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Original Research Article

Pathways of care for the obstetric cases referred to a tertiary care centre in North-East India: a prospective analysis

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ABSTRACT

Background: The referral system is crucial in emergency obstetric situations thereby reducing maternal morbidity and mortality along with improving neonatal outcomes. We aim to study the baseline characteristics of referred obstetric patients, analyse the reason for referral and determine the fetomaternal outcome of the referred patients.

Methods: This was a prospective observational study conducted in a tertiary referral centre in Shillong, Meghalaya. Categorical variables were presented as frequency and percentages. Continuous variables presented as mean (SD). The predictors of adverse outcomes determined using chi square test. A p-value < 0.05 was considered statistically significant.

Results: The total number of referred cases in the study period was 500. The majority 300 (61%) from the age group < 30 years and multi-gravida 59%. The majority 282 (57%) referring centres were within the radius of 20 km from the tertiary health care institute. The commonest indication of referral was Labour abnormalities 47 (9%). The maternal outcomes accounts for 454 (90.8%) went for discharges, 38 (7.6%) were shifted to ICU, 7 (1.4%) cases expired and 1 went for LAMA. Perinatal outcomes, 70.9% were Live Birth, 7.5% were shifted to the NICU, 7.5% were pre-term, 7.4% were stillbirth, and 6.7% were abortion cases.

Conclusions: In order to create an efficient referral system, the peripheral health care system must be strengthened with adequate, competent individuals and a robust referral mechanism in place. Prompt referrals accompanied with thorough and detailed referral slips may be helpful in facilitating early action.

Keywords: Referral centres, Causes of referral, Maternal outcomes, Tertiary health care, North-East India

INTRODUCTION

The referral system is an integral component of any health care system especially in emergency obstetric situations where the survival and degree of materno-fetal morbidity are directly dependent on early recognition of a complication, its prompt initial management and appropriate care during transport.¹ This is especially important in the situation of complicated pregnancies where two or more lives are at stake and timely identification of high risk and complicated obstetric cases can reduce maternal morbidity, arrest maternal deaths and improve neonatal outcomes. Referral services for

identification and referral of high-risk pregnancies are an integral part of maternal and child health services.² The three-tier health care delivery system was conceived in such a manner that the patients in need of a higher level of expertise and care could be referred accordingly from primary to secondary directly to tertiary level centre. The Prevention of Maternal Mortality (PMM) network study has proposed a three-delay model for referrals in obstetric and gynaecological emergencies.³ Thus along with providing care at tertiary centres, it has become essential to assess the existing health service facilities in order to evaluate deficiencies and strategize interventions based on clinical evidence to curtail the delay time to treatment. An

efficient referral system provides access to treatment and skills by linking different levels of care through appropriate referrals.⁴ To refer a patient is a medical decision and depends on many things including the skills of the referring staff, the tools for diagnosis, the availability of a health institution with specialist facilities, the quality of care at the referral institution, the cost of care, distance, transportation, communication, someone to travel with the patient, and feasibility of travel by the patient.⁵ The type of obstetric complication determines the level of care needed and the place to be referred to, and this makes the referral pathways complex.⁶

Compliance to referral may depend on the counselling skills of the referrer, the socio-cultural beliefs of the patient and her family, and perceptions of the quality of care.⁷ A recent systematic review on interventions to improve referral systems and transportation for EmOC in developed country settings observed that most programs focus on birth preparedness, complication readiness, availability of transport, and costs of transport.⁸ The interventions included in the review focused on improving self-referrals, with only a few on interventions to improve referrals between institutions, the number and quality of institution-referrals, and transport for between-institution transfers. India accounts for a fifth of annual global maternal deaths (56,000) and the Maternal Mortality Ratio (MMR) is estimated to be 91/100,000 live births.⁸ India has implemented many interventions to reduce the MMR, including schemes to strengthen health infrastructure and to improve the proportion of institutional deliveries.⁹ Maternal death reviews from India suggest that most of the mothers who died had gone through multiple referrals before reaching the appropriate facility.^{9,10}

Usually, no records relating to referrals between institutions are kept and no referral slips or communication about the referred case is provided to the next level institution. There is no routine feedback mechanism or routine monitoring of the appropriateness of referrals in India.¹¹ The World Health Organization estimates that at least 88-98% of maternal deaths can be averted with timely access to existing, emergency obstetric care using effective and efficient referral systems. Timeliness and appropriateness of referral are a challenge to obstetricians, since the delay in referral affects the maternal and perinatal outcome adversely, hence identification of “at risk” patients and obstetric emergencies and timely referral is of immense importance.¹²

Aim

To analyze the characteristics of the referring center to determine effectiveness of current referral system.

Objectives

The study aims to evaluate the baseline characteristics of obstetric patients who are referred to the tertiary care

center, analyze the reasons for their referral, and determine the fetomaternal outcomes among these patients.

By examining these aspects, the study seeks to provide insights into referral patterns, identify common complications or risk factors, and assess the impact of timely referral on both maternal and neonatal health.

METHODS

Study design and area

This is a prospective observational study wherein all referred antenatal cases to NEIGRIHMS between January 2021 to January 2026 in Department of Obstetrics and Gynaecology, NEIGRIHMS, Shillong are included.

Data related to baseline characteristics of the Antenatal patient, referral details and fetomaternal outcome are analysed.

Selection criteria

Inclusion criteria

The referred obstetric patients managed by the Department of obstetrics and gynaecology in the antenatal ward, labour room and postnatal ward are included.

Exclusion criteria

Booked cases at our tertiary care institute, referred cases <20 weeks gestation, post-partum referrals and self-referrals.

Data collection and procedure

The particulars noted includes detail of age of patient, address, presenting complaints, history of events during current pregnancy including antenatal care, obstetric history, past history, menstrual history, general, systemic, abdominal, vaginal examination findings at admission, details noted in reference slip, i.e. referring centre, reason for referral, type and distance of referring centre, time taken to reach NEIGRIHMS from referring centre, Investigations done and treatment given at referring centre, details of delivery (vaginal/LSCS), maternal outcome (ongoing pregnancy, abortion, preterm delivery, full-term delivery, mortality) and fetal outcome (live birth, Stillbirth, NICU admission, abortion)

Statistical analysis

Statistical analysis was done using the statistical software namely IBM SPSS statistics version 22. Categorical variables will be presented as frequency and percentages. Continuous variables will be presented as mean (SD). The predictors of adverse outcomes will be determined using chi square test. A p-value<0.05 will be considered statistically significant.

Ethical consideration

Ethical clearance required for the study was taken from the Institute Ethic Committee. Confidentiality and anonymity of information were maintained.

RESULTS

500 obstetric cases were referred to the Department of Obstetrics and Gynaecology, NEIGRIHMS, Shillong, Meghalaya, during the study period. The mean age of patients referred is 27 years old.

Table 1: Distribution of cases according to age.

Age (in years)	Number of cases	%
<30	304	61
30-40	182	36
>40	14	3

Table 1 shows the distribution of cases according to age. The majority 300 (61%) of cases being referred were from the age group <30 years old women, 178 (36%) were from the age group 30-40 years and 14 (3%) were from the age group of >40 years old.

Table 2: Distribution of cases according to parity.

Parity	Number of cases	%
Nulli	6	1
Primi	116	23
Multi	293	59
Grandmulti	85	17

Table 2 shows the distribution of cases according to parity. 6 (1%) of cases were Nulli-gravida, 113 (23%) were primi-gravida and the majority 59% of the cases referred were multi-gravida, and 17% were Grand-multigravida.

Table 3: Distribution of cases according distance.

Distance (in km)	Number of cases	%
<20	286	57
21-40	54	11
41-60	93	19
61-80	22	4
81-100	33	7
101-120	2	0.4
121-140	1	0.2
>141	9	2

Table 3 shows the distribution of cases according to distance of the referring centre to the tertiary health care institute. 282 (57%) referring centres were within the radius of 20 km from the tertiary health care institute, 53 (11%) centres were 20–40 km and 91 (18%) centres were 41–60 km away from the tertiary health care institute, 22 (4%) and 32 (7%).

Referring centres were 61–80 km and 81–100 kms away from the tertiary health care institute, 2 (0.4%) and 1 (0.2%) centre were within 101–120km and 121–140 km away from the tertiary healthcare institute. 9 (2%) referring centres were more than 141 km away from the tertiary health care institute.

Table 4: Distribution of cases according cause of referral.

Cause of referral	Number of cases	%
Labour abnormalities	47	9
Pre-eclampsia	36	7
Unavailability of doctor/facility/resources	36	7
Oligohydramnios	33	6.6
Others	33	6.6
Previous LSCS	31	6.2
PROM	27	5.4
Eclampsia	25	5
Hypertensive disorder	22	4
Placenta previa	22	4
APH	22	4
Safe confinement	19	3.8
Heart diseases	18	3.6
Breech presentation	17	3.4
Multiple pregnancy	16	3.2
Ectopic pregnancy	15	3.0
Anaemia	14	2.8
Fetal distress/IUGR/IUFD	11	2.2
Abortion	10	2
Retrovirus positive	9	1.8
Obstructed labour	7	1.4
Abruption placenta	7	1.4
Sepsis/shock	6	1.2
PPH	5	1.0
Gestational diabetes	4	0.8
Polyhydramnios	4	0.8
Retained placenta	4	0.8

Table 5: Distribution of cases according to mode of delivery.

Mode of delivery	Number of cases	%
NVD	112	22.81059
LSCS	346	70.46843
Abortion	33	6.720978

Table 4 shows the various indication of referral to the tertiary care centre. The commonest indication of referral was labour abnormalities about 47 (9%) which includes early labour, prolonged labour, pre-term labour, CPD 36 (7%).

Table 6: Distribution of cases according to maternal outcome.

Maternal outcome	Number of cases	%
Discharge	454	90.8
Expired	7	1.4
ICU	38	7.6
LAMA	1	0.2

Pre-eclampsia and unavailability of doctor/facility/resources. 33 (6.6%) oligohydramnios, others which includes uterine prolapsed, ruptured uterus, kidney disease, UTI, PID, seizure, carcinoma/sarcoma, hematoma, polio. 31 (6.2%) previous LSCS, 27 (5.4%) PROM, 25 (5%) eclampsia, 22 (4%) hypertensive disorder, placenta previa, APH. 19 (3.8%) safe confinement, 18 (3.6%) heart disease, 17 (3.4%) breech presentation, 16 (3.2%) multiple pregnancy, 15 (3.0%) Ectopic Pregnancy, 14 (2.8%) anaemia, 11 (2.2%) fetal distress/IUGR/IUFD, 10 (2%) abortion, 9 (1.8%) retrovirus positive, 7 (1.4%) obstructed labour, 7 (1.4%) abruption placenta, 6 (1.2%) sepsis/shock, 5 (1.0%) PPH, 4 (0.8%). Table 5 shows the mode of delivery of referral to the tertiary care centre. Out of 491 referral cases 346 (70.5%) delivered by LSCS, 112 (22.9%) undergone NVD, and 33 (6.8%) were aborted cases. Table 6 shows

the maternal outcome of referral to the tertiary care centre. Out of 500 referral cases 454 (90.8%) went for discharges, 38 (7.6%) were shifted to ICU, 7 (1.4%) cases expired and 1 went for LAMA. Table 7 shows the foetal outcome of referral to the tertiary care centre. Majority referral cases 348 (70.9%) were live birth, 37 (7.5%) were shifted to the NICU, 37 (7.5%) were pre-term, 36 (7.4%) were stillbirth, and 33 (6.7%) were abortion cases. The predictors of adverse outcomes were determined using chi square test.

Table 7: Distribution of cases according to foetal outcome.

Fetal outcome	Number of cases	%
Live birth	348	70.87576
Stillbirth	36	7.331976
NICU admission	37	7.535642
Abortion	33	6.720978
Pre-term	37	7.535642

From Table 8, the results for variable factors showed that none of the predictors had a significant relationship with the maternal outcome (p-value<0.05 will be considered statistically significant). Hence, there is no significant relationship between the predictor variables and the maternal outcomes.

Table 8: The predictors of maternal adverse outcomes determined by chi square test.

Chi square test for maternal outcome						
Variables predictor	Frequency (n=500)	Discharged	Expired	ICU	LAMA	P value
Age (in years)						
<30	335	309	4	21	1	0.676
30-40	151	132	3	16	0	
>40	14	13	0	1	0	
Referred from						
Primary	170	161	1	8	0	0.172
Secondary	330	293	6	30	1	
Distance (in km)						
0-20	286	261	4	20	1	0.934
21-40	54	51	0	3	0	
41-60	93	78	2	13	0	
61-80	22	22	0	0	0	
81-100	33	31	1	1	0	
101-120	2	2	0	0	0	
121-140	1	1	0	0	0	
>140	9	8	0	1	0	
Parity						
Nulli	6	6	0	0	0	0.349
Primi	116	108	3	5	0	
Multi	293	265	1	26	1	
Grand multi	85	75	3	7	0	
Mode of delivery						
LSCS	346	307	6	32	1	0.703
Abortion	33	32	0	1	0	
NVD	112	106	1	5	0	
Others	9	9	0	0	0	

p value<0.05 will be considered statistically significant.

Table 9: The predictors of foetal adverse outcomes determined by chi square test.

Chi square test for foetal outcome								
Variables predictor	Frequency (n=500)	Abortion	NICU	Preterm	Stillborn	Live birth	Others	P value
Age (in years)								
<30	335	20	24	29	25	233	4	0.09
30-40	151	12	12	8	10	106	3	
>40	14	1	1	0	1	9	2	
Referred from								
Primary	170	10	6	12	15	126	1	0.099
Secondary	330	23	31	25	21	222	8	
Distance (in km)								
0-20	286	18	22	24	17	199	6	0.574
21-40	54	3	1	2	4	42	2	
41-60	93	5	12	6	8	62	0	
61-80	22	1	1	2	3	15	0	
81-100	33	5	1	3	3	21	0	
101-120	2	0	0	0	1	1	0	
121-140	1	0	0	0	0	1	0	
>140	9	1	0	0	0	7	1	
Parity								
Nulli	6	1	0	0	0	0	5	0.00
Primi	116	5	6	14	2	89	0	
Multi	293	20	27	22	25	197	2	
Grand multi	85	7	4	1	9	62	2	
Mode of delivery								
LSCS	346	0	35	32	36	243	0	0.00
Abortion	33	33	0	0	0	0	0	
NVD	112	0	2	5	0	105	0	
Others	9	0	0	0	0	0	9	

(p value<0.05 is considered statistically significant.). (Note: "Others" indicates women who were still pregnant and had not given birth yet).

From Table 9, the results for variable factors showed that only Parity and Mode of Delivery predictors had a significant relationship with the fetal outcome (p value <0.05 will be considered statistically significant).

DISCUSSION

This study includes 500 obstetric cases which were referred to the Department of Obstetrics and Gynaecology, NEIGRIHMS, Shillong, during the 5 years study period. The mean age of patients referred is 27 years old. The majority 300 (61%) of cases being referred were from the age group <30 years old women. These findings were similar to a study conducted by Mishra et al.¹⁴ Maximum pregnancy occurs between 21-30 years of age group in our country, due to teenage pregnancy and early marriages; we get maximum referral cases in this group. These reports indicates that teenage pregnancies are mostly associated with complications such as anaemia and preeclampsia which need much attention.¹⁴ The majority 59% of the cases referred were multi-gravida which is almost similar to the findings of a study conducted by Anavadia et al.¹⁵ The majority 282 (57%) referring centres were within the

radius of 20 km from the tertiary health care institute. 12 referrals from more than 100 km away suggested that an intermediary care centre should be built in the peripheral to enhance maternal outcomes.

The commonest indication of referral was labour abnormalities about 47 (9%) which includes early labour, prolonged labour, Pre-term labour, CPD. It is important to identify the causative factors for labour abnormalities so that proper remedial measures can be taken to reduce their occurrence or severity. 36 (7%) cases were referred due to unavailability of doctor/facility/ resources. This shows that there is a need to develop intermediary care centre in periphery to improve the maternal outcome. For intranatal outcome, the majority 70.5% referred cases were delivered by LSCS, 22.9% undergone NVD, and 6.8% were aborted cases. Aborted cases include Ectopic pregnancy, spontaneous/incomplete abortion, severe illness of mother in which pregnancy put mother's health at harm, etc. The maternal outcomes accounts for 454 (90.8%) went for discharges, 38 (7.6 %) were shifted to ICU, 7 (1.4%) cases expired and 1 went for LAMA. Perinatal outcome accounts for 70.9% were Live Birth, 7.5% were shifted to the NICU, 7.5% were pre-term, 7.4% were stillbirth, and

6.7% were abortion cases. Various types of complex obstetric cases were received in this institution, out of 500 cases, 7 were maternal deaths accounted in this study which is mostly due to morbid condition of the patient at the time of referral. The majority of maternal deaths in rural areas are still attributable to eclampsia and postpartum haemorrhage, although maternal deaths can be avoided or decreased by enhancing the health care facilities in these communities, guaranteeing trained attendants, and providing basic medication.¹⁰⁻¹⁶

CONCLUSION

In order to create an efficient referral system, the peripheral health care system must be strengthened with adequate qualified and competent health care workers, development programs and skill enhancement of doctors in the periphery in form of skills training, necessary equipment, high-quality transportation, and efficient delivery system. To produce more useful labour, a variety of training sessions can also be held. These are essential components of the referral chain system, and by putting them into practice, we can enhance the fetomaternal result. In order to prevent serious morbidities and fatalities, prompt referrals accompanied with thorough referral slips or previous case information may be helpful in facilitating early and ideal action. A well-organized referral system would assist the physician in providing critical care that could save lives- both of the mother and foetus.

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