	14	16
PROM	4.8	4.51	12	12
IUFD	1.83	3.95	5	3
Previous LSCS	12.78	16.77	11	12
Ruptured uterus	0.64	2	-	0.8
Sepsis	2	1.6	-	8

[Table/Fig-9]: Comparison between cause of referrals in present study vs published studies [6,7,12].

Maternal mortality in the present study was 1.3%, with a total of nine deaths. Similar results were found in other studies like Prakash G et al., where the maternal death rate was 2.5% of the total study population [6]. Present results also correspond with studies conducted by Patel R et al., and Kumari A et al., where the maternal death rates were calculated to be 4.94% and 0.8%, respectively [3,5]. Our country has been witnessing a decreasing trend in maternal mortality, with rates decreasing from 130 in 2014-2016 to 103 in 2017-2019 [12].

Out of the 560 neonates included in the study, 26.5% (148) were admitted to the NICU. This contrasts with the study conducted by Rathi C and Gajiria KSN where NICU admission was 56% [13]. However, this is similar to the studies conducted by Prakash G et al., (2022) and Khade SA et al., where only 18.42% and 14.13% of neonates, respectively, were admitted to the NICU [6,14]. This contrast may be due to the fact that Rathi C and Gajiria KSN had a smaller sample size of 124, compared to present study of 700 cases [13]. Additionally, Khade SA et al.'s (2021) study was based in Mumbai, where the delay in referral or third delay might be less, leading to fewer NICU admissions [14].

Limitation(s)

During the study period, it was not possible to recruit all the referred patients due to time constraints. Additionally, the lack of proper and adequate documentation on the referral slips was a contributing factor. The authors did not investigate the reasons for referral such as human resources, infrastructure limitations, and equipment constraints.

CONCLUSION(S)

The reasons for obstetric referrals included both maternal and foetal causes, such as foetal distress, intrauterine growth restriction, and maternal conditions like oligohydramnios and previous caesarean section. The most common cause of referral delay was transportation. Timely referrals have led to a decrease in maternal and perinatal mortality. It is important to raise awareness among antenatal mothers and their family members about warning signs and when to seek medical attention to prevent delays. Furthermore, efforts should be made to enhance the capacity of primary and secondary centres by improving infrastructure, increasing manpower, ensuring blood availability, and providing necessary equipment. This would help reduce transportation delays and alleviate the burden on tertiary care hospitals.

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